Teach Yourself Trigonometry

Part 5 : The Circular Functions

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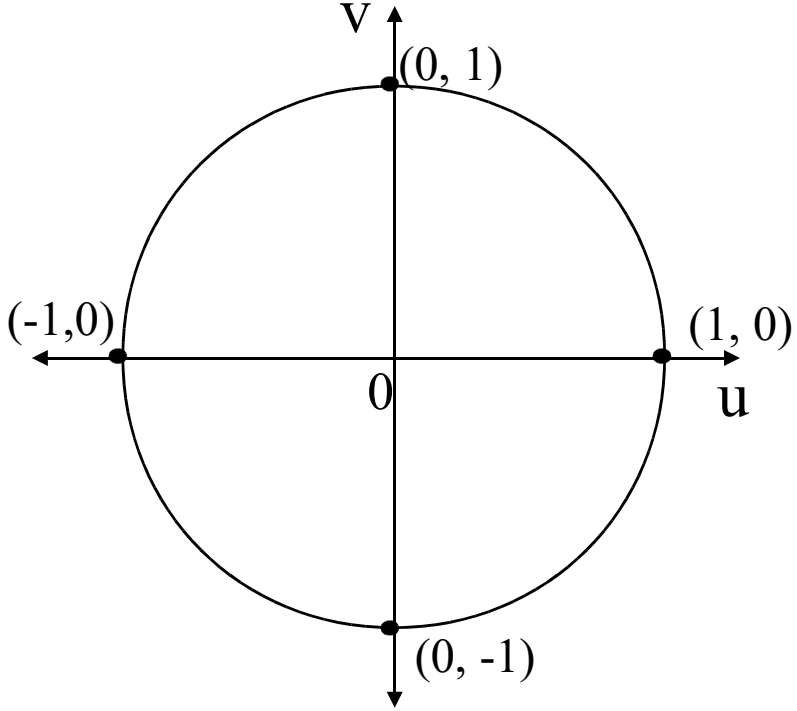
Part 5 : The Circular Functions

Once again, this lesson starts with the **unit circle**.



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Part 5 : The Circular Functions

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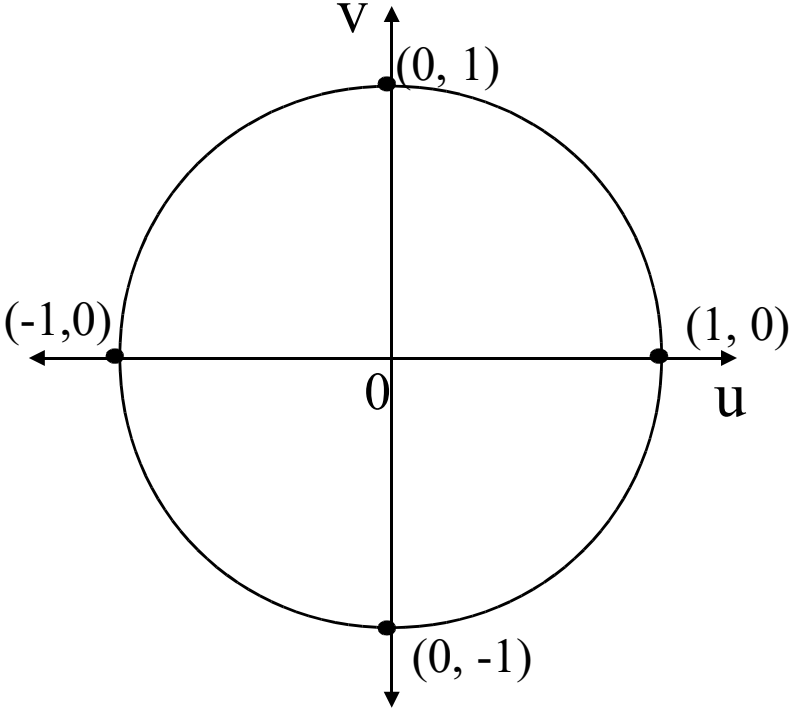

An angle is in ‘standard position’ if

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Part 5 : The Circular Functions

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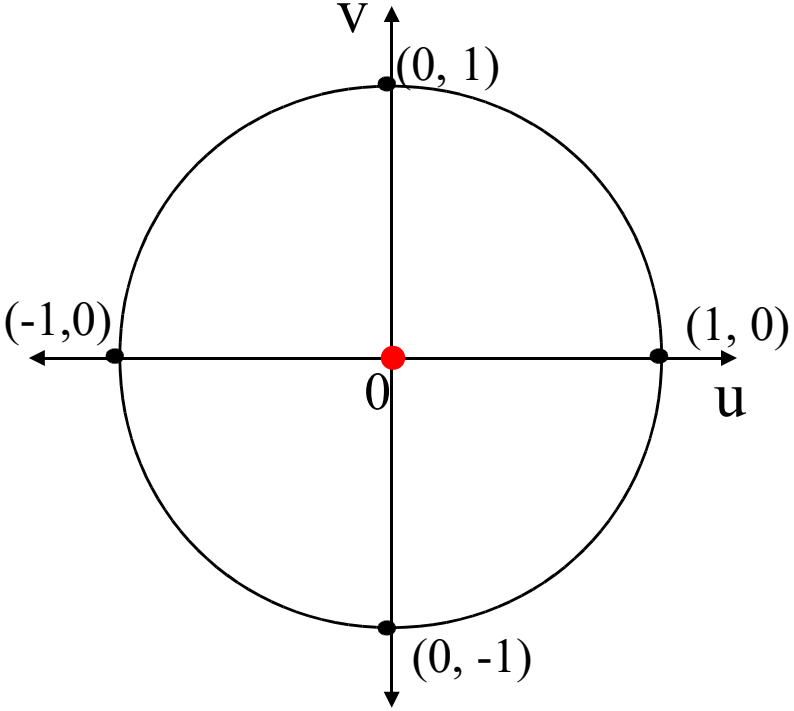

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Part 5 : The Circular Functions

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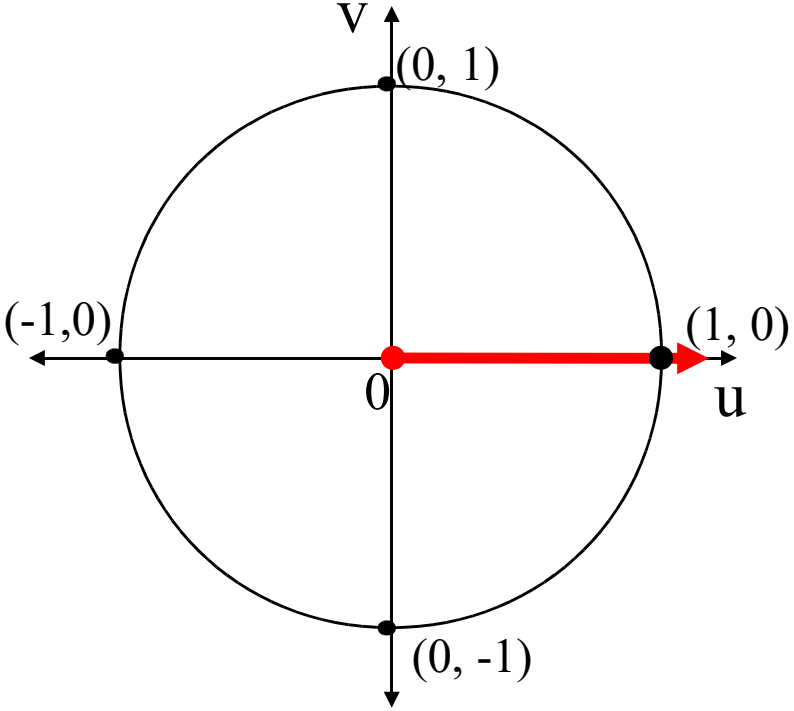

An angle is in 'standard position' if
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Part 5 : The Circular Functions

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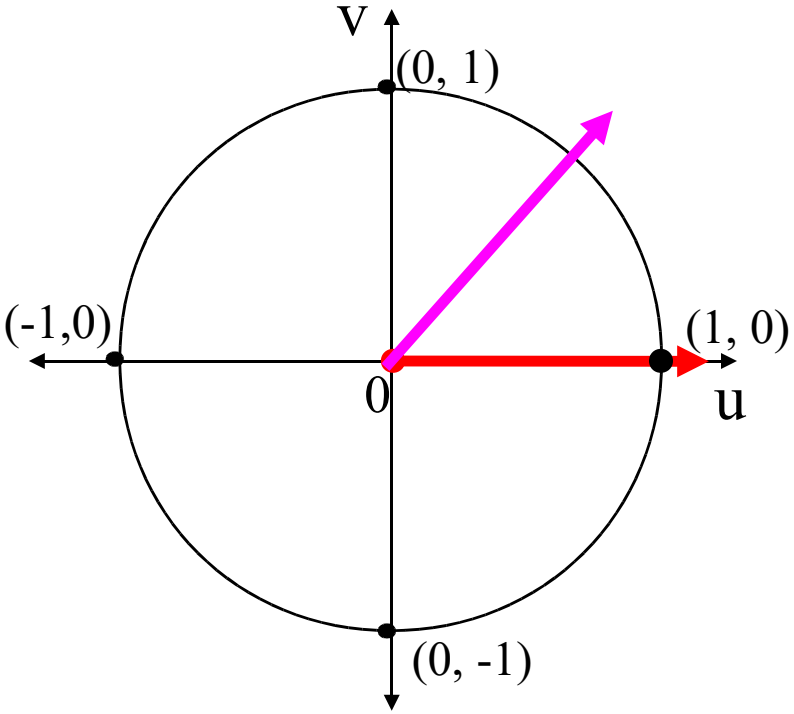

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Part 5 : The Circular Functions

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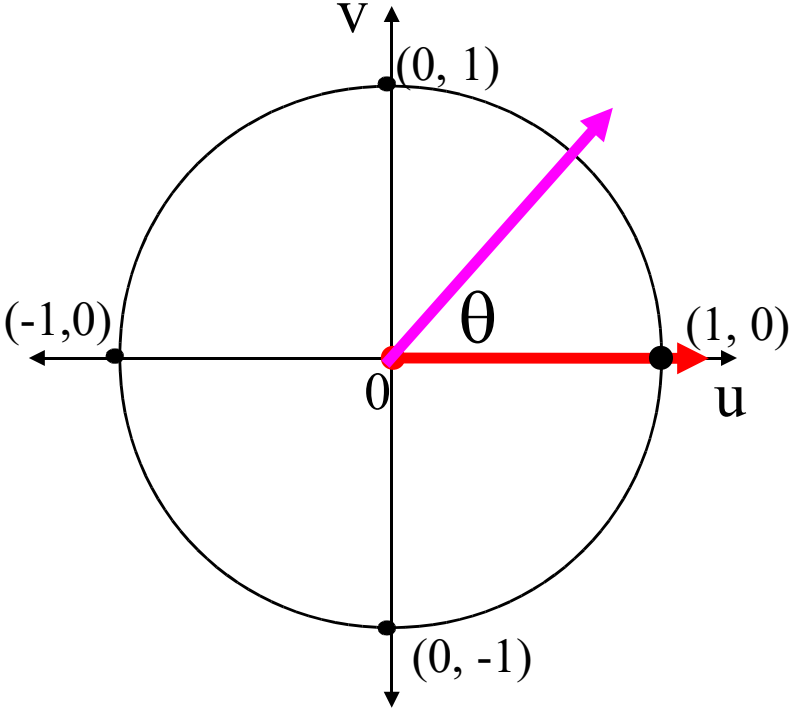

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It is common to name angles like this one θ, the Greek letter theta.

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Part 5 : The Circular Functions

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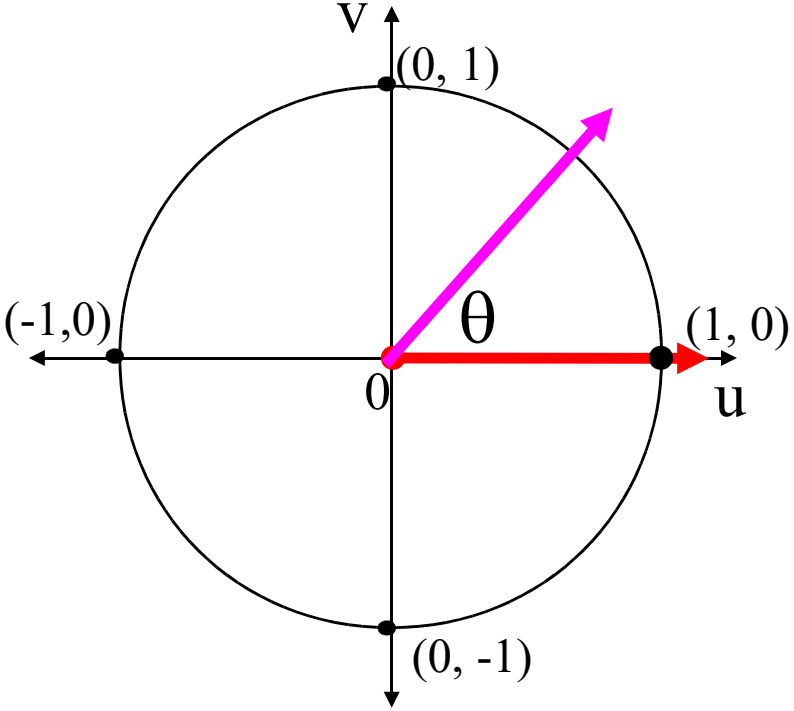

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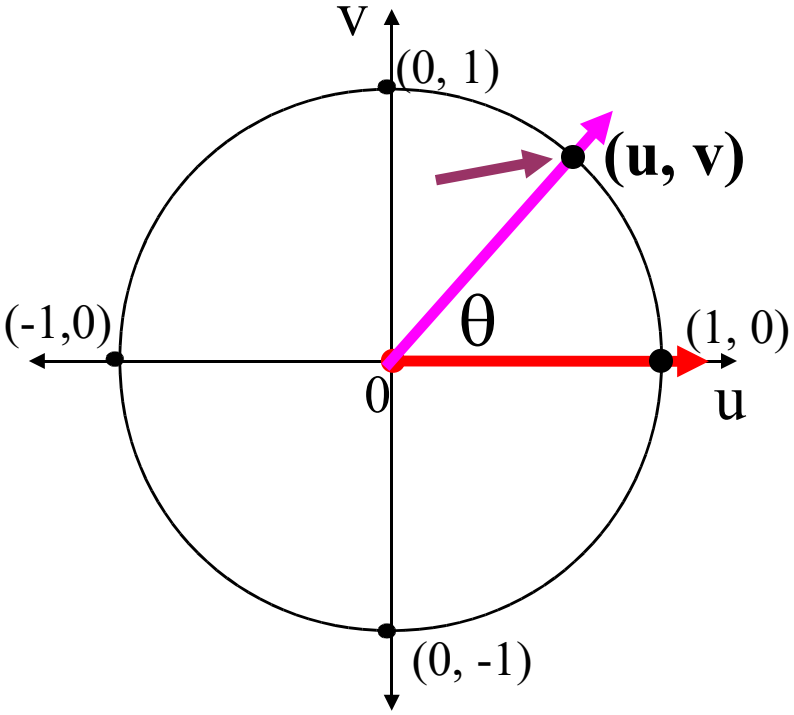

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We will focus on the point, (u, v), where the terminal side of θ intersects the unit circle.

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Part 5 : The Circular Functions

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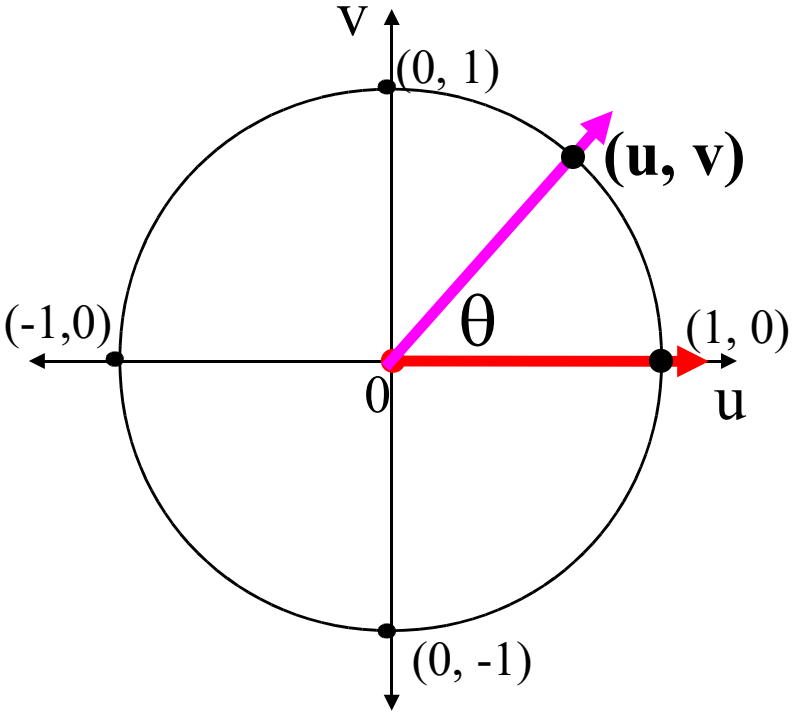

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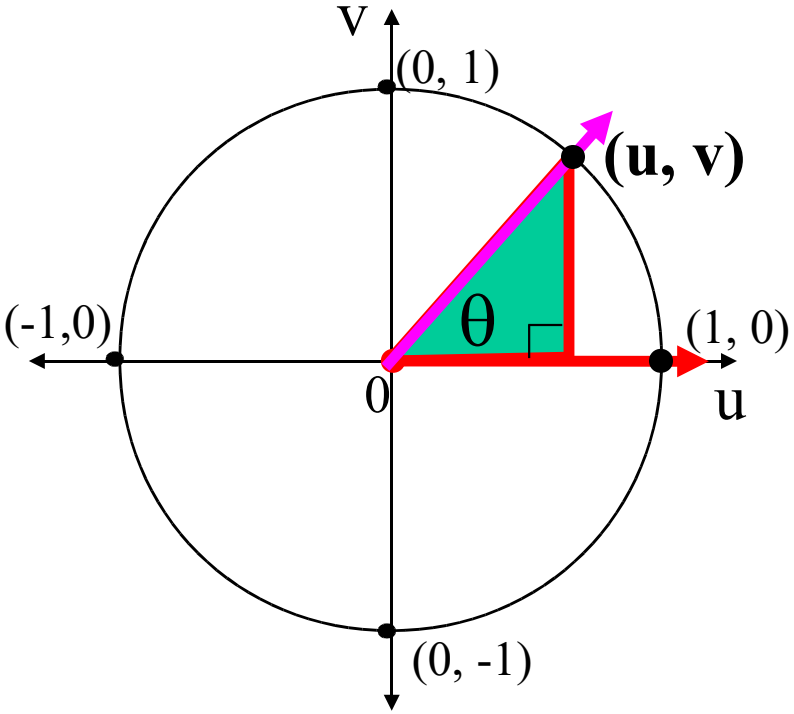

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Consider this right triangle.

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Part 5 : The Circular Functions

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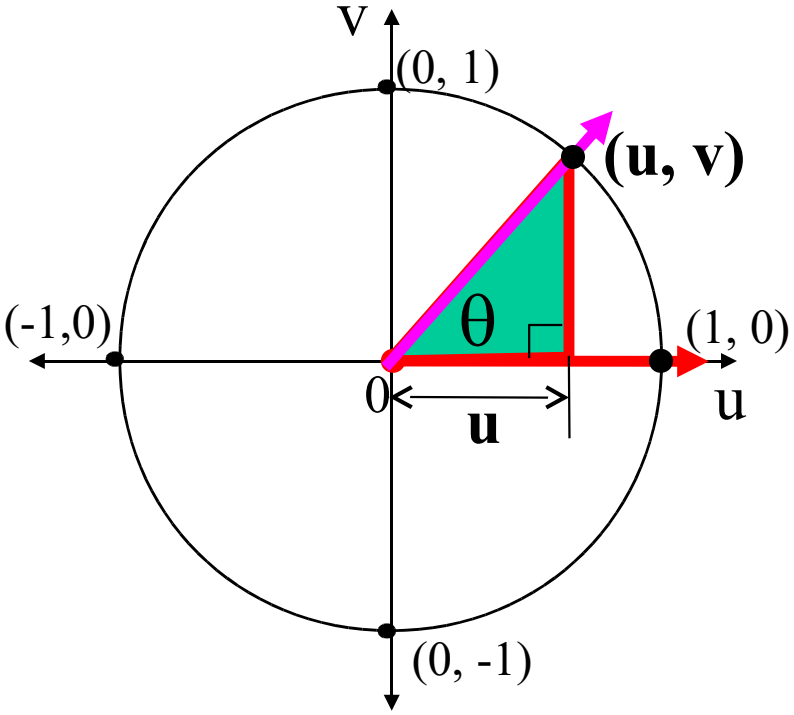

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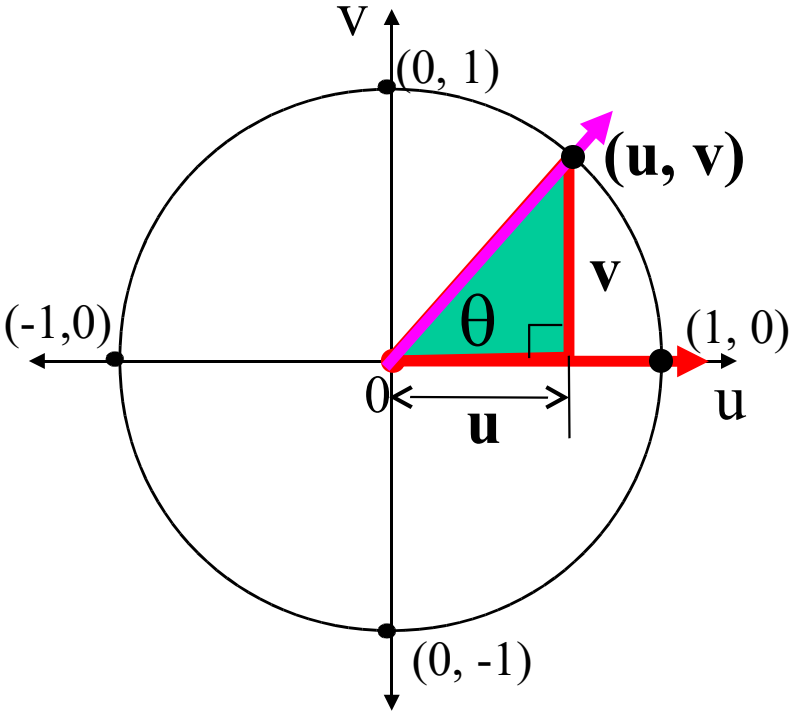

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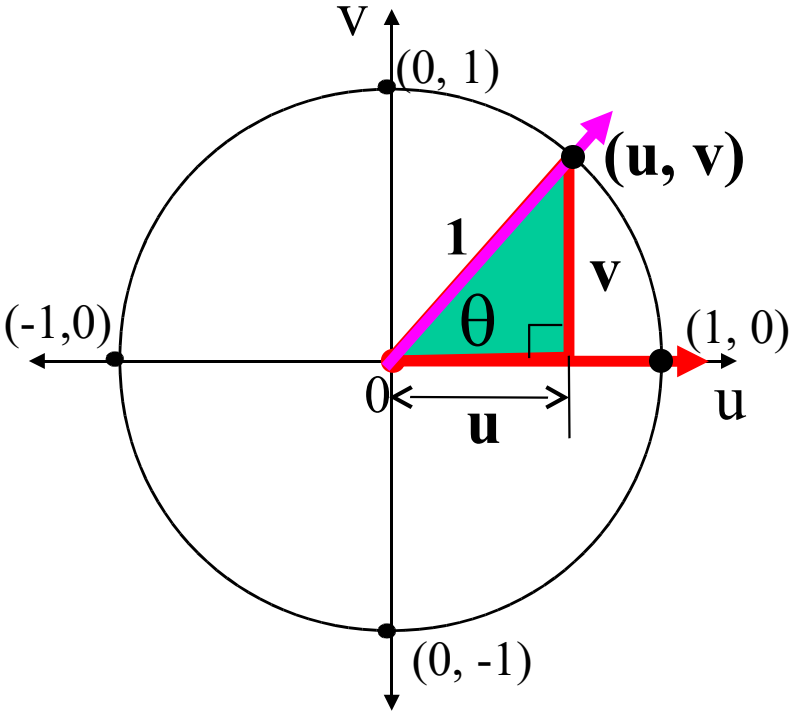

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Teach Yourself Trigonometry

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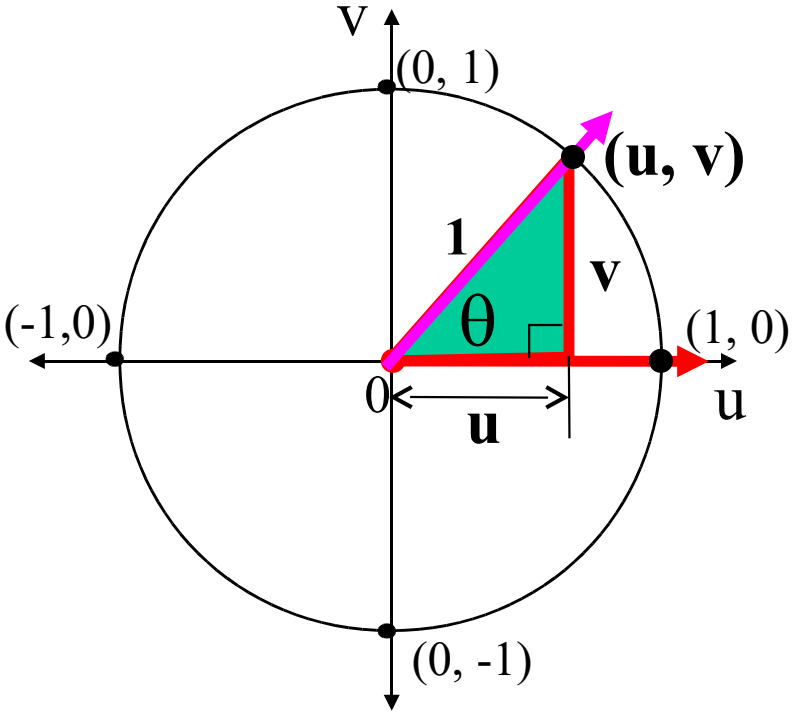

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Consider this right triangle.
Clearly, Sin θ = v

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Part 5 : The Circular Functions

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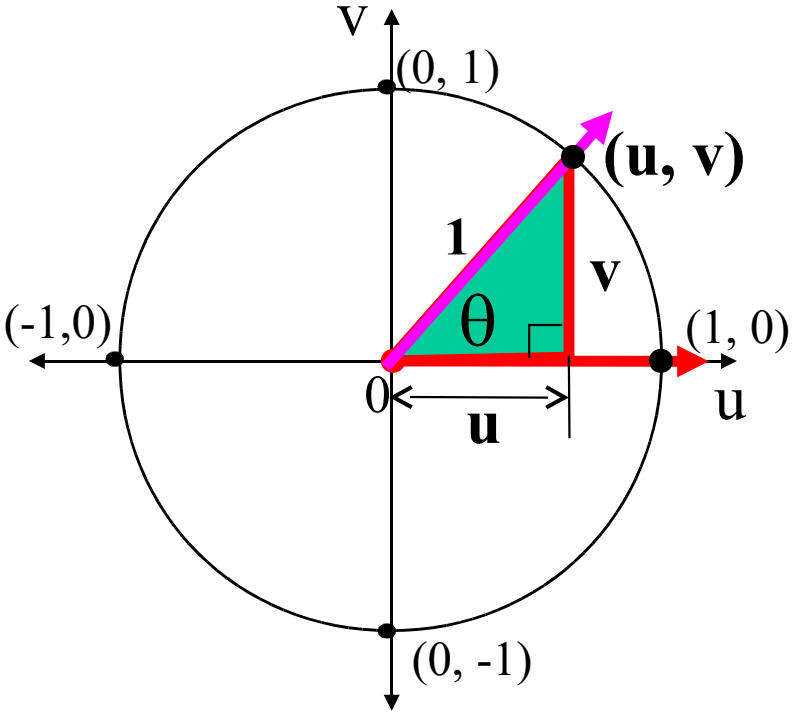

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Consider this right triangle.
Clearly, Sin θ = v and Cos θ = u.

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Part 5 : The Circular Functions

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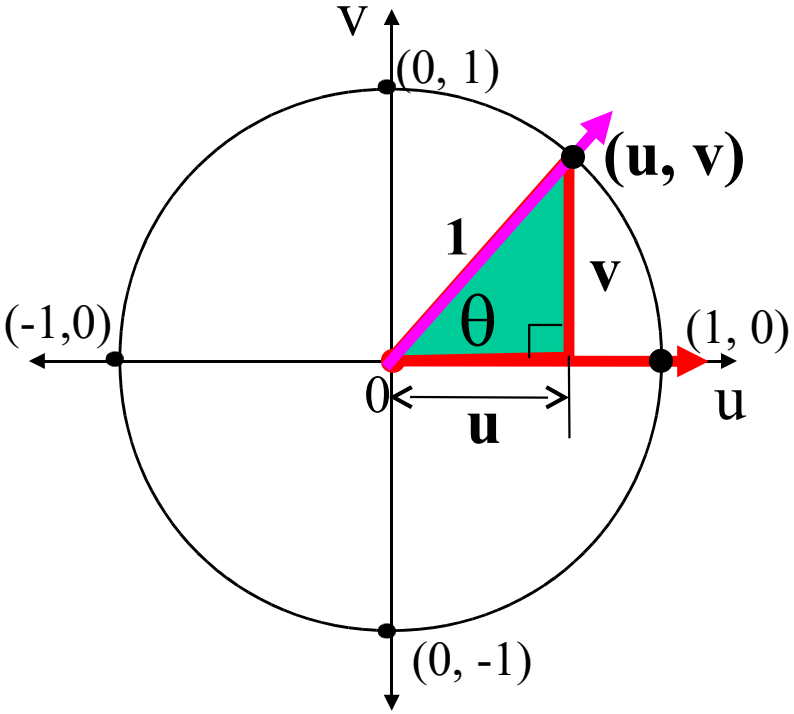

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Consider this right triangle.
Clearly, Sin θ = v and Cos θ = u.

It is important that you understand this.

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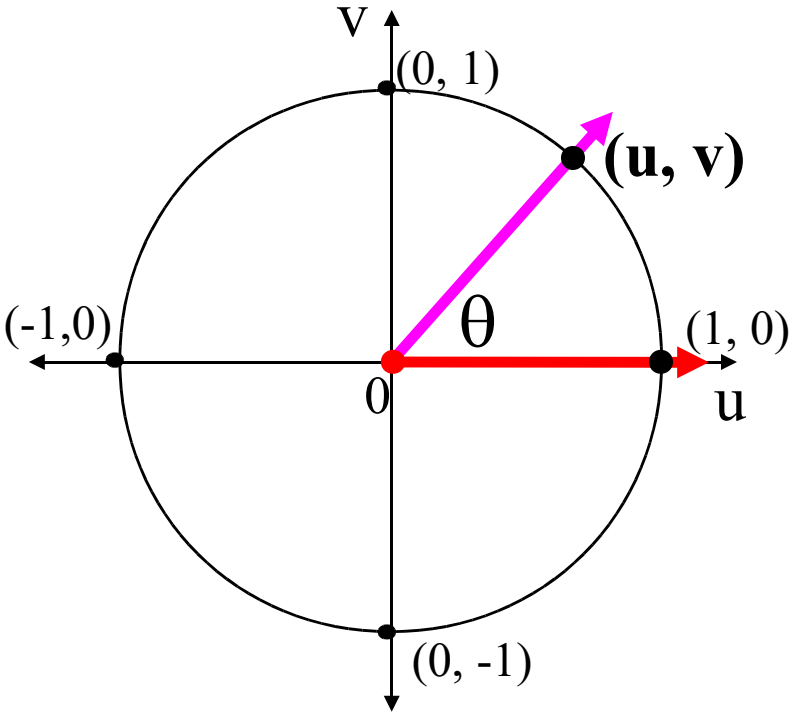
Part 5 : The Circular Functions

Sin θ = v and Cos θ = u



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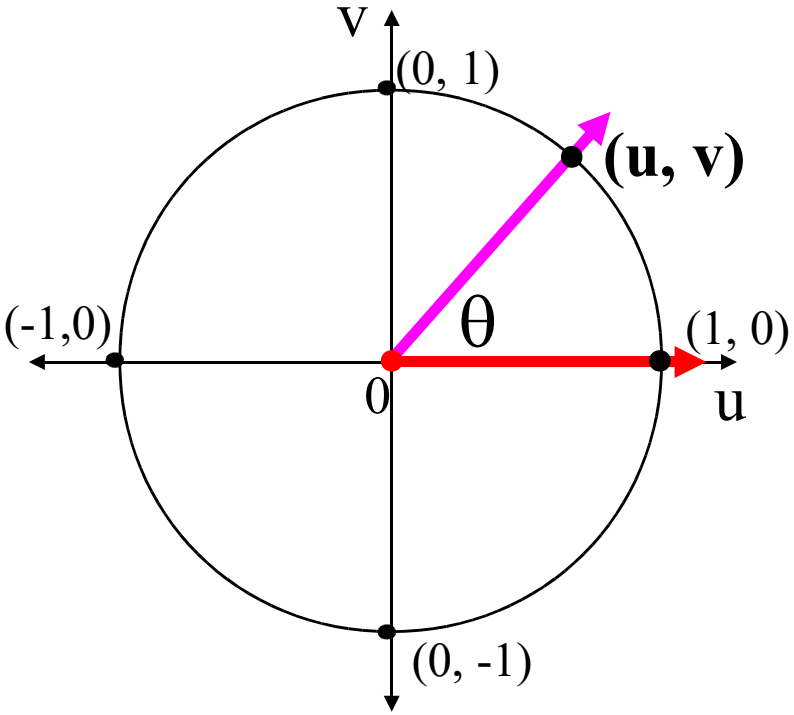
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ.

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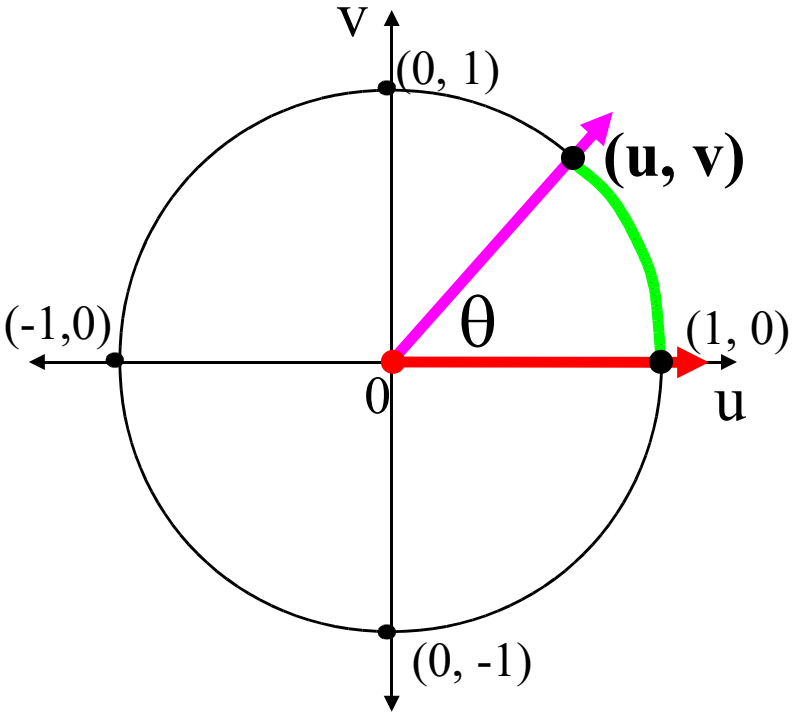
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ. This is defined to be the length of this arc

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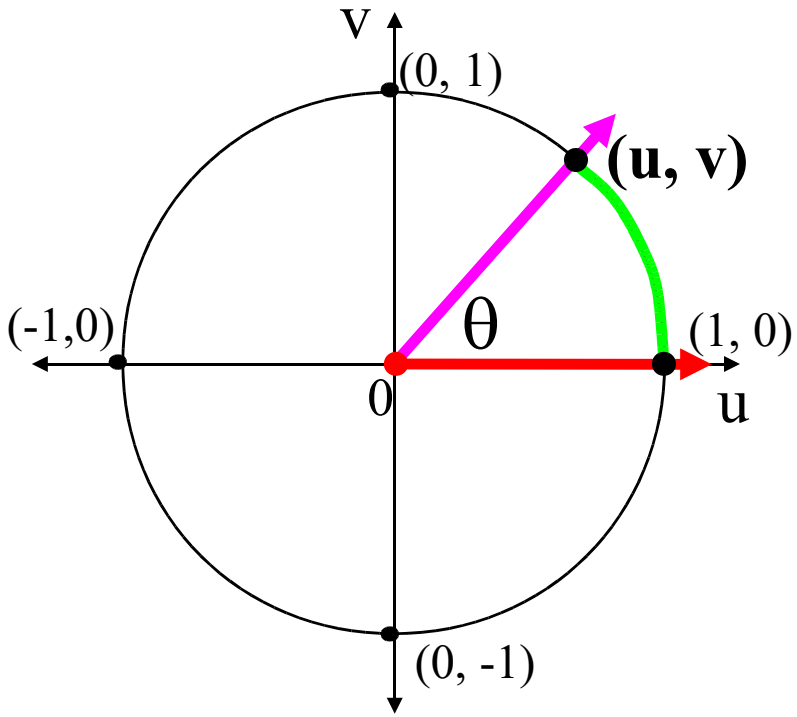
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ. This is defined to be the length of this arc divided by the radius of the circle.

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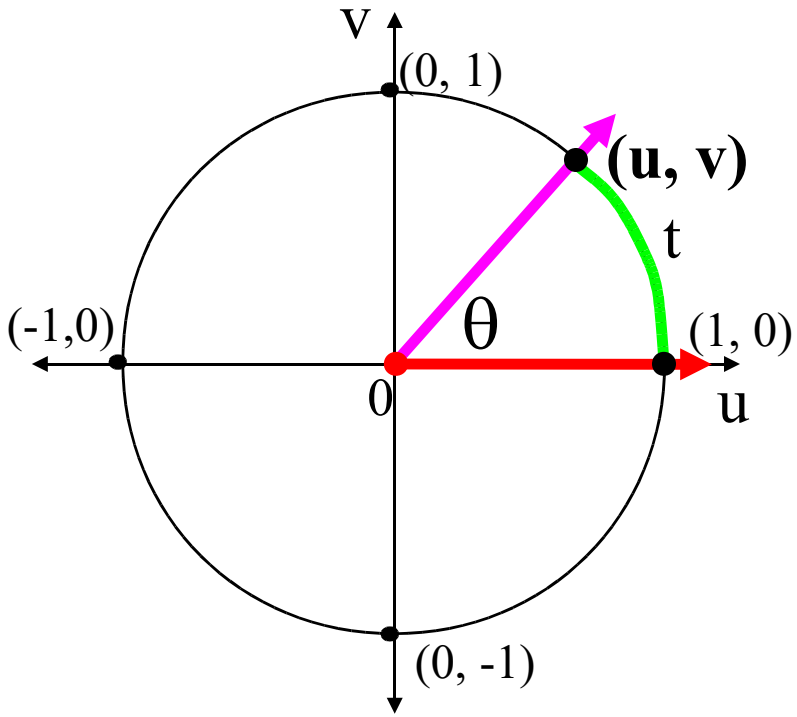
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ. This is defined to be the length of this arc divided by the radius of the circle. Let the length of the arc be t (units).

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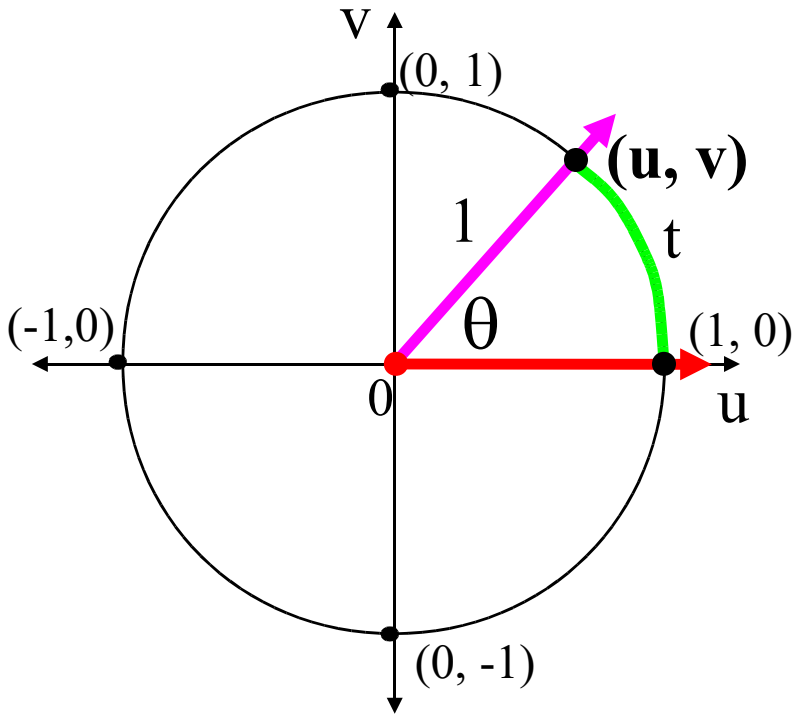
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ. This is defined to be the length of this arc divided by the radius of the circle. Let the length of the arc be t (units). Since the radius of the circle is 1 (unit),

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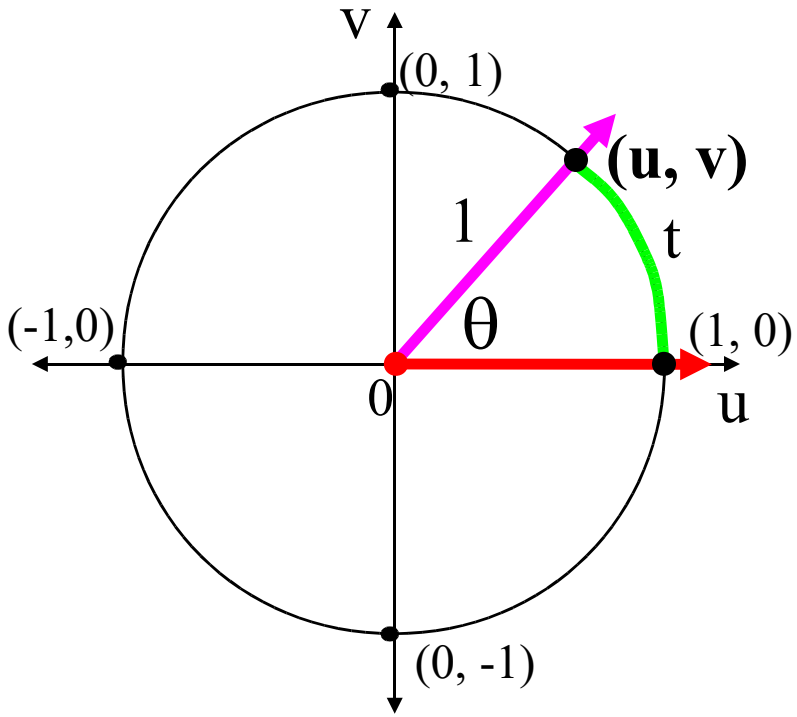
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

Now consider the radian measure of θ. This is defined to be the length of this arc divided by the radius of the circle. Let the length of the arc be t (units). Since the radius of the circle is 1 (unit), the radian measure of θ is the real number t.

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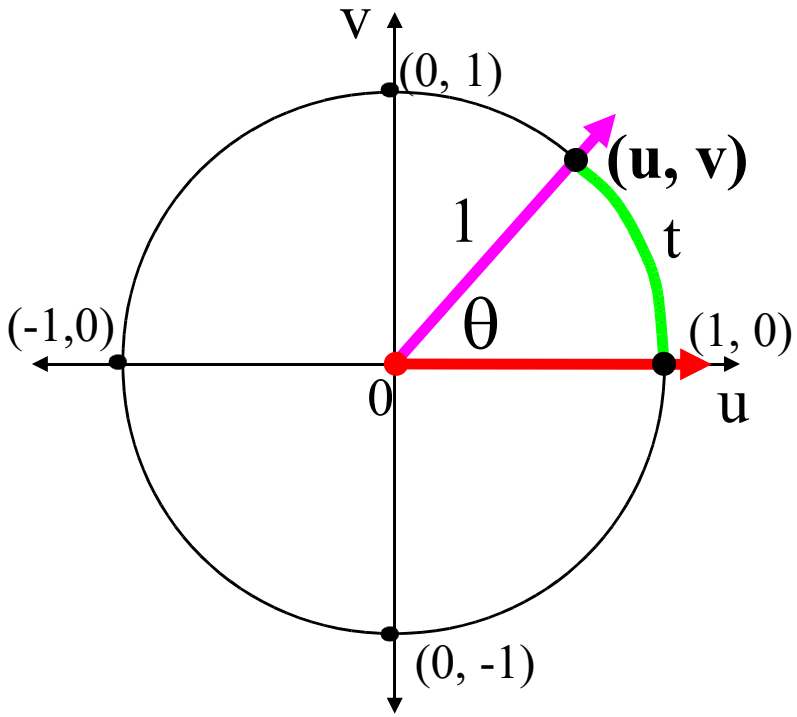
Part 5 : The Circular Functions



Sin θ = v and Cos θ = u

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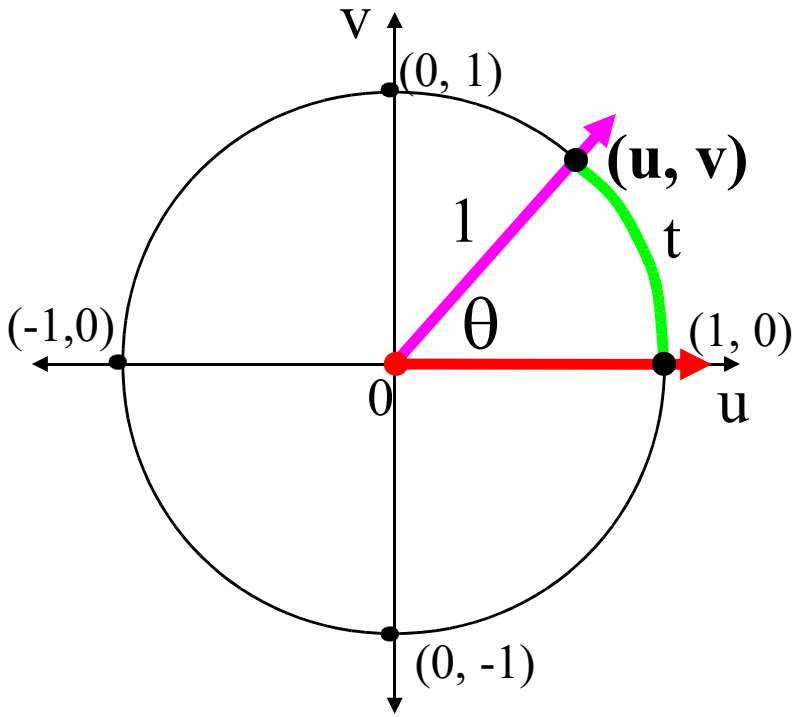
Part 5 : The Circular Functions



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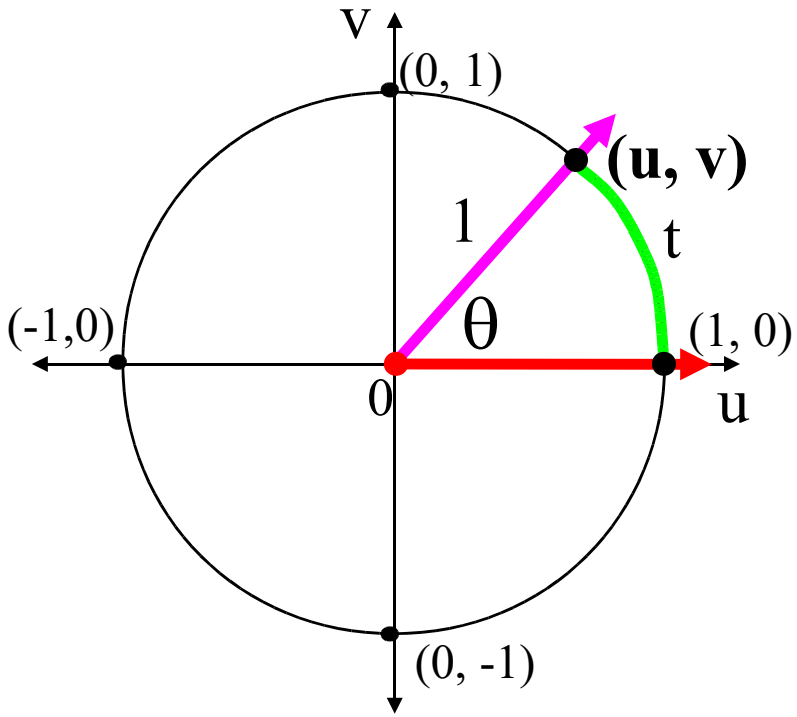

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Sin t = v

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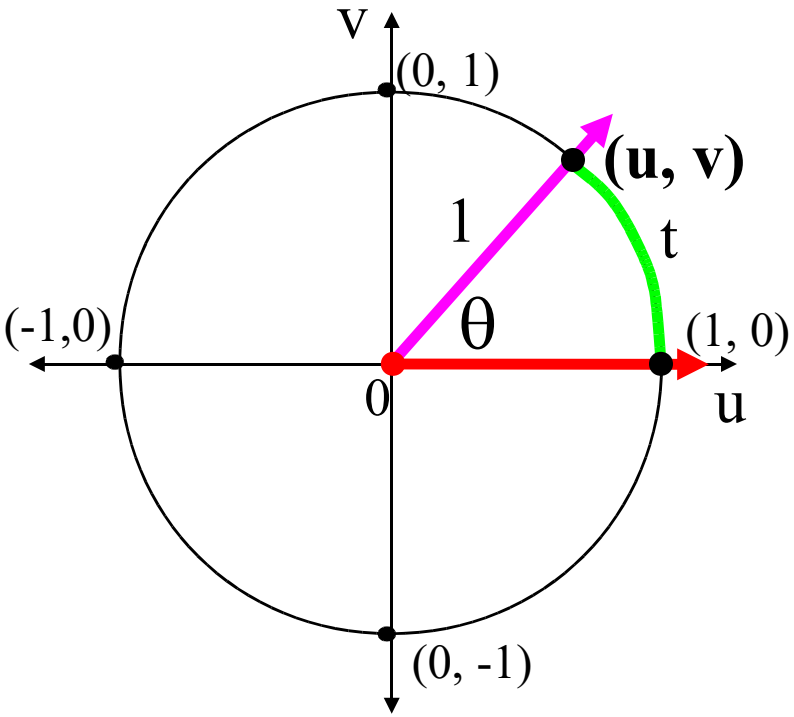
Part 5 : The Circular Functions



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Sin t = v

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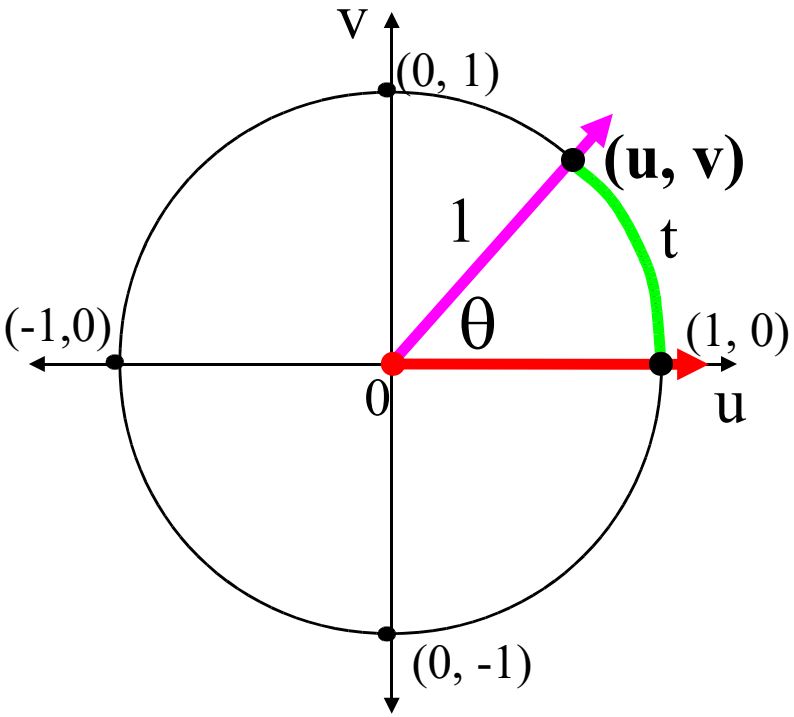
Part 5 : The Circular Functions



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Sin t = v **and** **Cos t = u**

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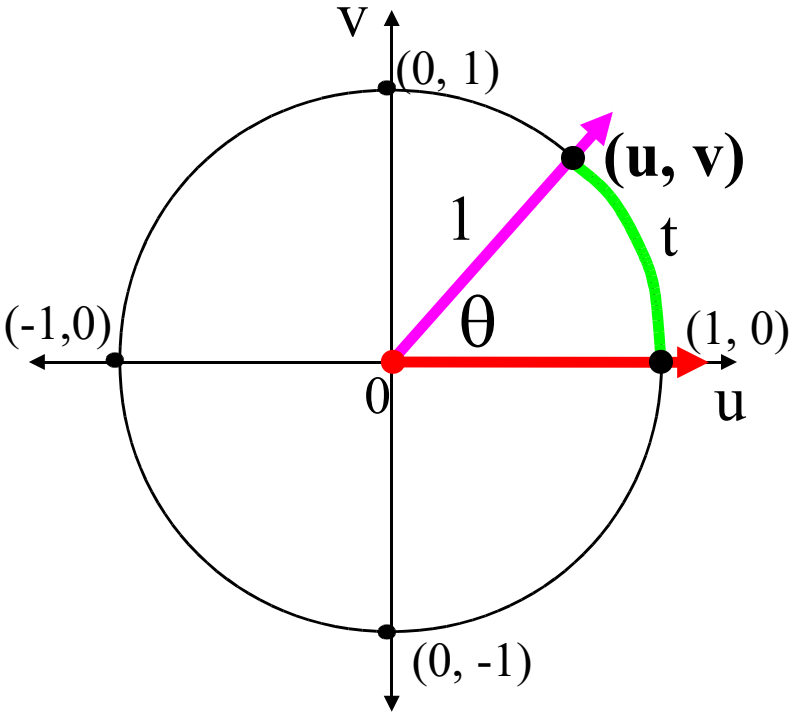
Part 5 : The Circular Functions



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Sin t = v **and** **Cos t = u**

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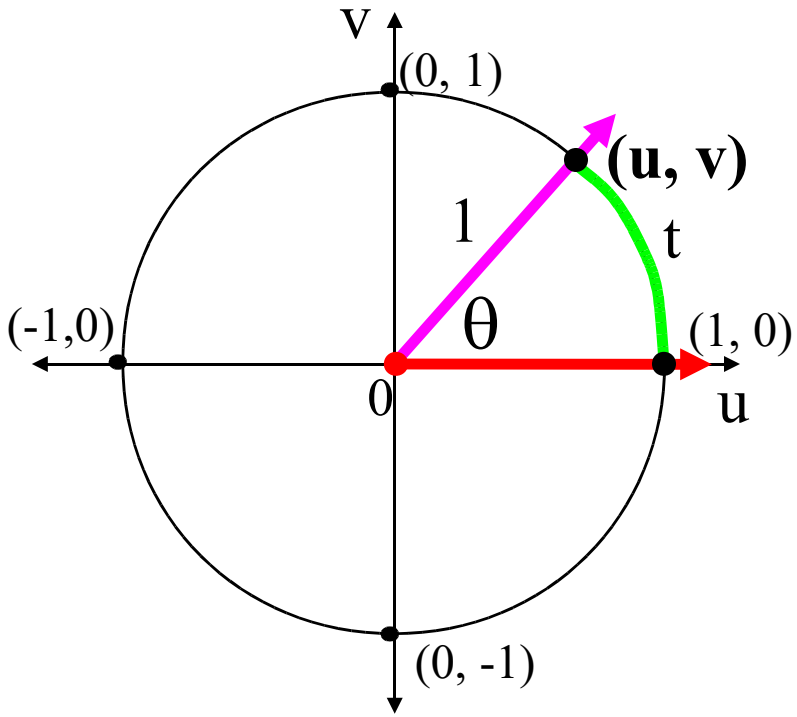
Part 5 : The Circular Functions

Sin t = v and Cos t = u



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Part 5 : The Circular Functions

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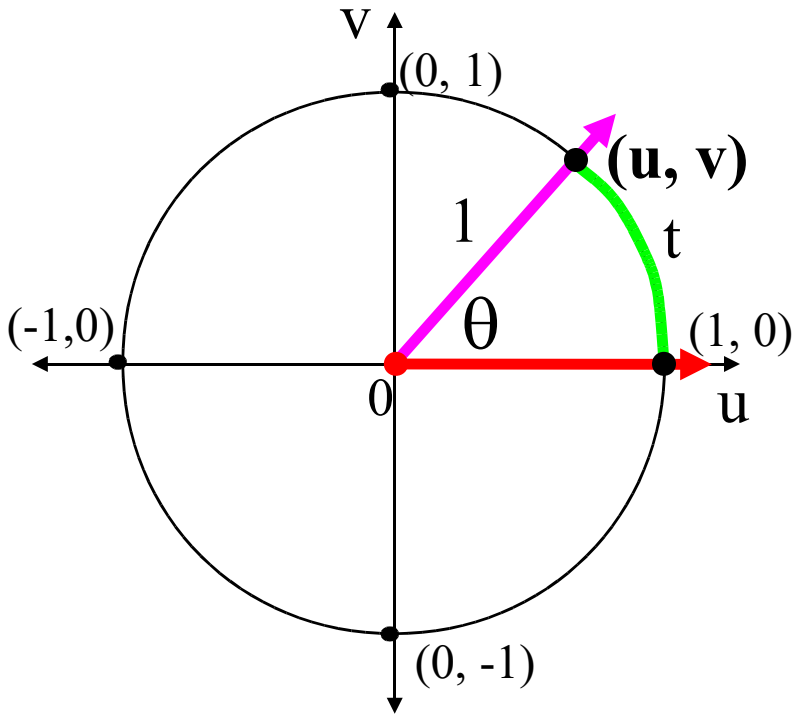

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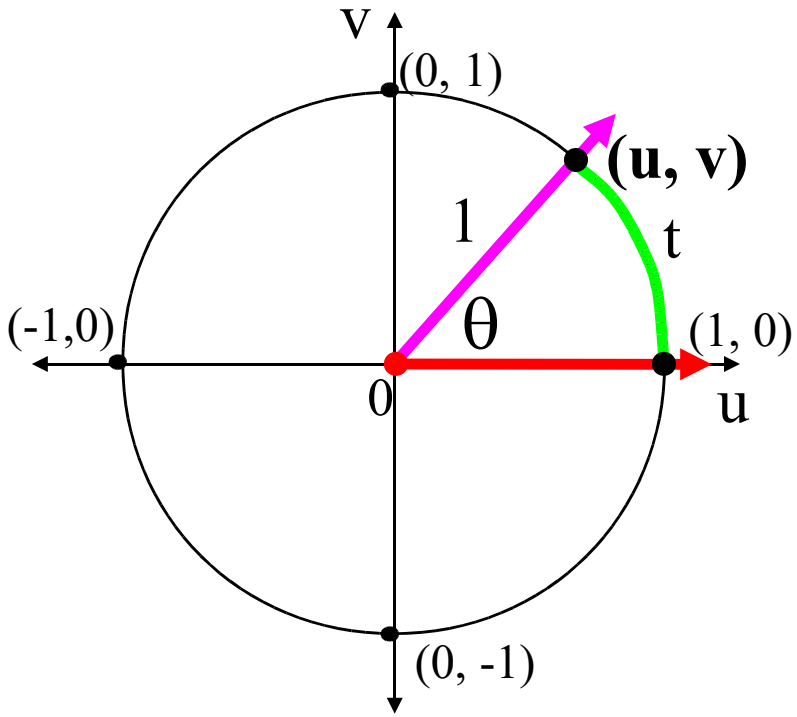
Part 5 : The Circular Functions

Sin t = v and **Cos t = u**



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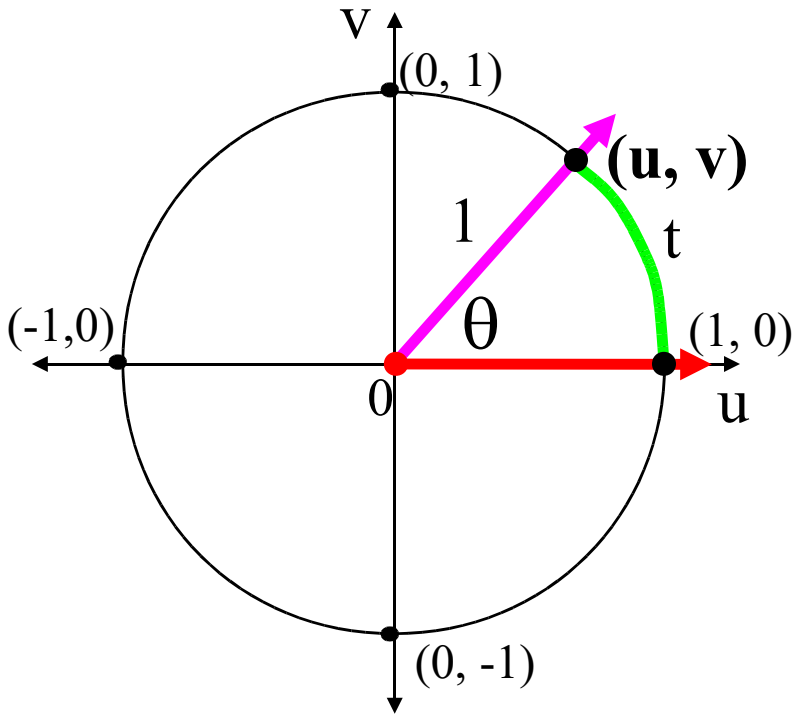
Part 5 : The Circular Functions

Sin t = v and **Cos t = u**



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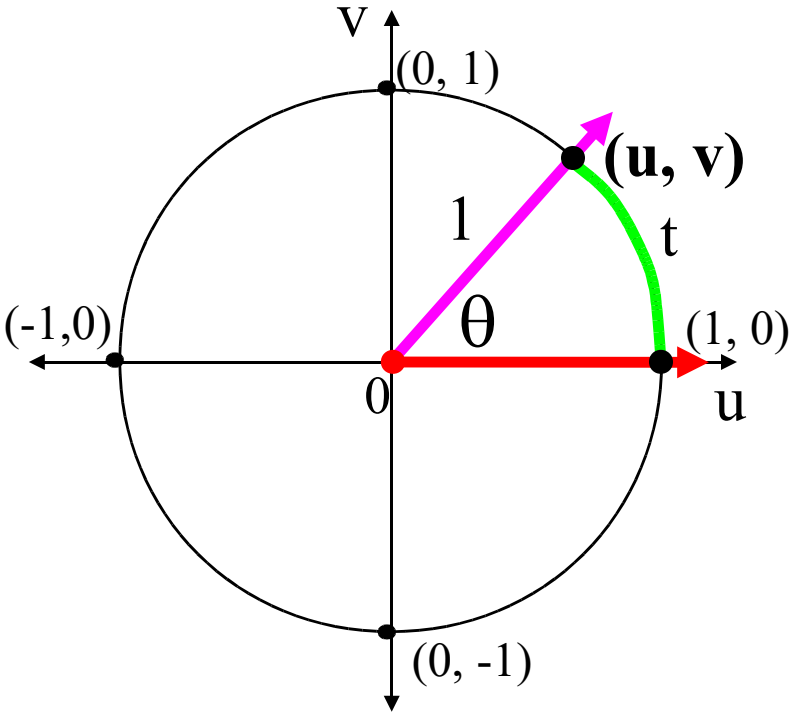
Part 5 : The Circular Functions

Sin t = v and Cos t = u



The Circular Functions

y = Sin t and **y = Cos t**

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Part 5 : The Circular Functions

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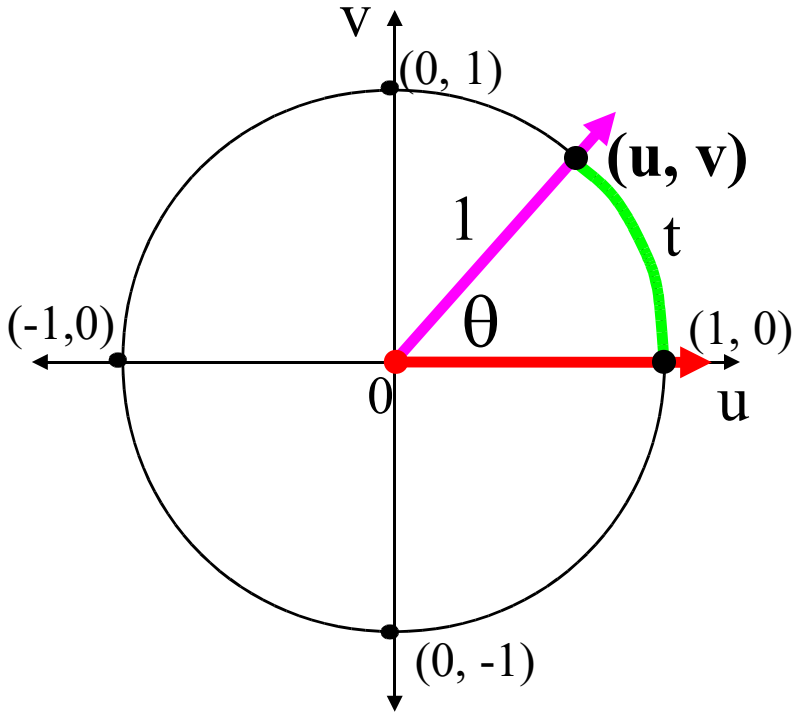

The Circular Functions

y = Sin t and **y = Cos t**

In part 4, we learned how the Wrapping Function pairs every real number with a point on the unit circle.

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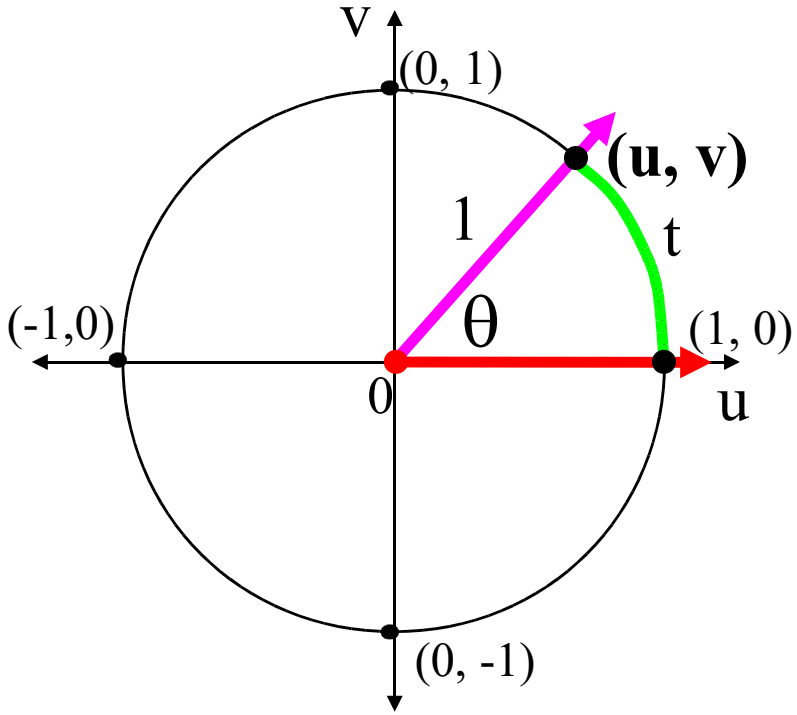
Part 5 : The Circular Functions

Sin t = v and **Cos t = u**



The Circular Functions

y = Sin t and **y = Cos t**

In part 4, we learned how the Wrapping Function pairs every real number with a point on the unit circle. We will use the Wrapping Function here and graph these circular functions.

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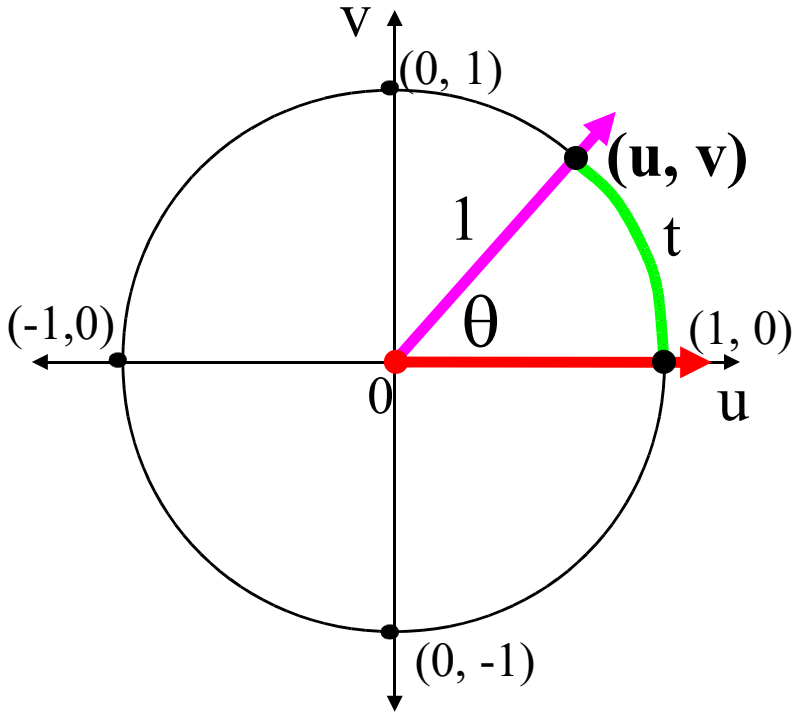
Part 5 : The Circular Functions



Sin t = v and Cos t = u

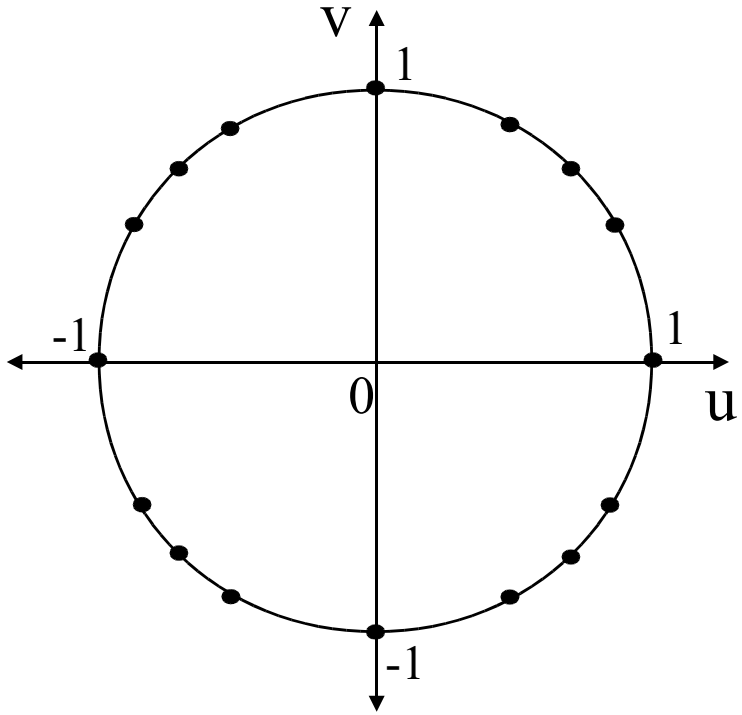
The Circular Functions

y = Sin t and **y = Cos t**

In part 4, we learned how the Wrapping Function pairs every real number with a point on the unit circle. We will use the Wrapping Function here and graph these circular functions, beginning with the Sine Function.

Teach Yourself Trigonometry

Part 5 : The Circular Functions



Sin t = v and Cos t = u

The Circular Functions

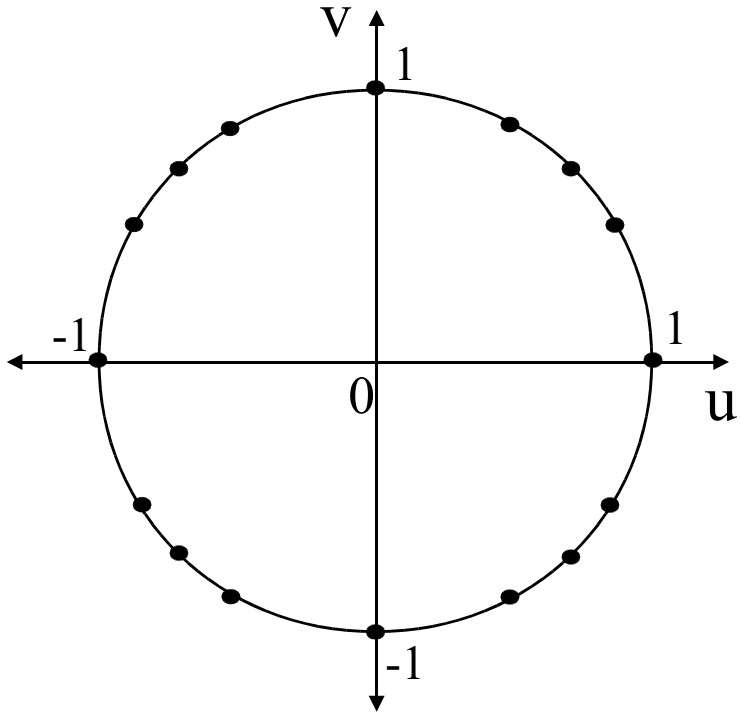
y = Sin t and **y = Cos t**

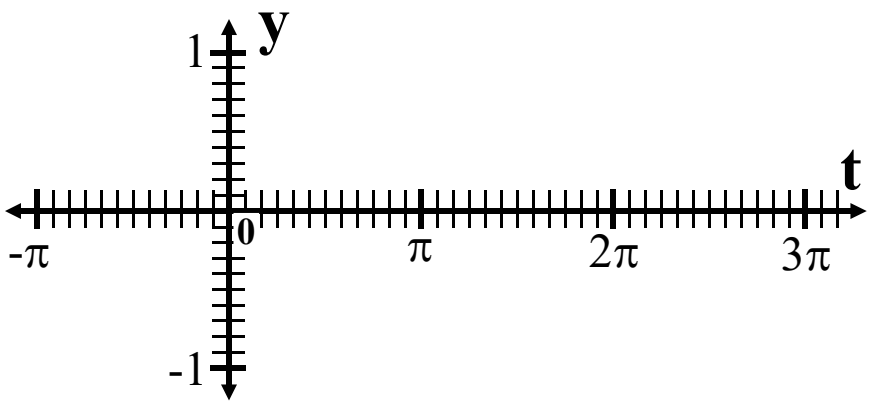
In part 4, we learned how the Wrapping Function pairs every real number with a point on the unit circle. We will use the Wrapping Function here and graph these circular functions, beginning with the Sine Function. This diagram shows the 'key points' that we will use.

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

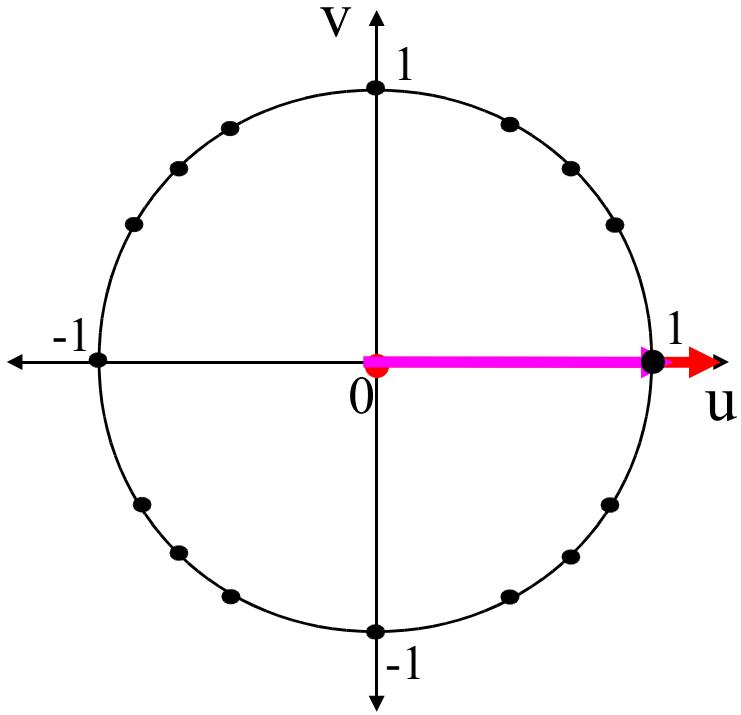
y = Sin t and **y = Cos t**

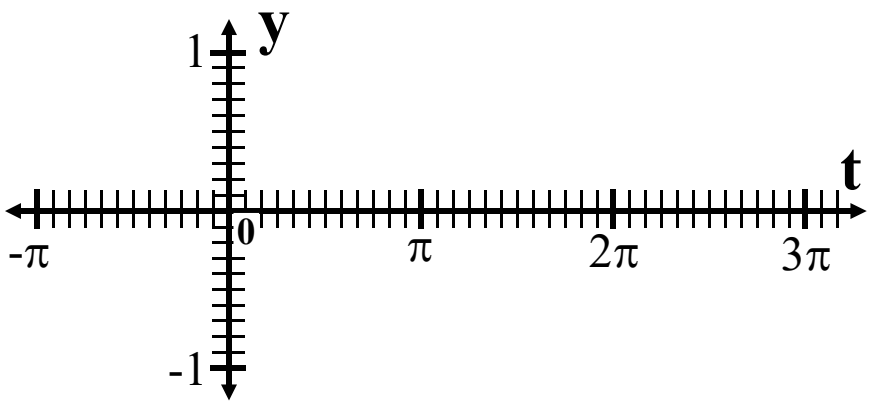
θ	t	Sin t

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and **y = Cos t**

θ	t	Sin t
0°	0	
30°	π/6	
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60°	π/3	
90°	π/2	
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135°	3π/4	
150°	5π/6	
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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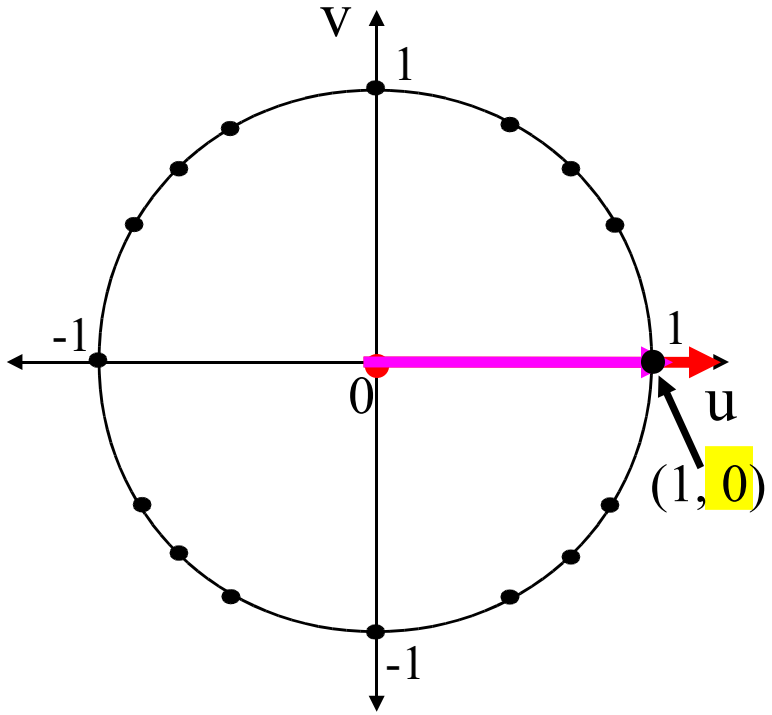

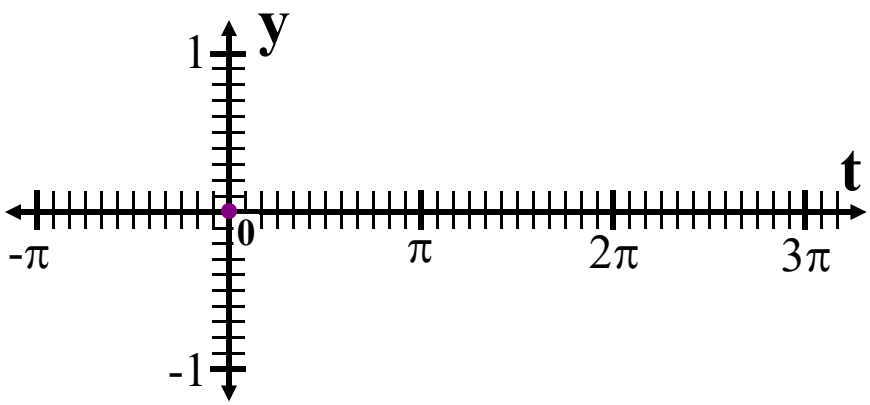

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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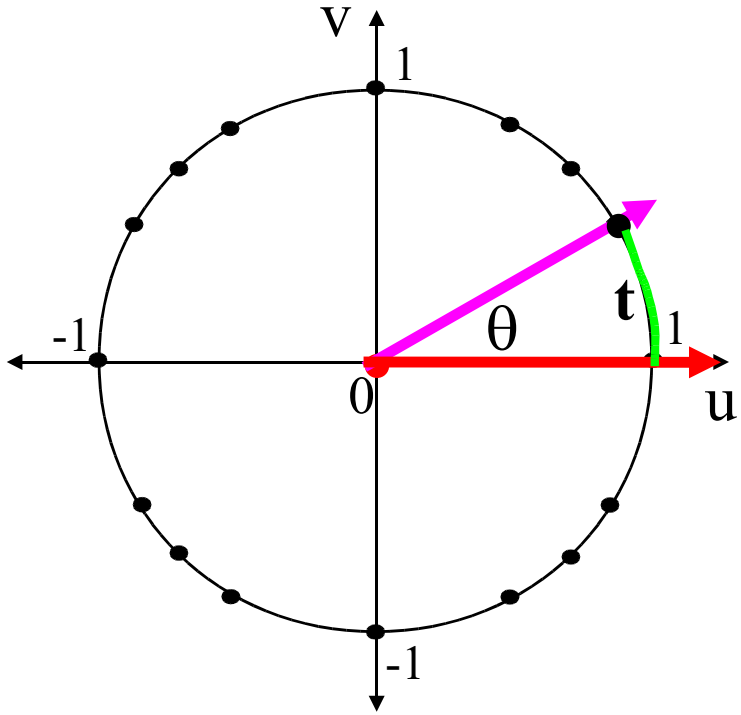

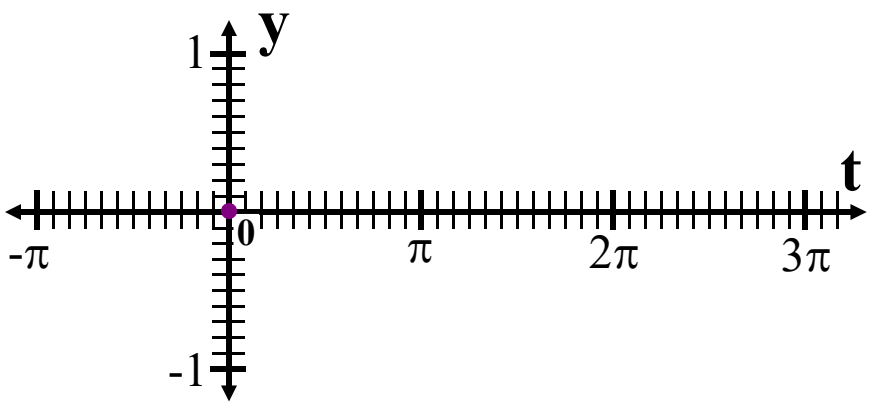

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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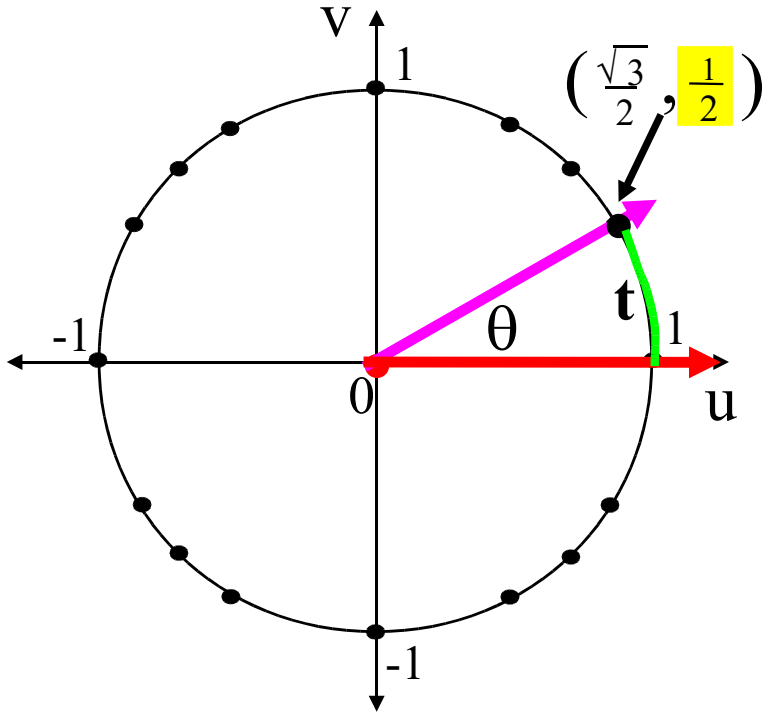

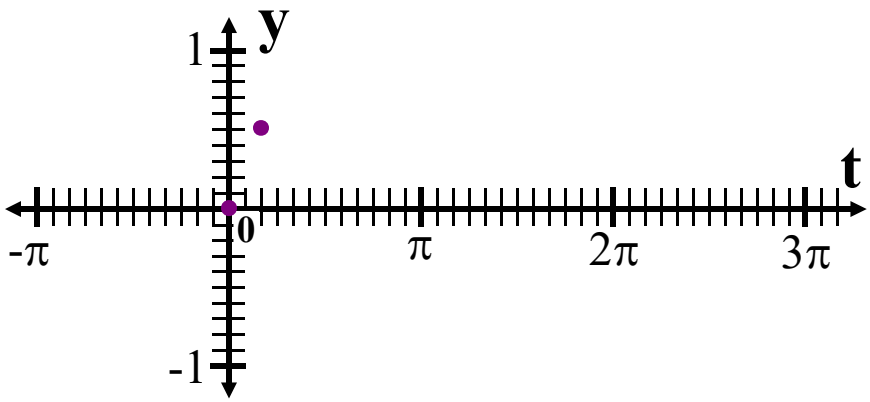

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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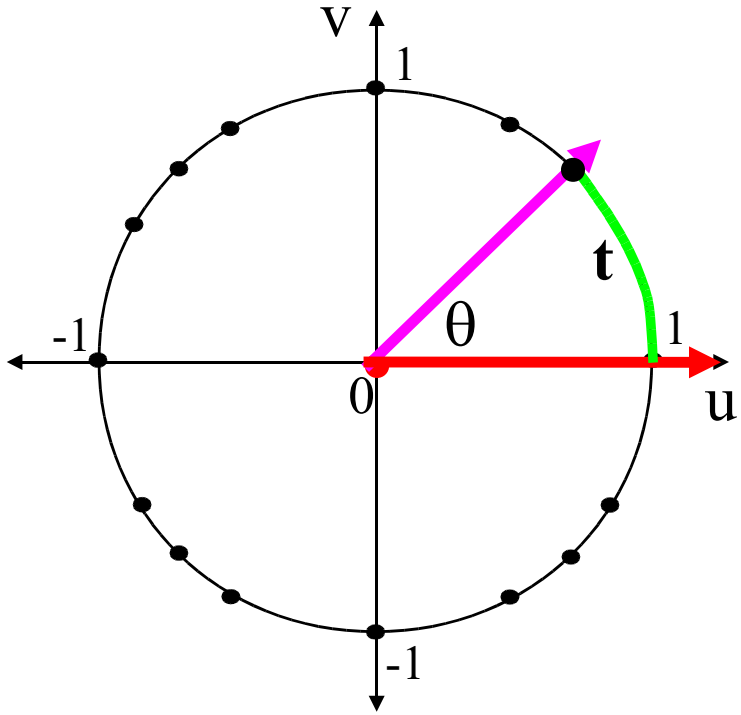

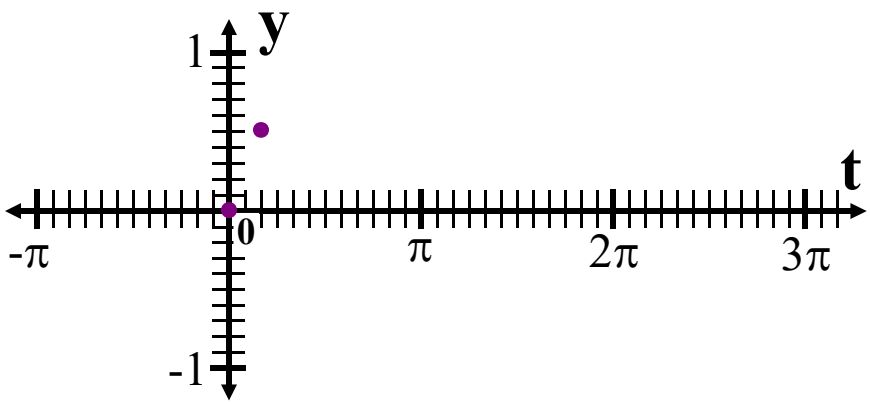

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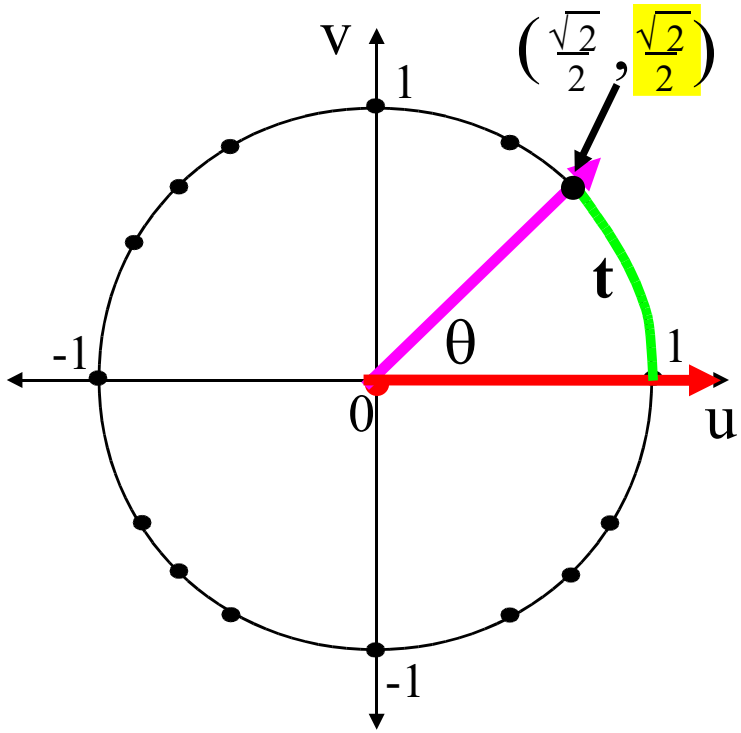
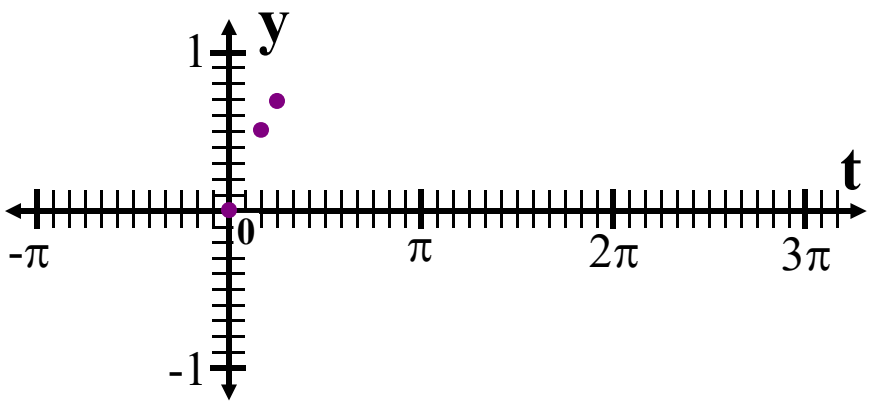
Teach Yourself Trigonometry

Part 5 : The Circular Functions





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The Circular Functions

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0°	0	0
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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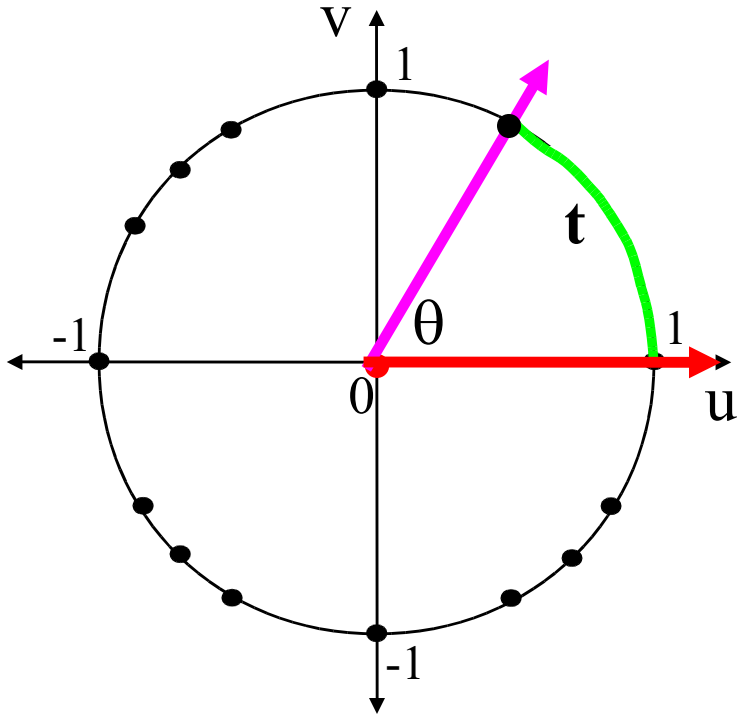

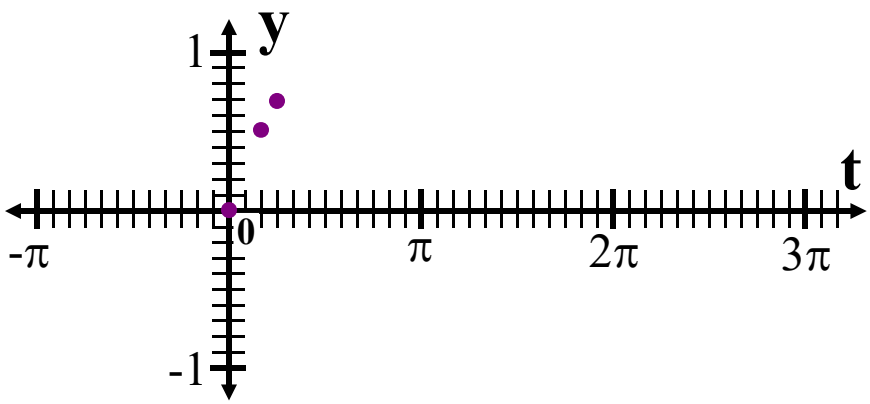

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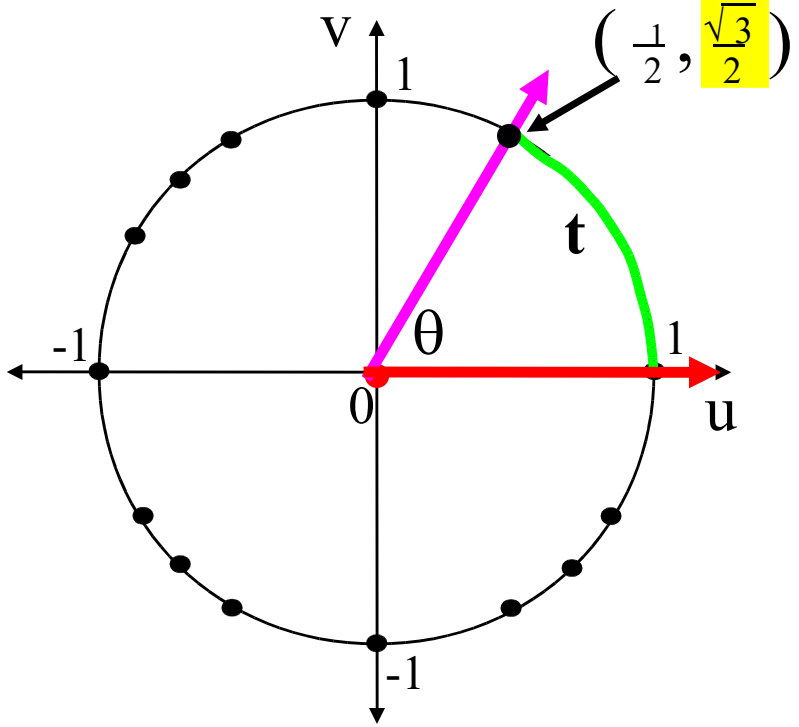
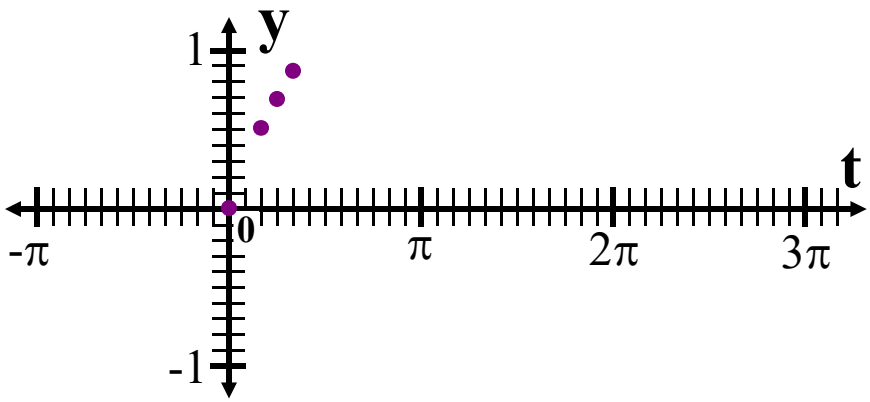
Teach Yourself Trigonometry

Part 5 : The Circular Functions





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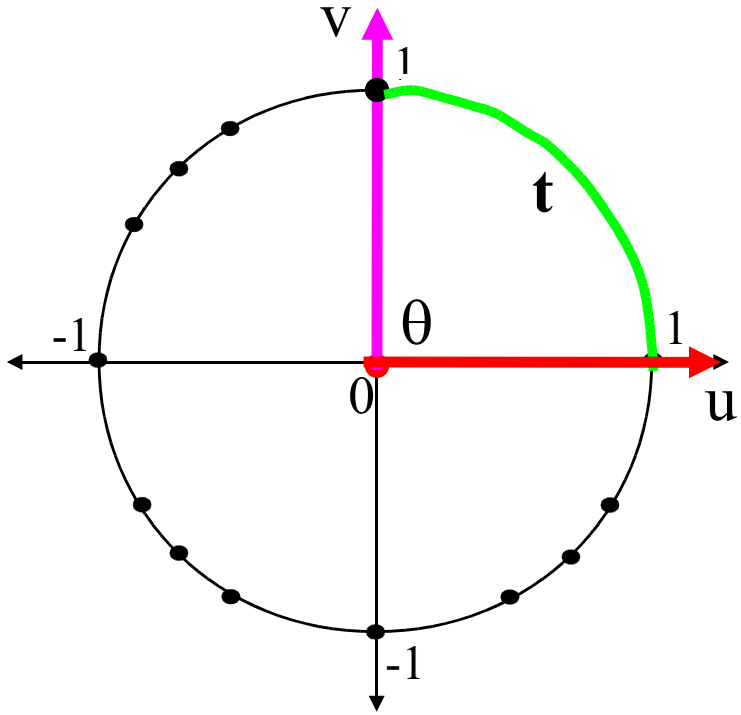

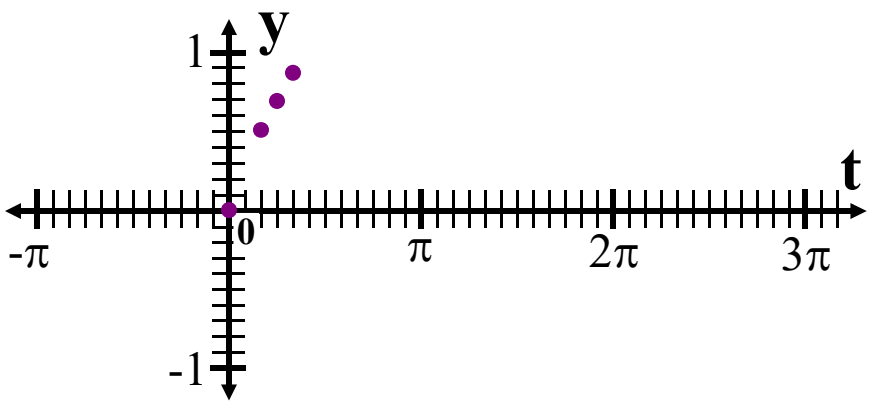

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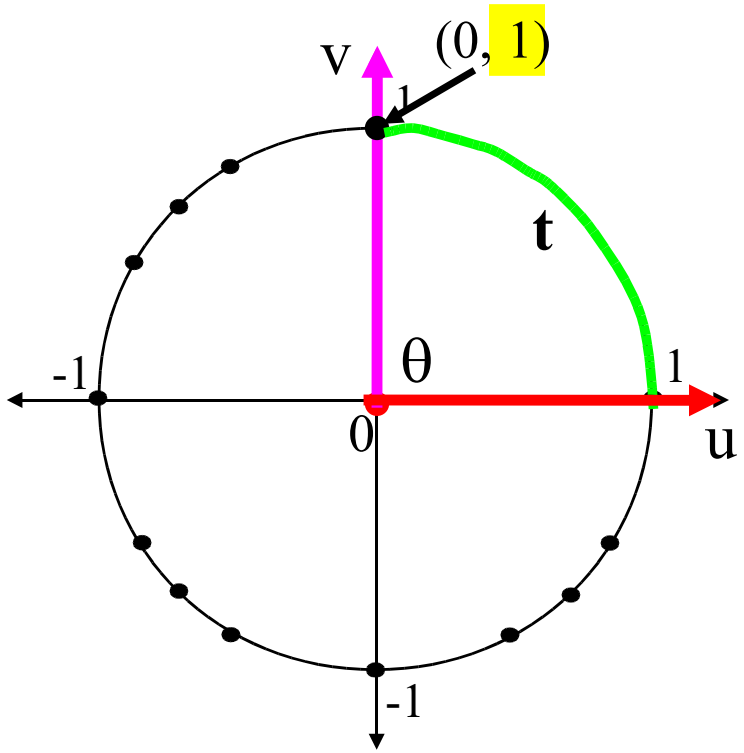
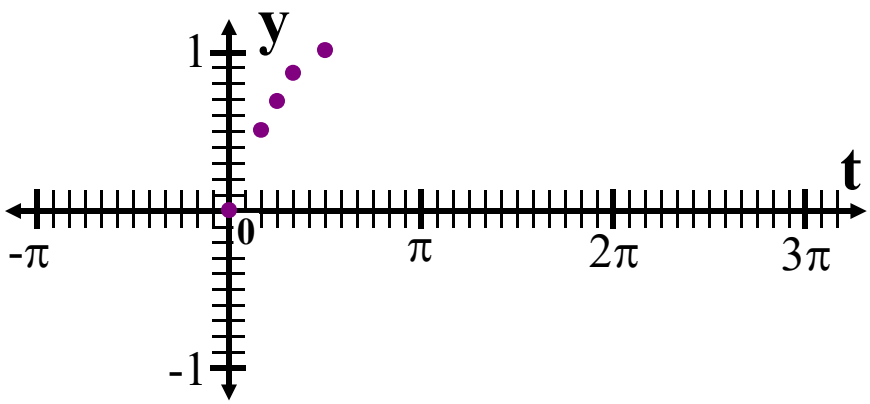
Teach Yourself Trigonometry

Part 5 : The Circular Functions





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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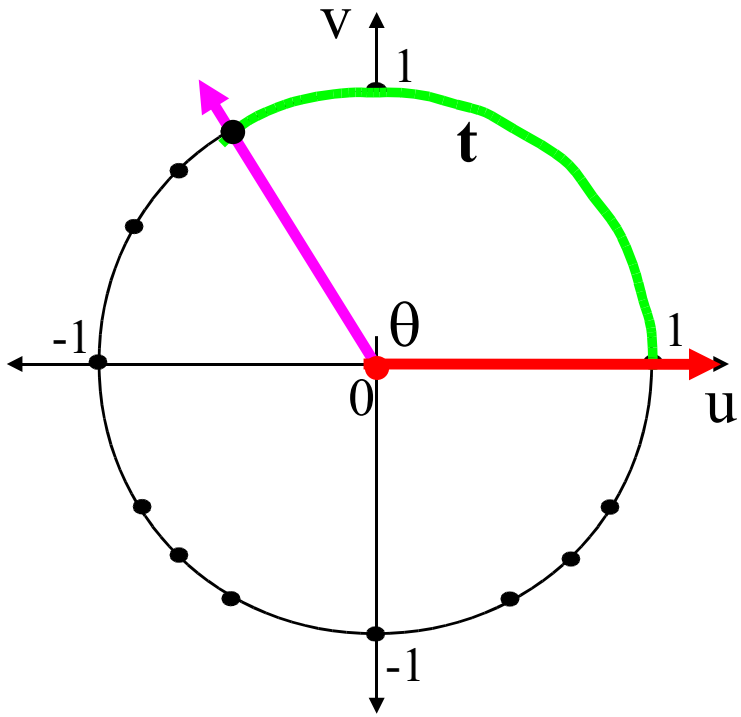

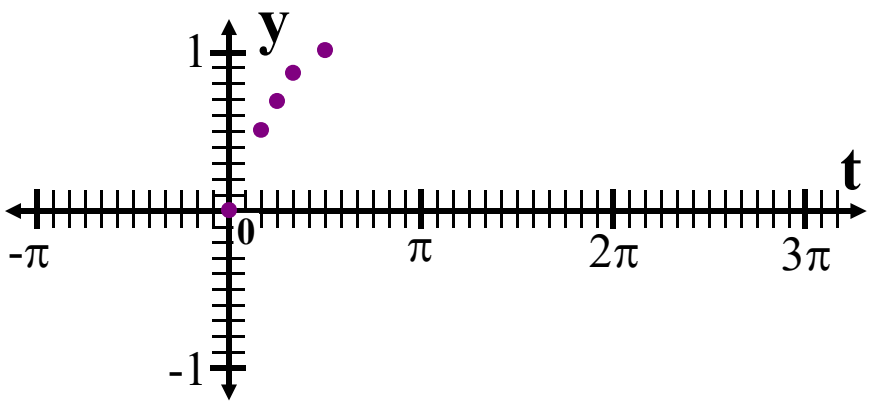

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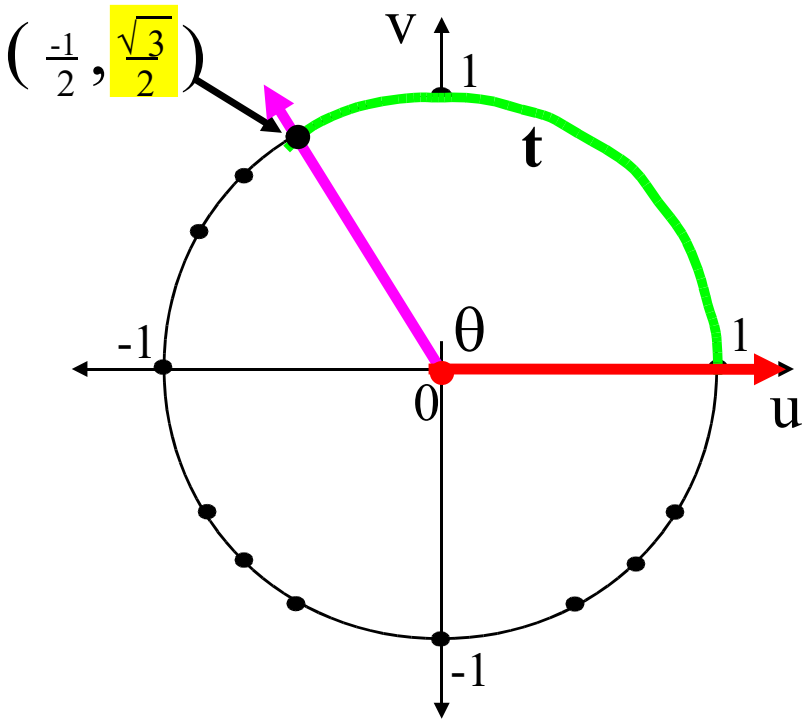
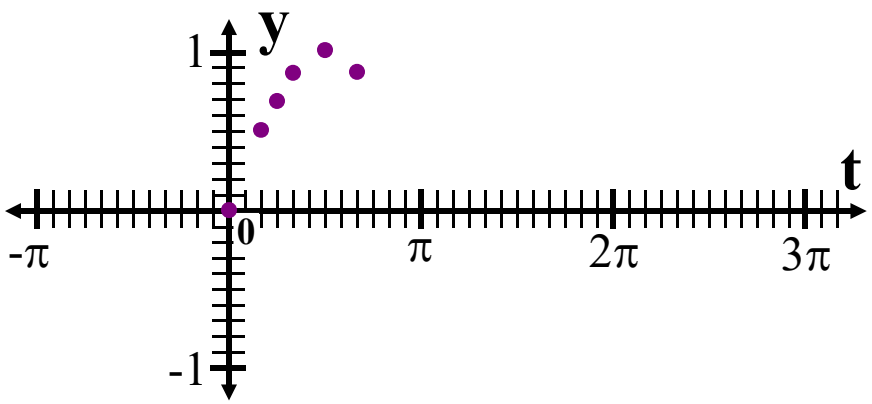
Teach Yourself Trigonometry

Part 5 : The Circular Functions





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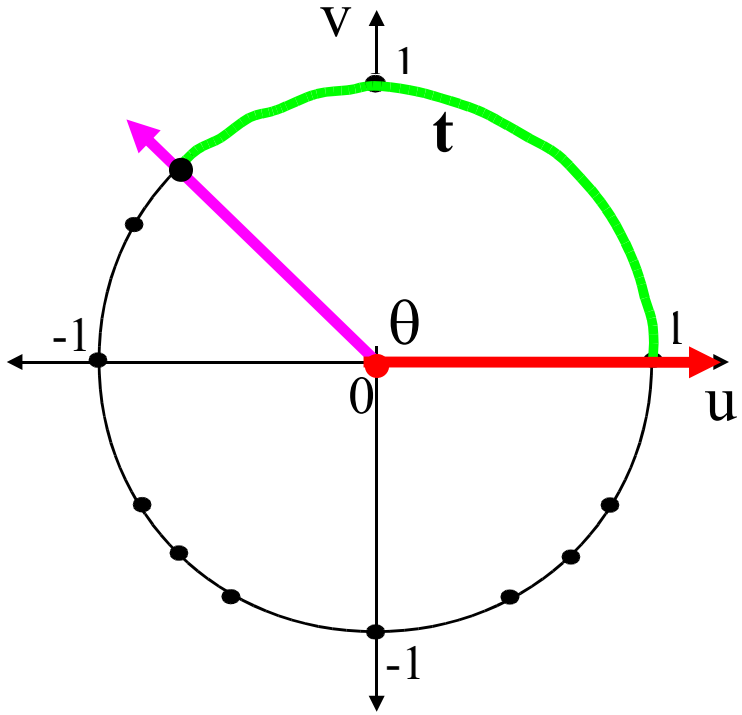

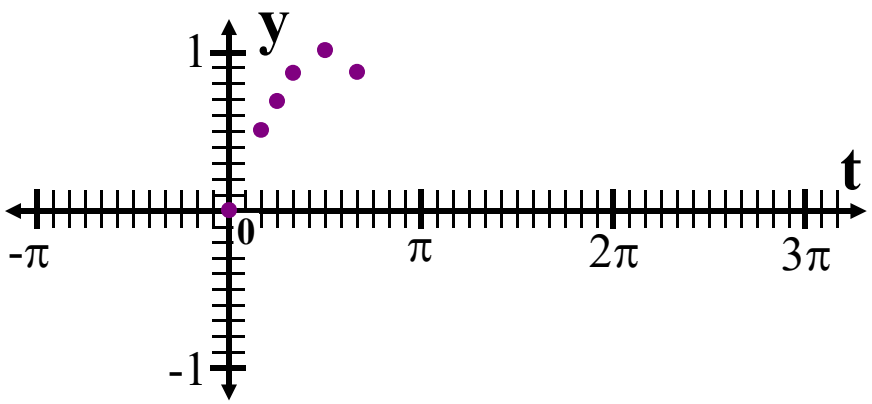

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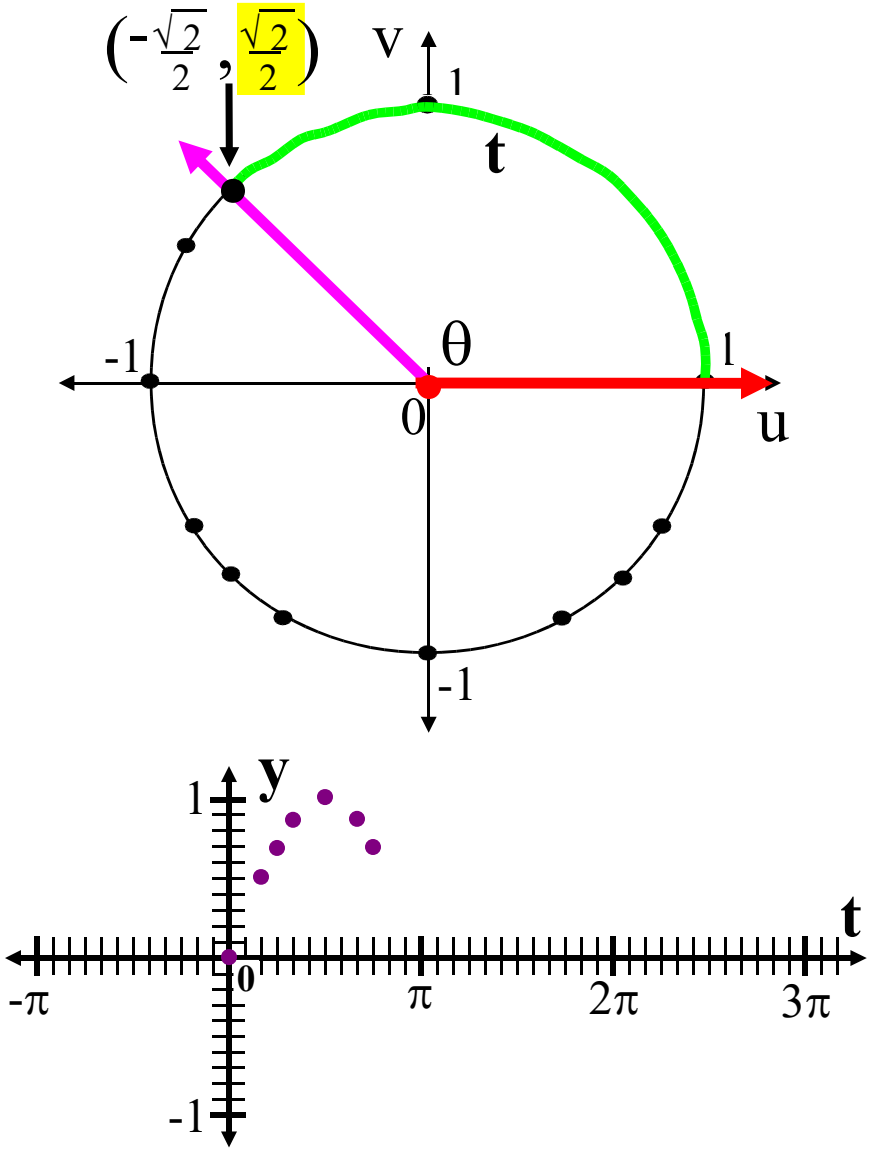
Teach Yourself Trigonometry

Part 5 : The Circular Functions



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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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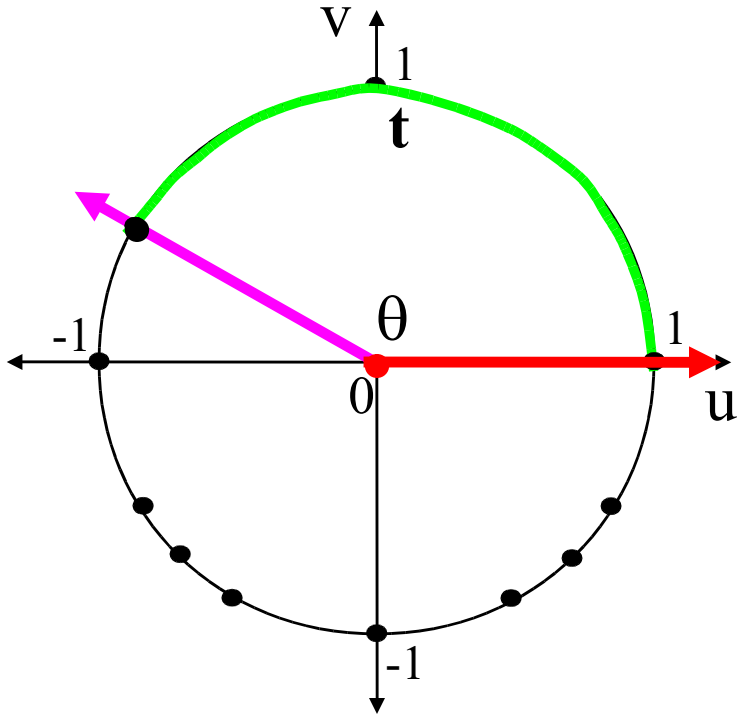

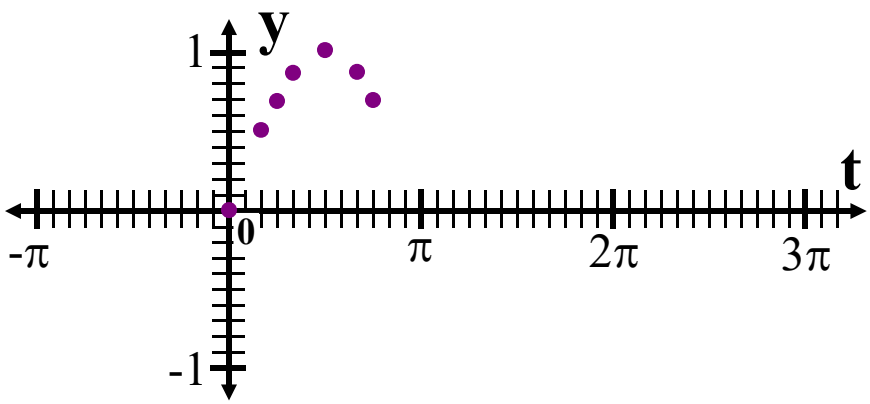

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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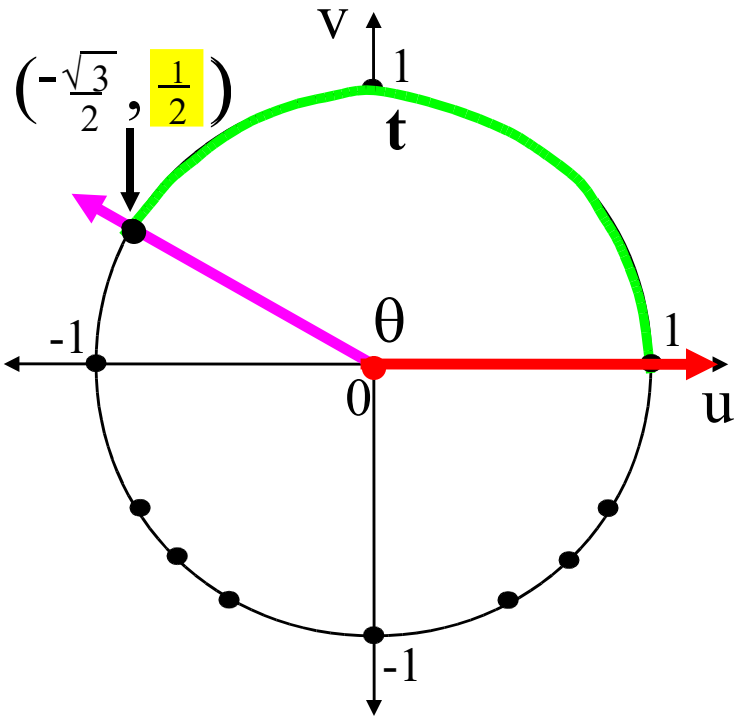

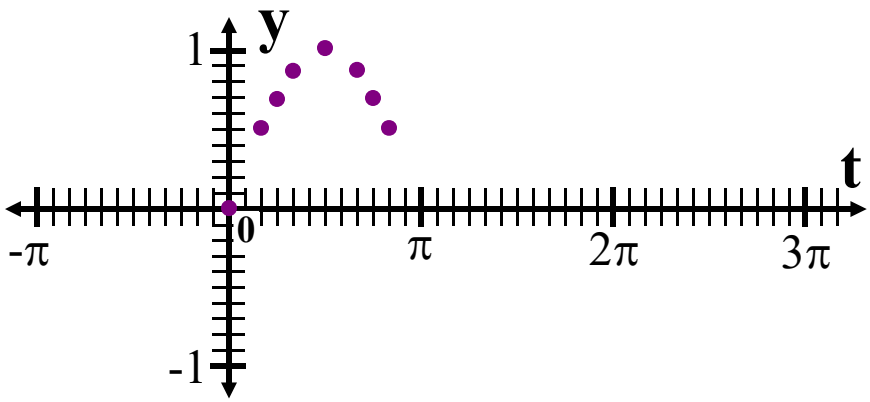

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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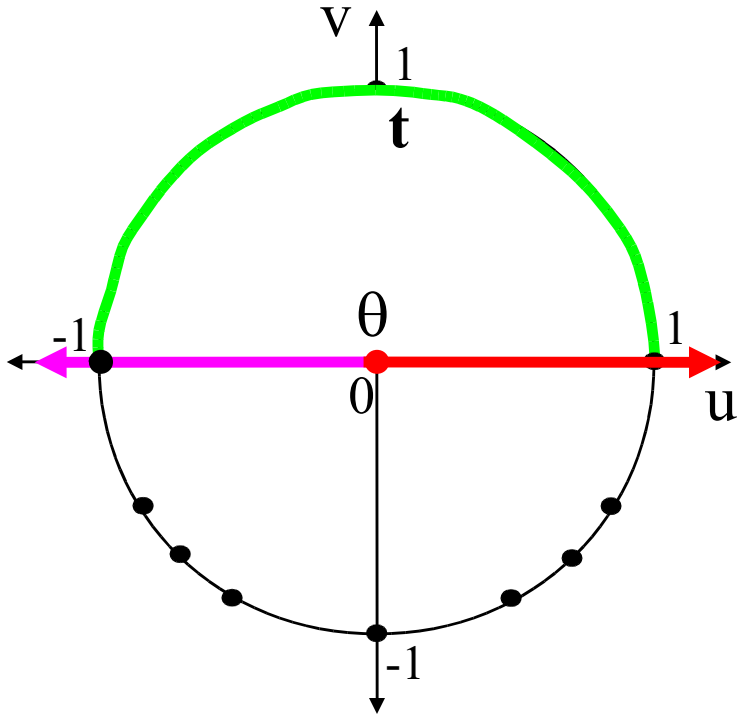

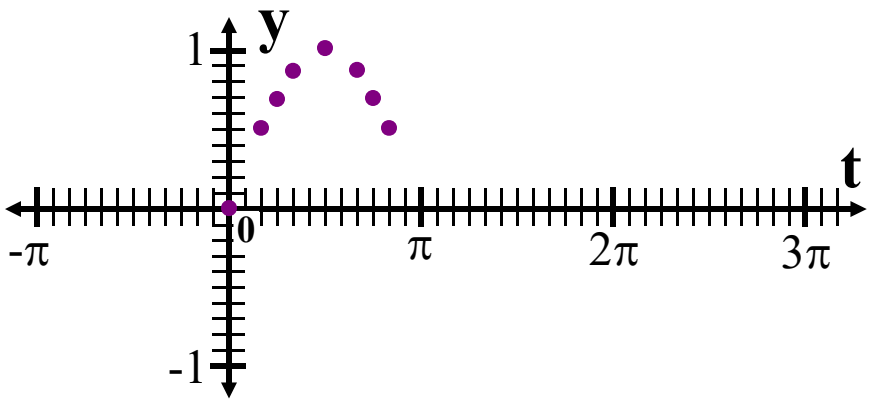

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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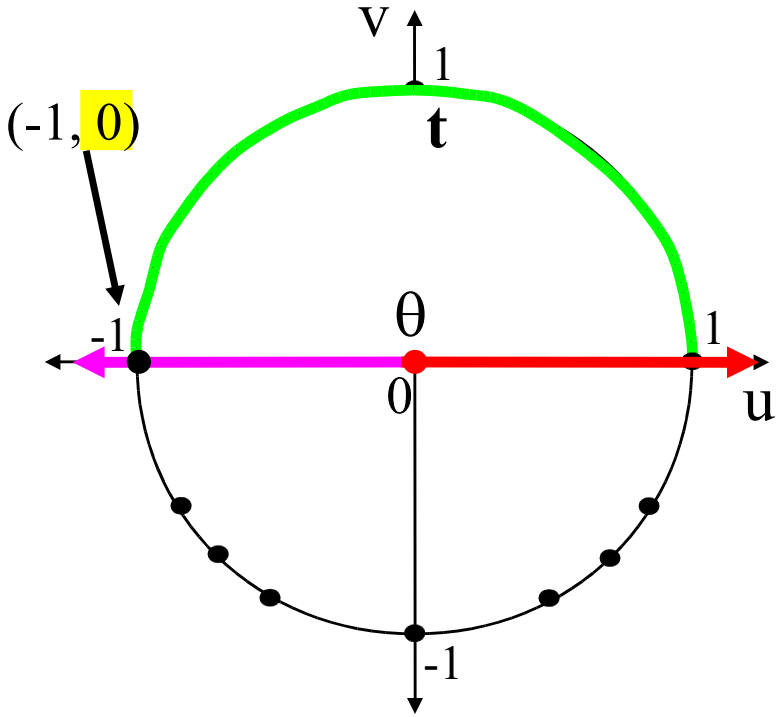

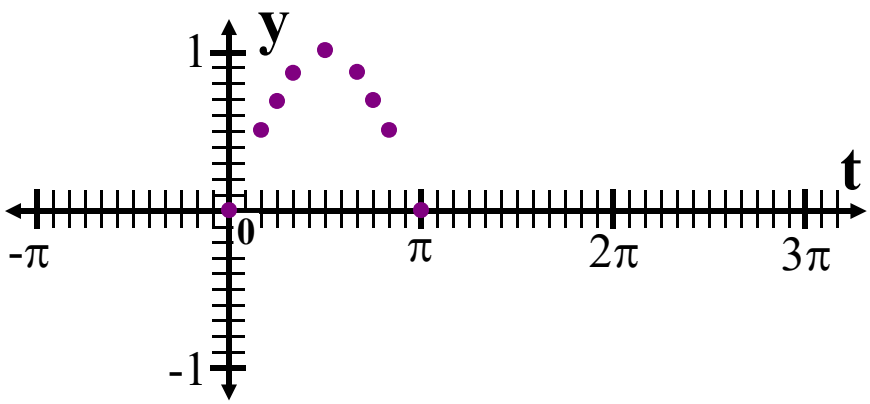

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Part 5 : The Circular Functions

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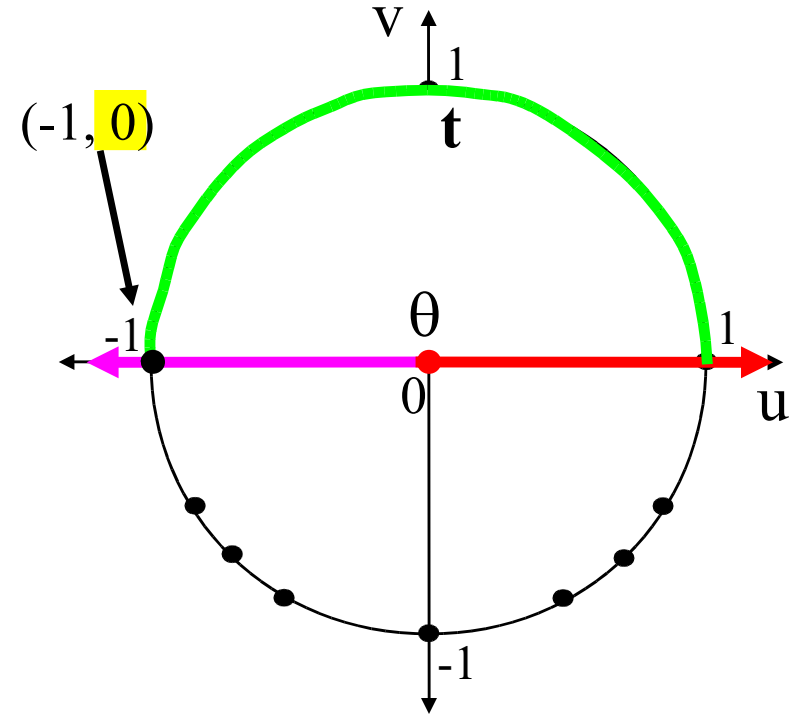

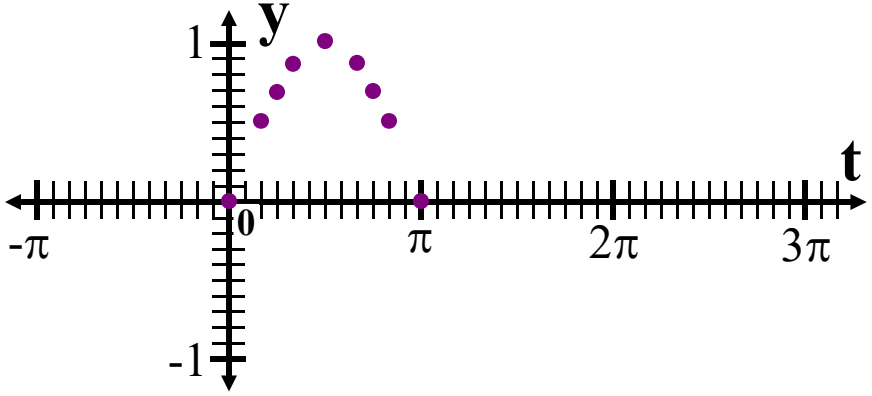

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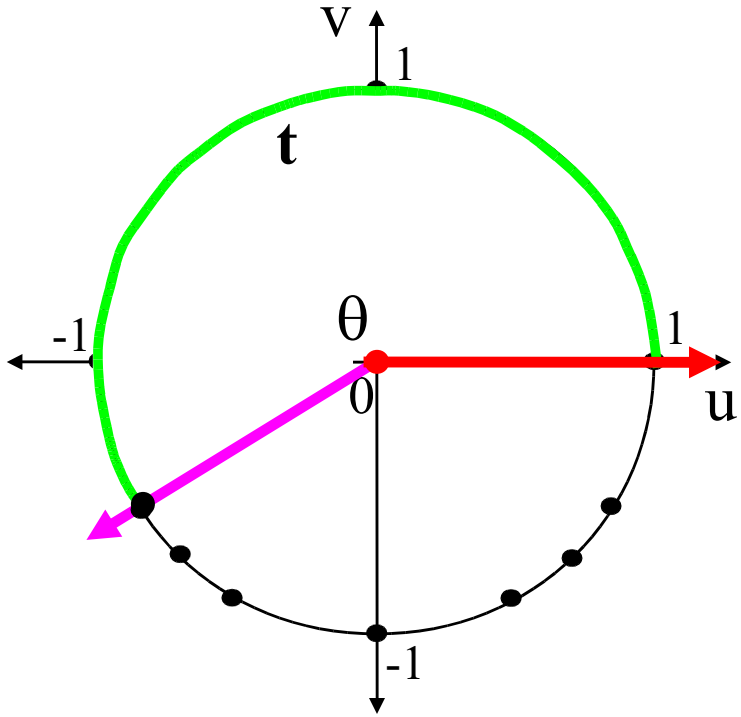
135°	3π/4	√2/2
150°	5π/6	1/2
180°	π	0

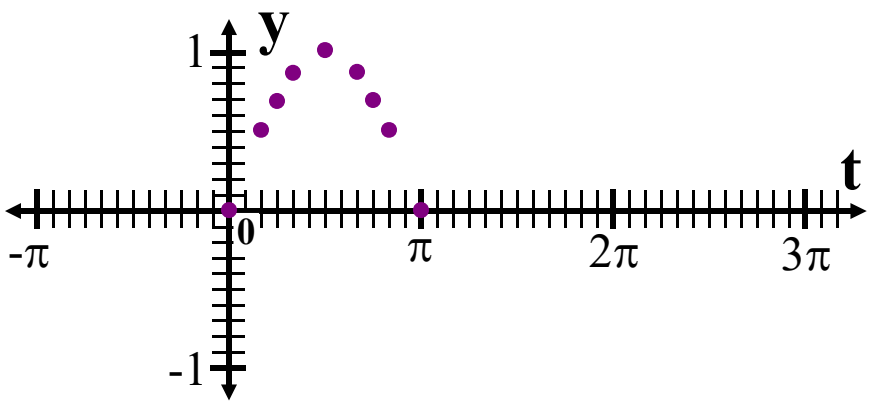
θ	t	Sin t
180°	π	0
210°	7π/6	
225°	5π/4	
240°	4π/3	
270°	3π/2	
300°	5π/3	
315°	7π/4	
330°	$\frac{11\pi}{6}$	
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

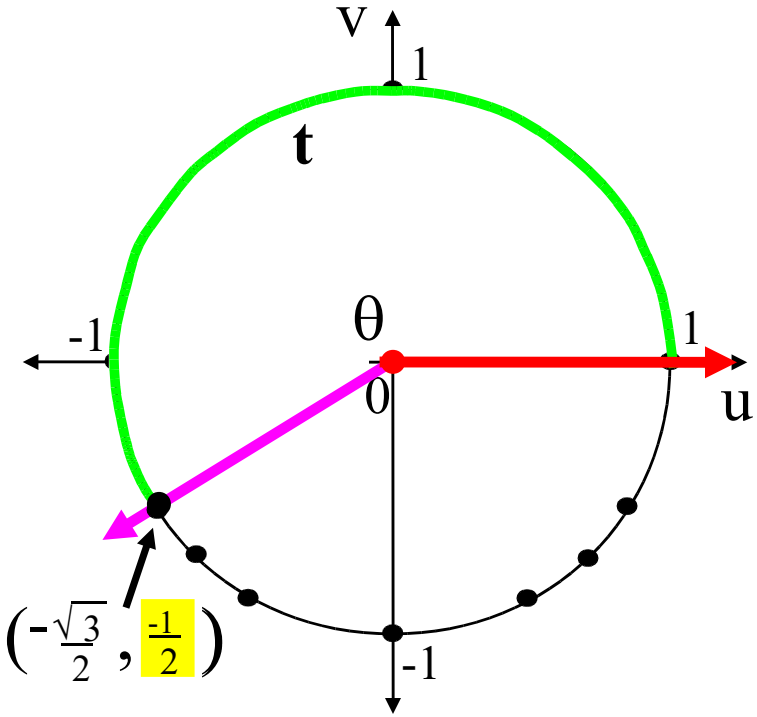
θ	t	Sin t
0°	0	0
30°	π/6	1/2
45°	π/4	$\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$
90°	π/2	1
120°	2π/3	$\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$
150°	5π/6	1/2
180°	π	0

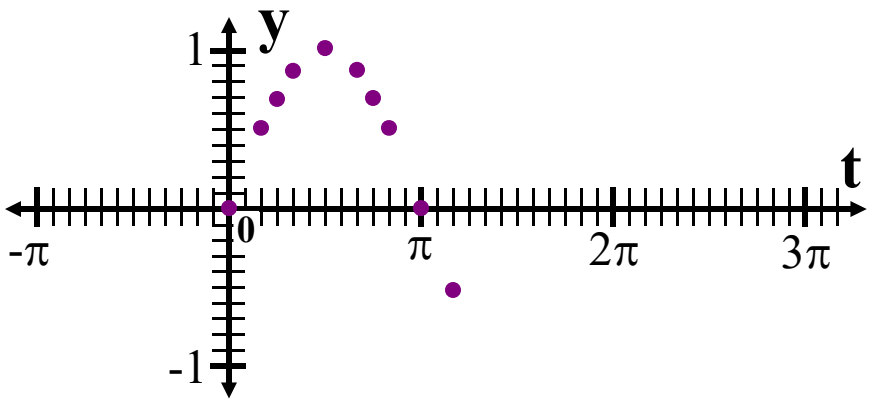
θ	t	Sin t
180°	π	0
210°	7π/6	
225°	5π/4	
240°	4π/3	
270°	3π/2	
300°	5π/3	
315°	7π/4	
330°	$\frac{11\pi}{6}$	
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

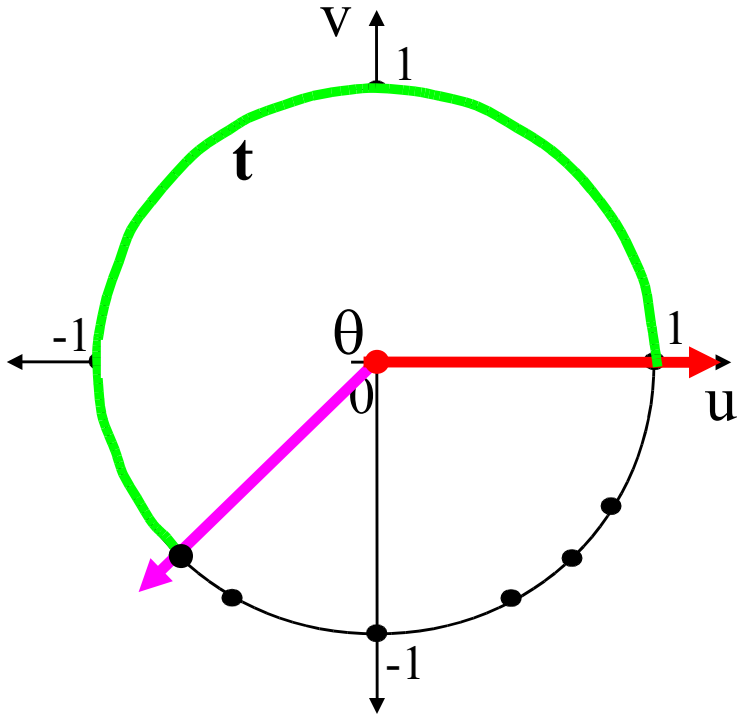
y = Sin t and y = Cos t

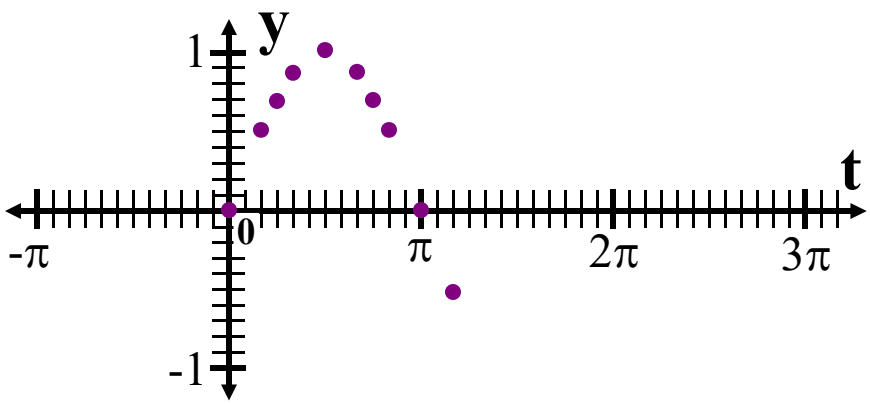
θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	
60°	π/3	$\sqrt{3}/2$	240°	4π/3	
90°	π/2	1	270°	3π/2	
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

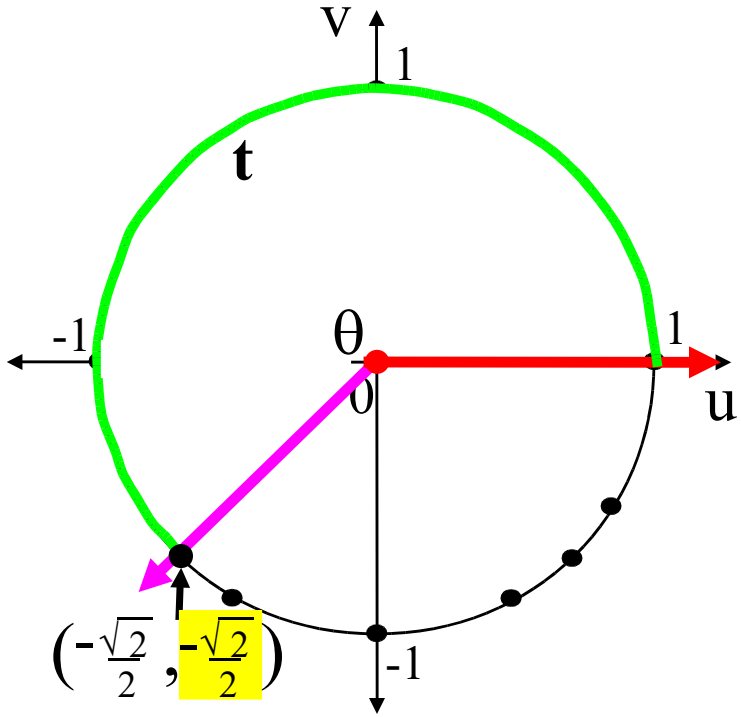
y = Sin t and y = Cos t

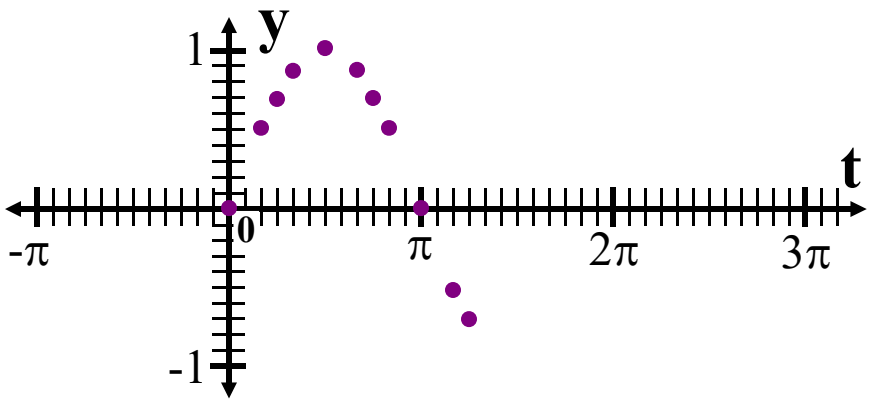
θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	
60°	π/3	$\sqrt{3}/2$	240°	4π/3	
90°	π/2	1	270°	3π/2	
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	
90°	π/2	1	270°	3π/2	
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
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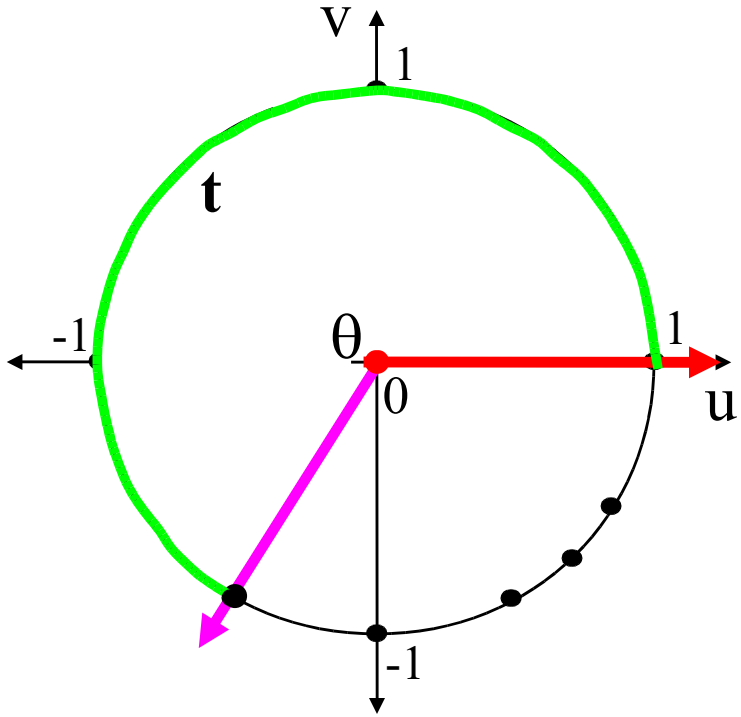
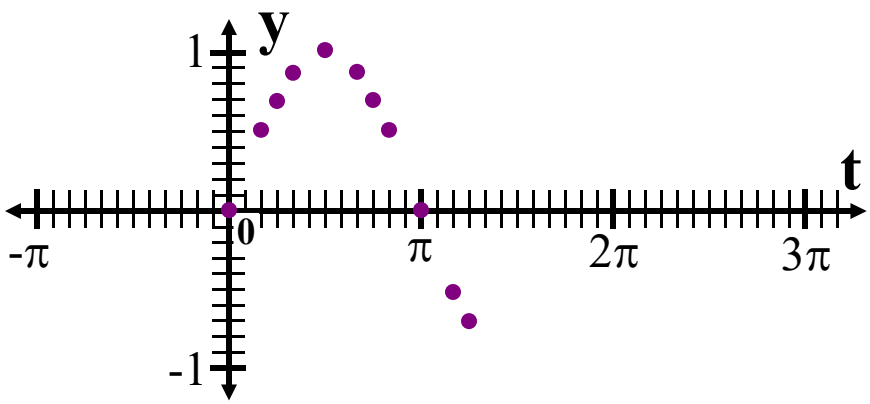
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

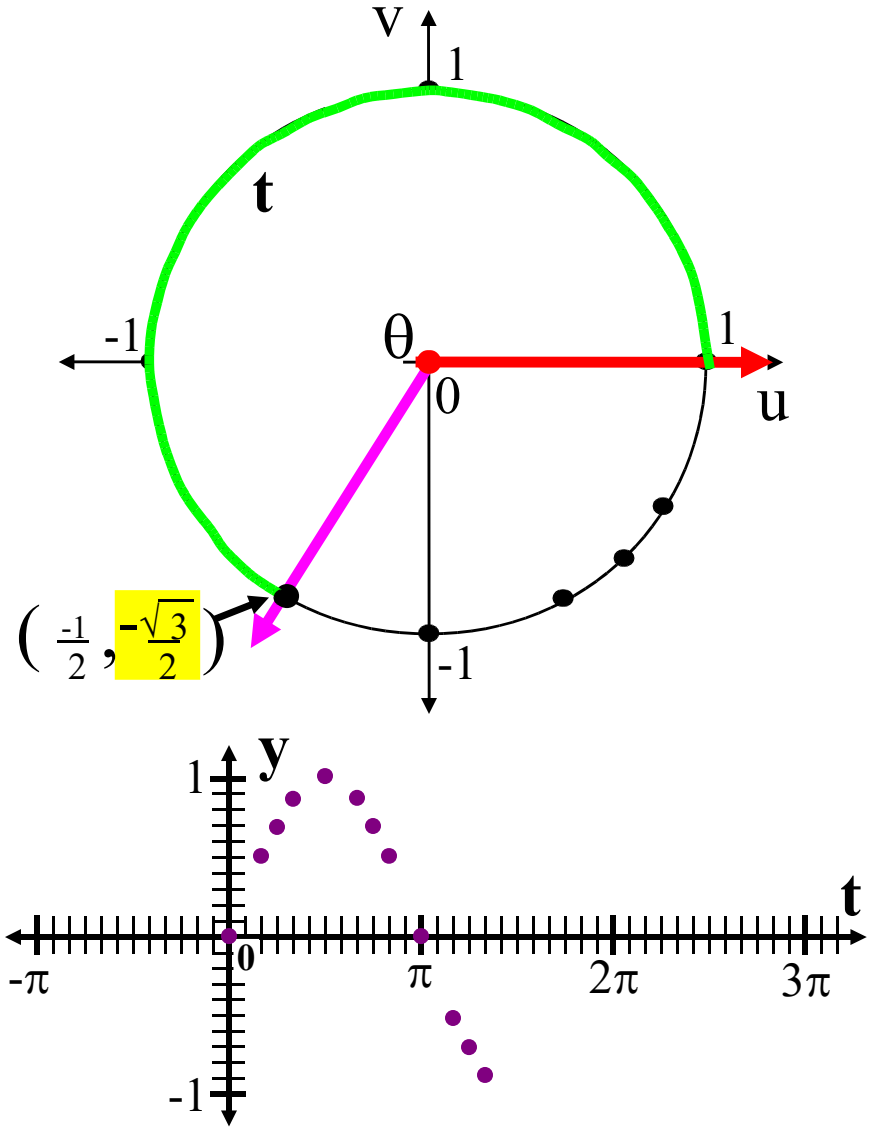
y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	
90°	π/2	1	270°	3π/2	
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u



The Circular Functions

y = Sin t and y = Cos t

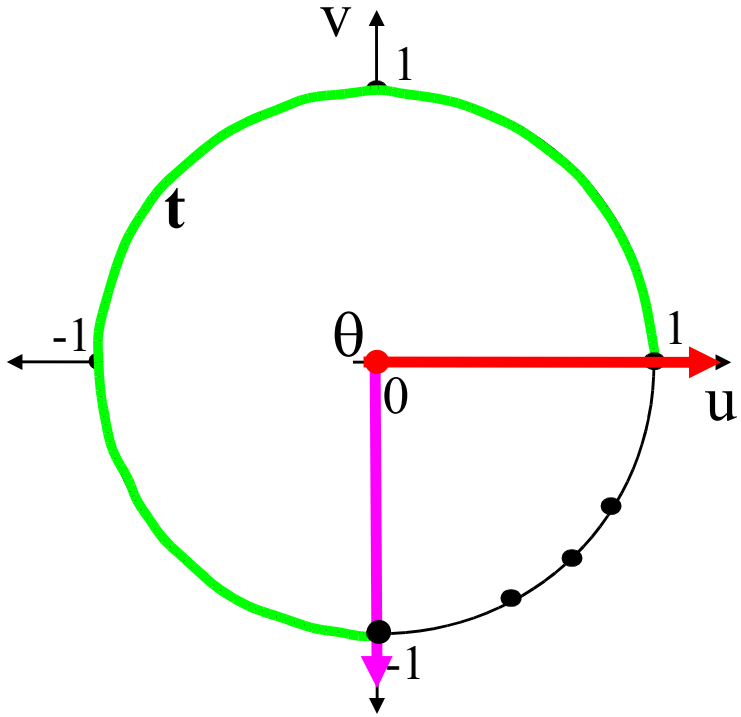
θ	t	Sin t
0°	0	0
30°	π/6	1/2
45°	π/4	√2/2
60°	π/3	√3/2
90°	π/2	1
120°	2π/3	√3/2
135°	3π/4	√2/2
150°	5π/6	1/2
180°	π	0

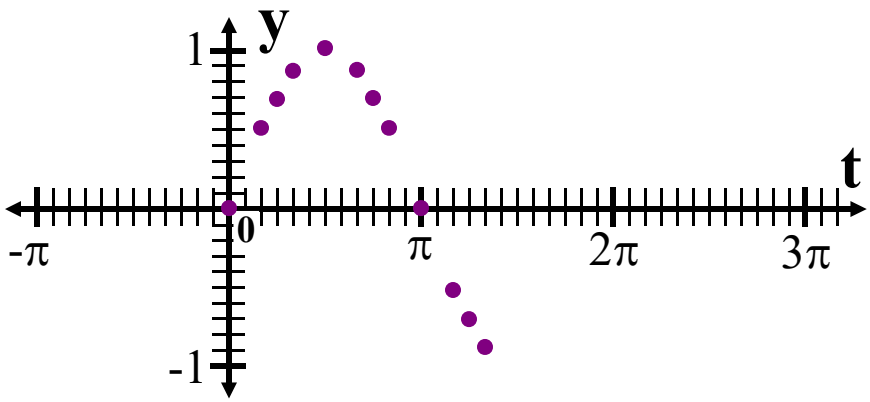
θ	t	Sin t
180°	π	0
210°	7π/6	-1/2
225°	5π/4	-√2/2
240°	4π/3	-√3/2
270°	3π/2	
300°	5π/3	
315°	7π/4	
330°	11π/6	
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
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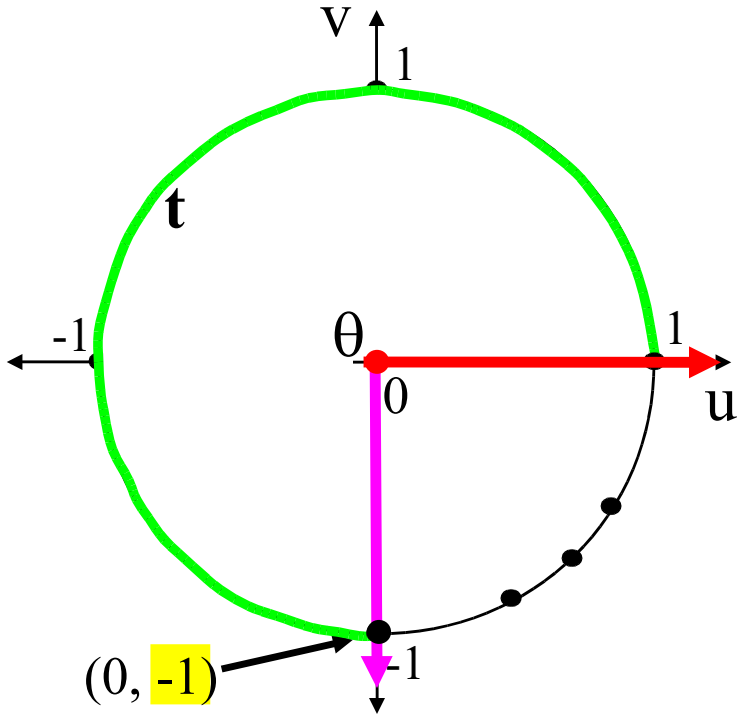
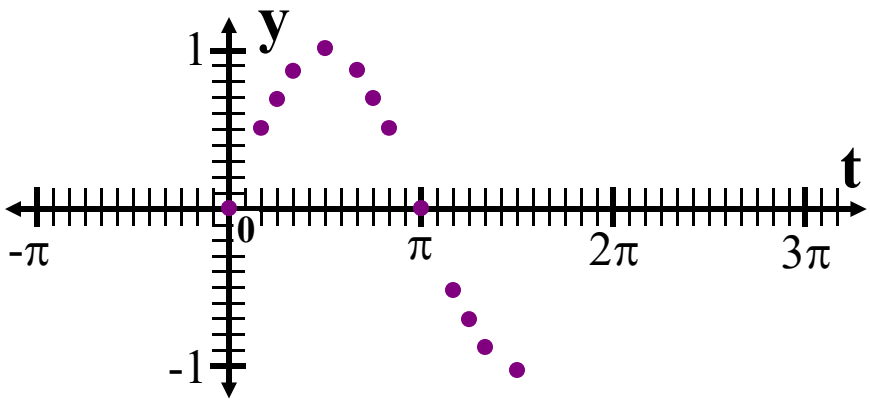
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
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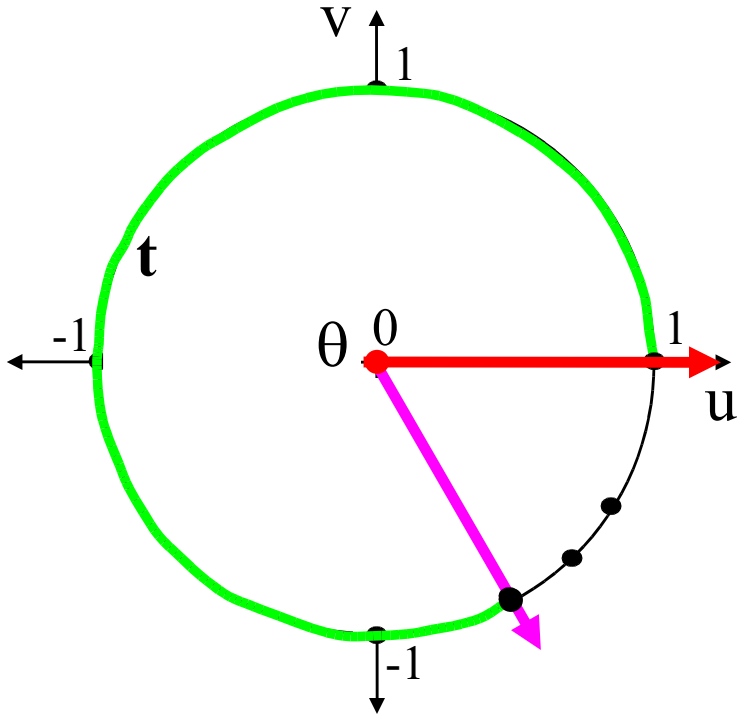
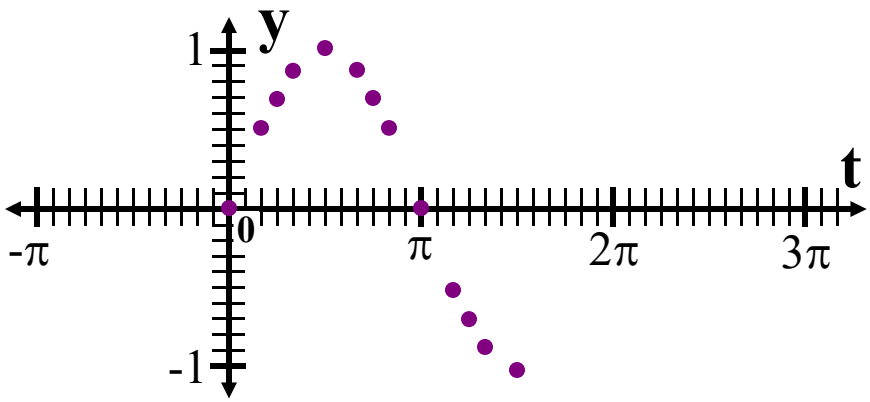
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

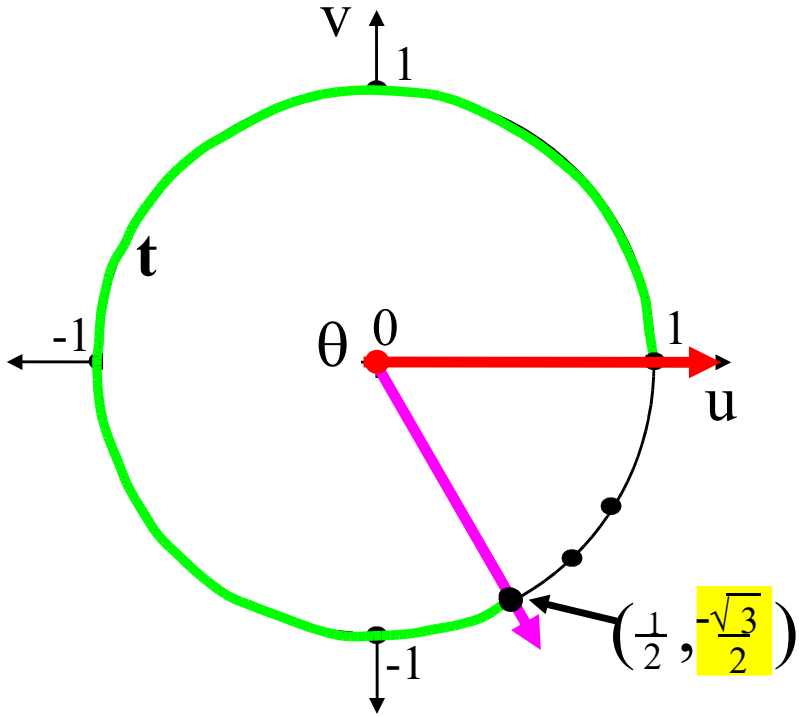
y = Sin t and **y = Cos t**

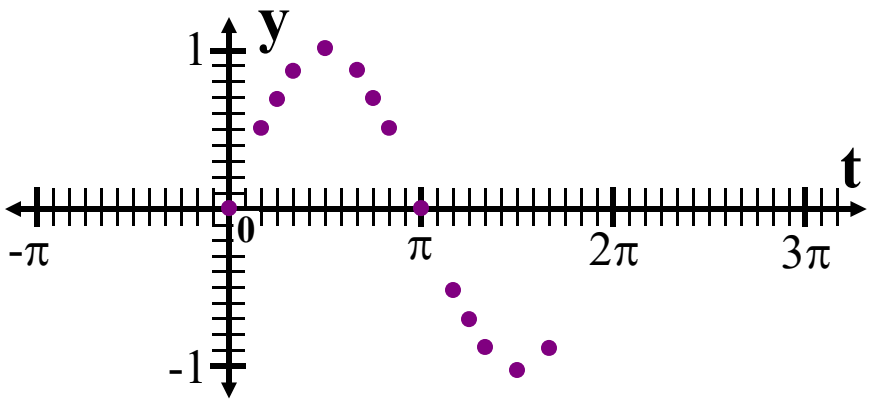
θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

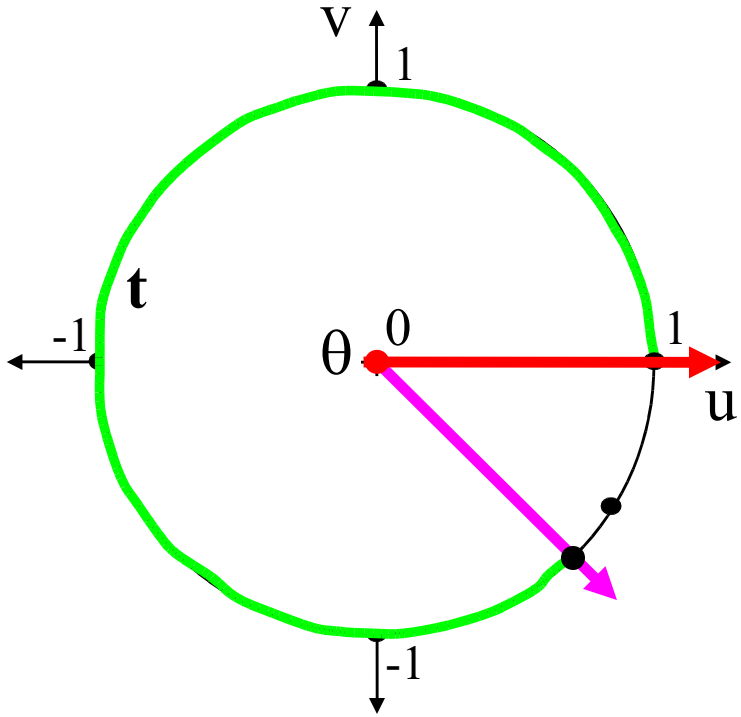
y = Sin t and y = Cos t

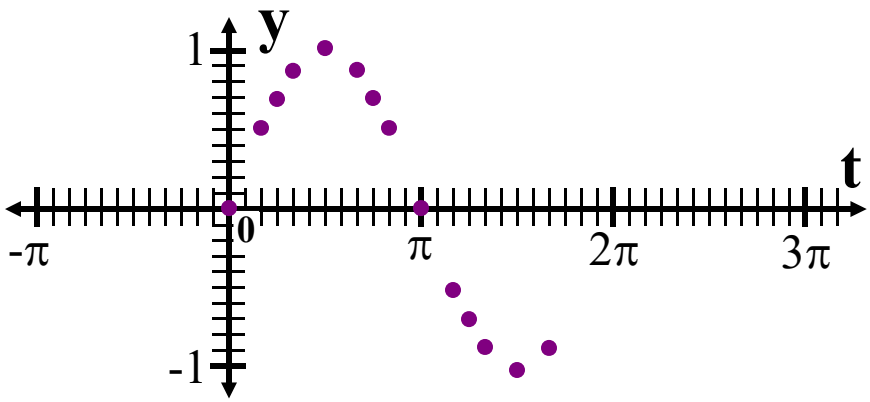
θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and **y = Cos t**

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	√2/2	225°	5π/4	-√2/2
60°	π/3	√3/2	240°	4π/3	-√3/2
90°	π/2	1	270°	3π/2	-1
120°	2π/3	√3/2	300°	5π/3	-√3/2
135°	3π/4	√2/2	315°	7π/4	
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
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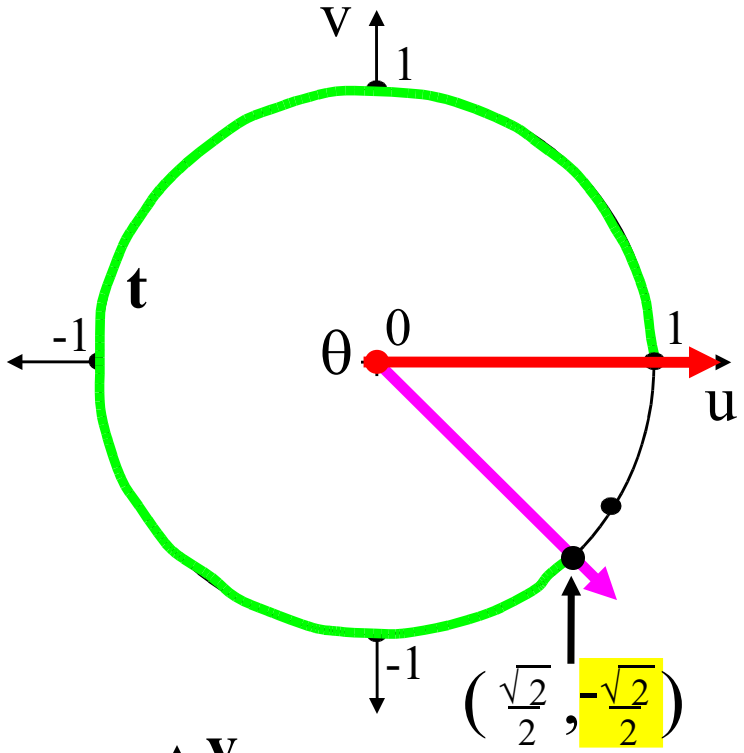
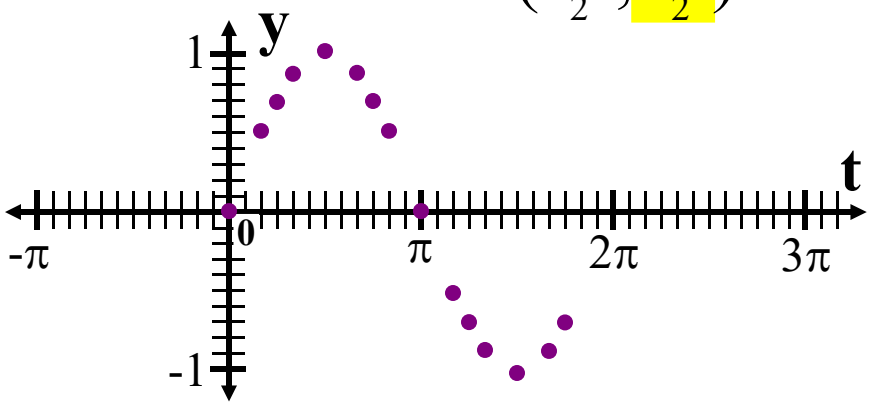
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	$-\sqrt{2}/2$
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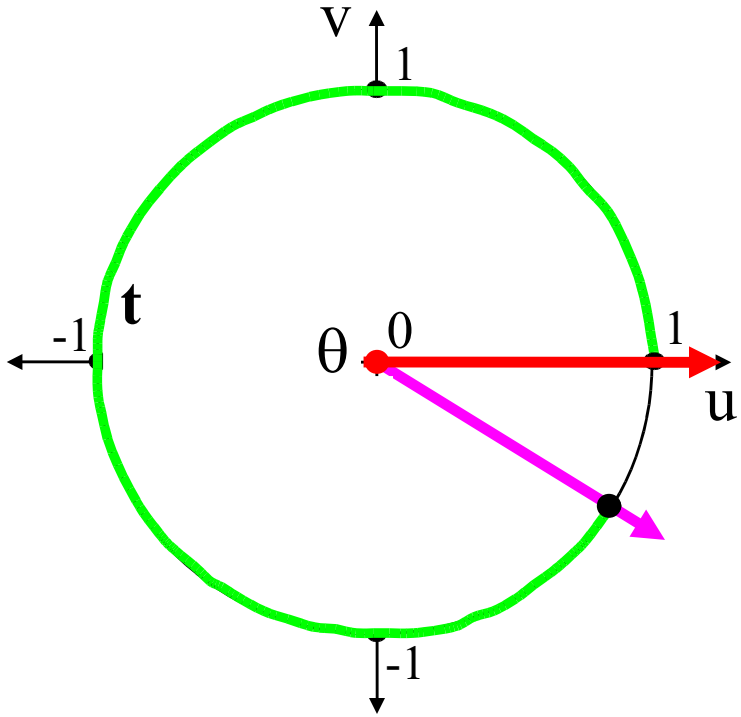
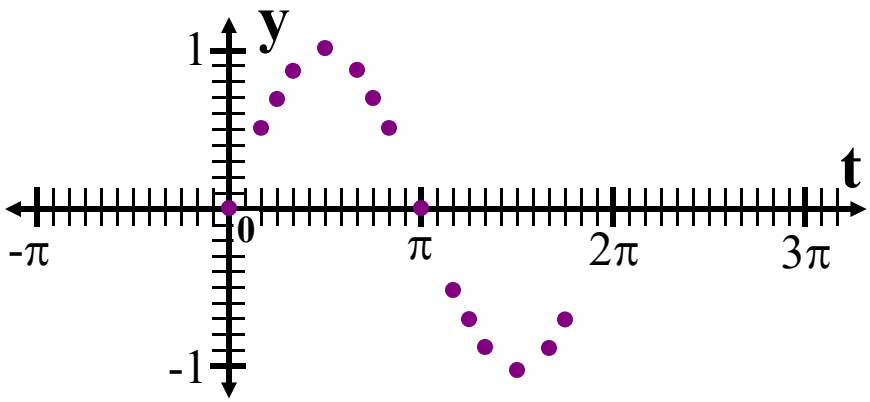
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	$-\sqrt{2}/2$
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	
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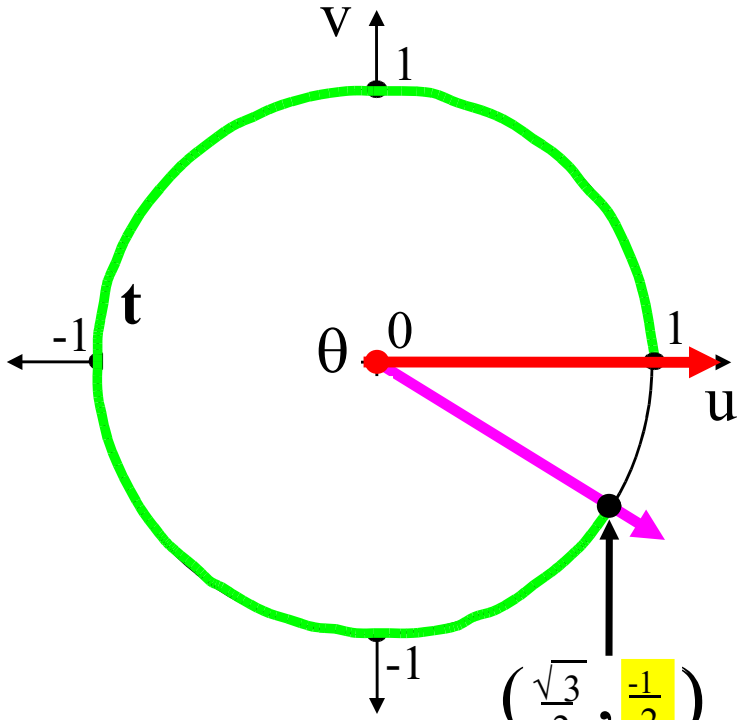
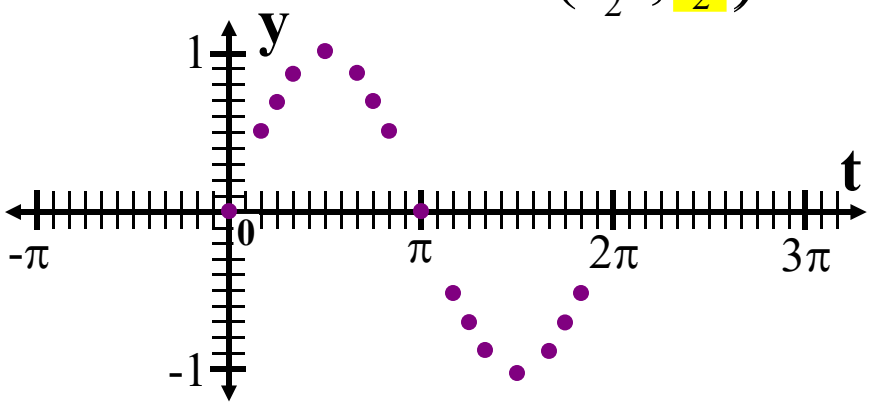
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and **y = Cos t**

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	√2/2	225°	5π/4	-√2/2
60°	π/3	√3/2	240°	4π/3	-√3/2
90°	π/2	1	270°	3π/2	-1
120°	2π/3	√3/2	300°	5π/3	-√3/2
135°	3π/4	√2/2	315°	7π/4	-√2/2
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	-1/2
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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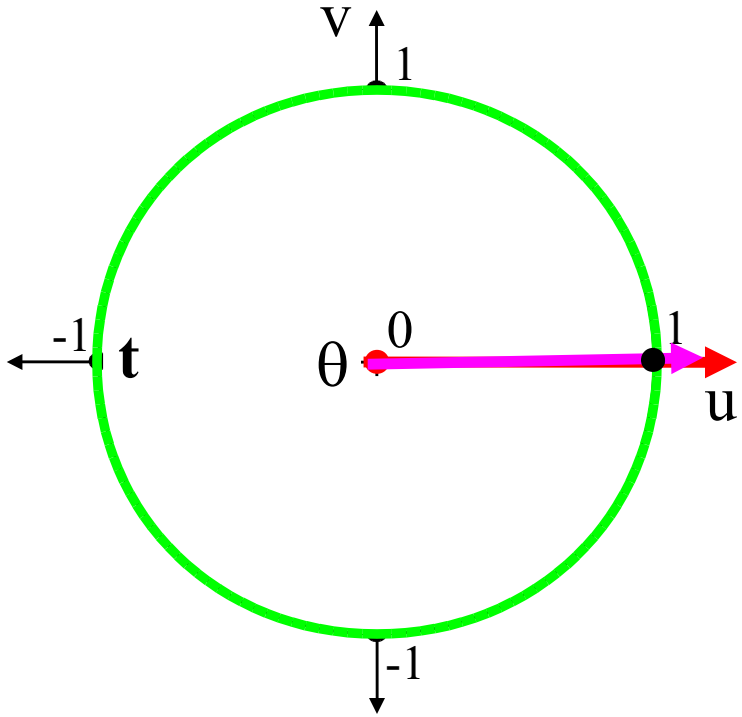

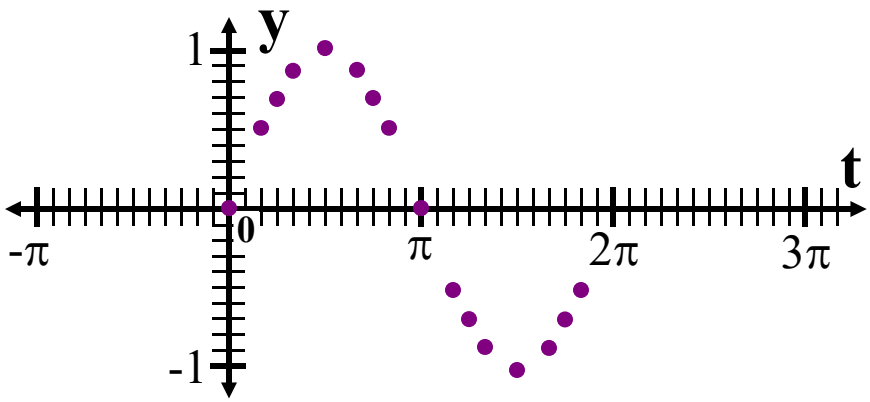

The Circular Functions

y = Sin t and **y = Cos t**

θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
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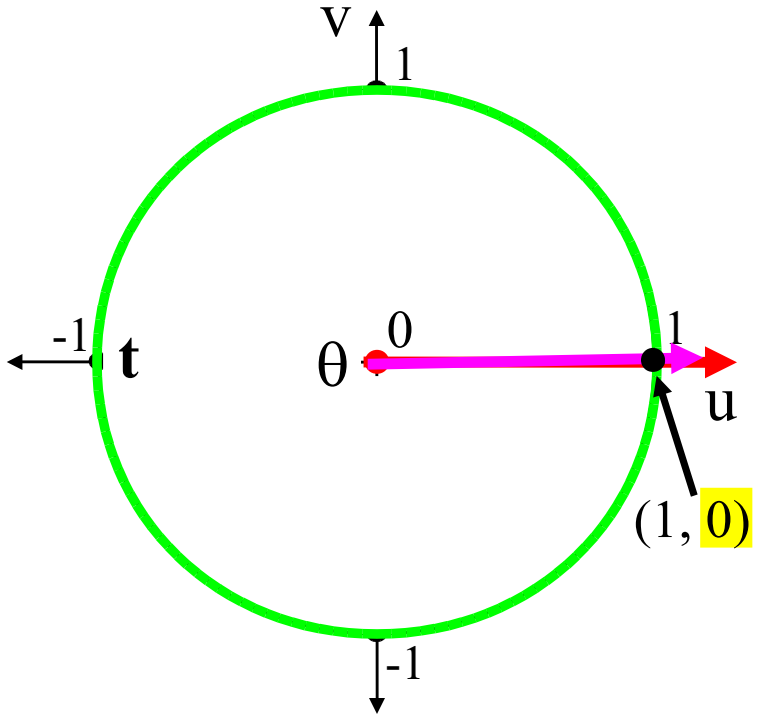
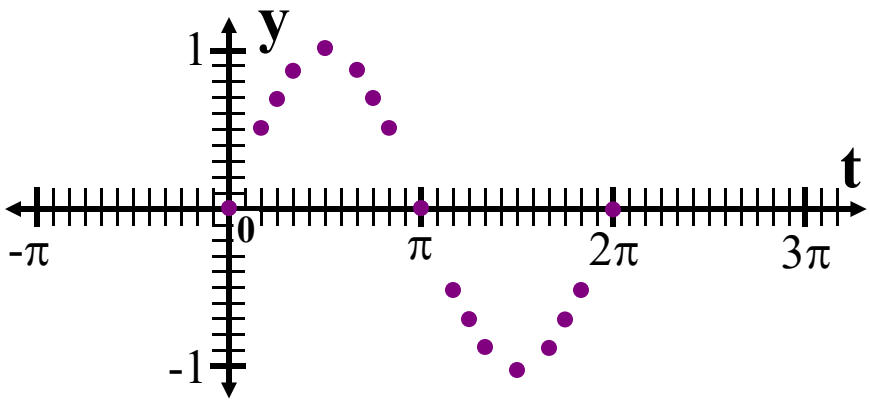
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	$-\sqrt{2}/2$
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	-1/2
180°	π	0	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

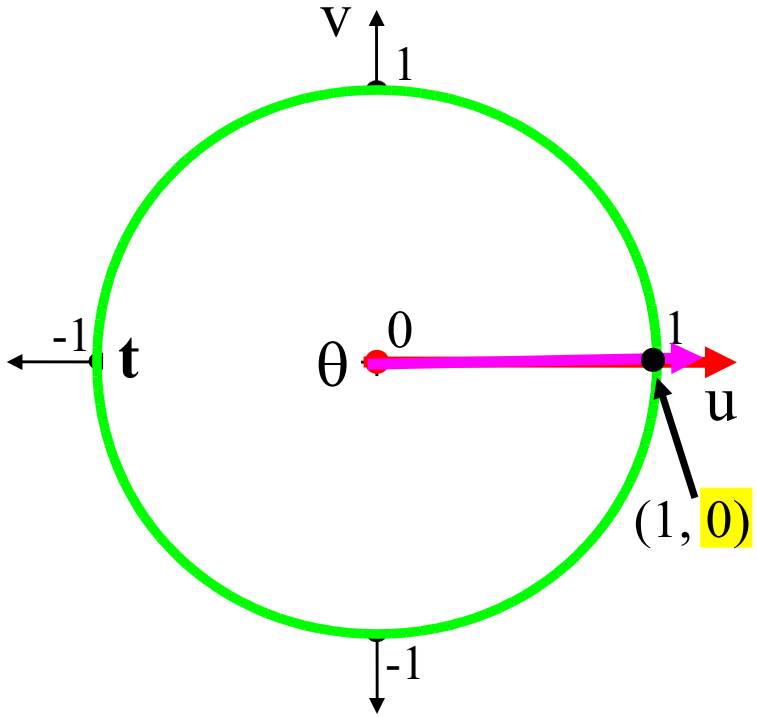
y = Sin t and **y = Cos t**

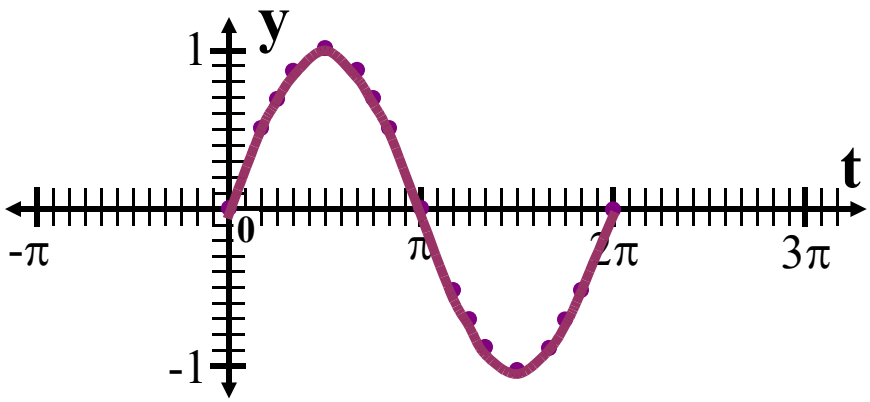
θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
135°	3π/4	$\sqrt{2}/2$	315°	7π/4	$-\sqrt{2}/2$
150°	5π/6	1/2	330°	$\frac{11\pi}{6}$	-1/2
180°	π	0	360°	2π	0

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

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θ	t	Sin t	θ	t	Sin t
0°	0	0	180°	π	0
30°	π/6	1/2	210°	7π/6	-1/2
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60°	π/3	$\sqrt{3}/2$	240°	4π/3	$-\sqrt{3}/2$
90°	π/2	1	270°	3π/2	-1
120°	2π/3	$\sqrt{3}/2$	300°	5π/3	$-\sqrt{3}/2$
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180°	π	0	360°	2π	0

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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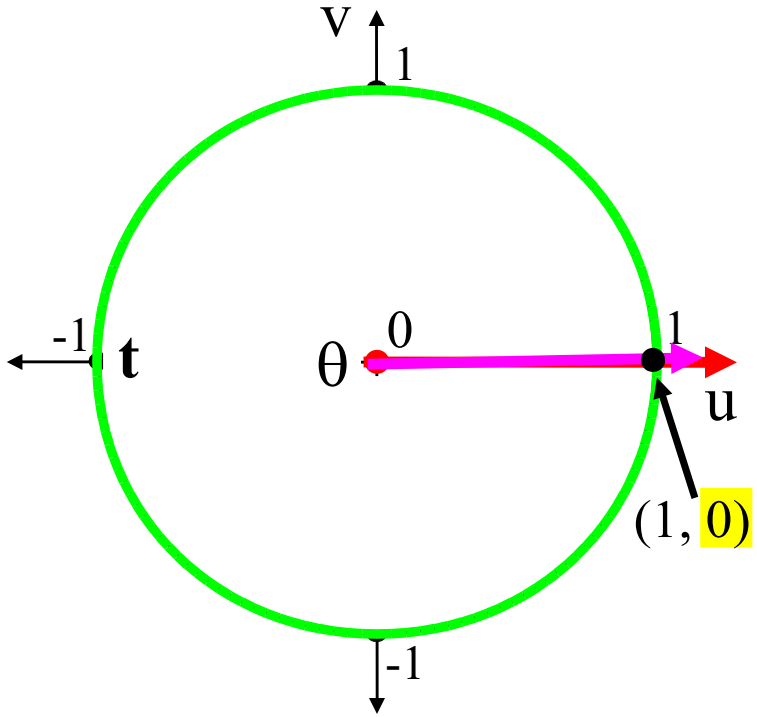

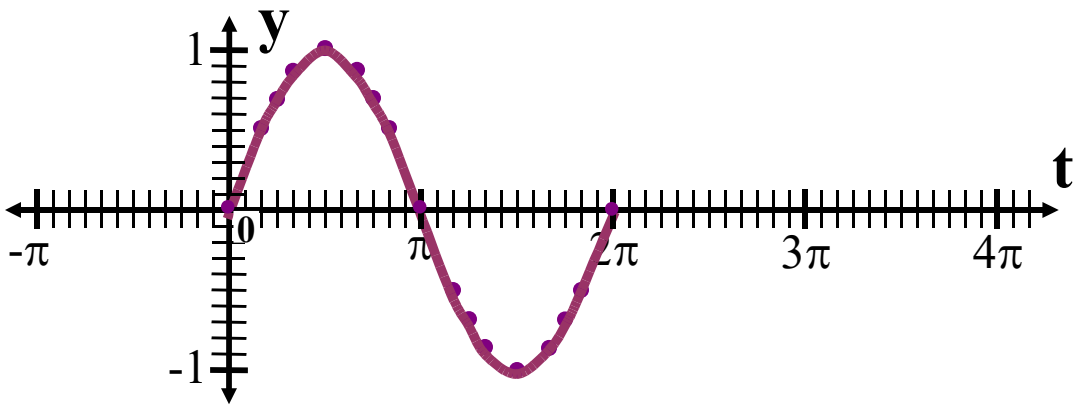

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y = Sin t and **y = Cos t**

θ	t	Sin t
360°	2π	0
390°	$\frac{13\pi}{6}$	
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540°	3π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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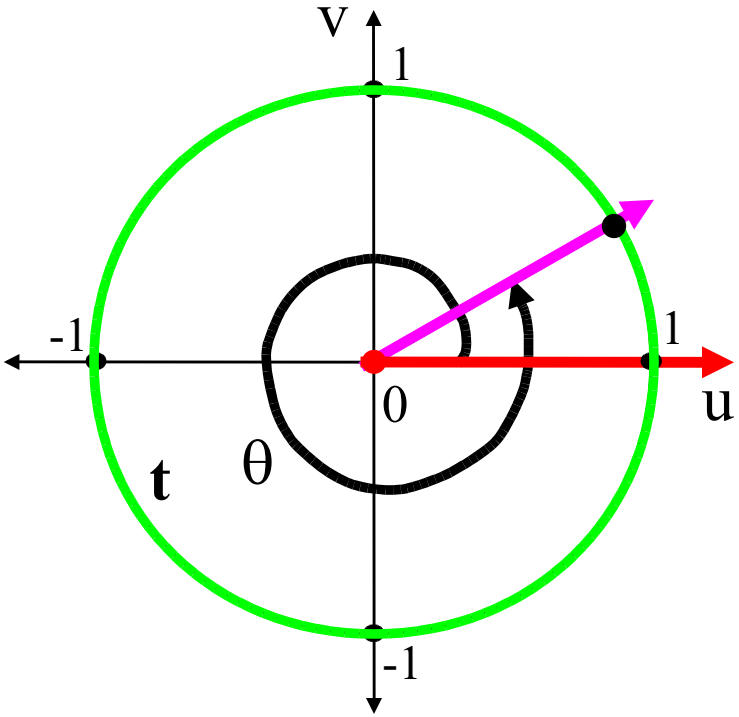

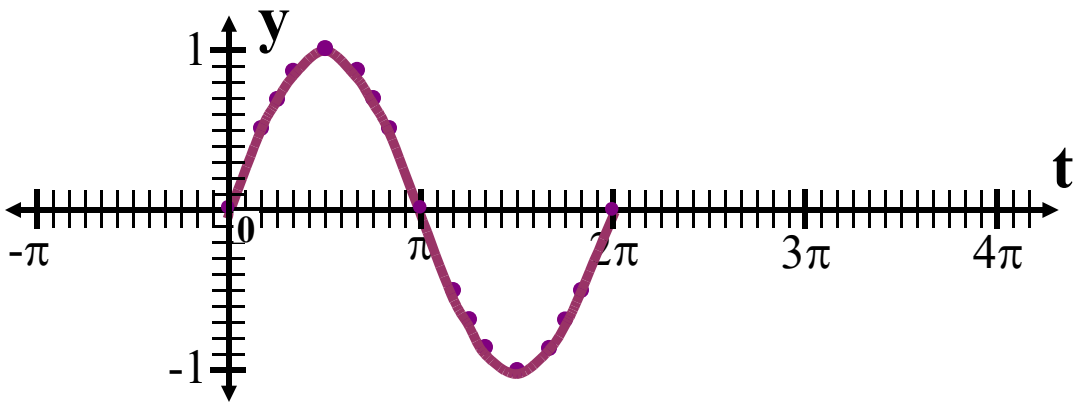

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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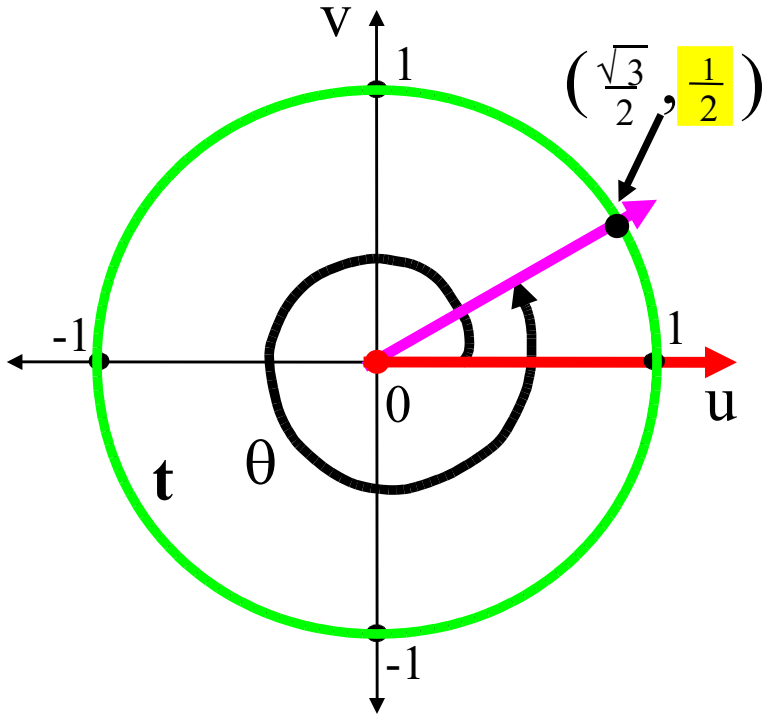

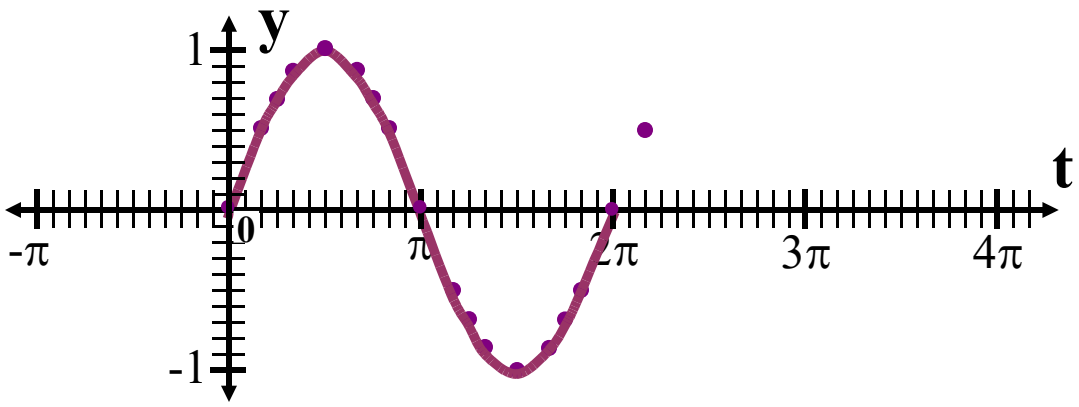

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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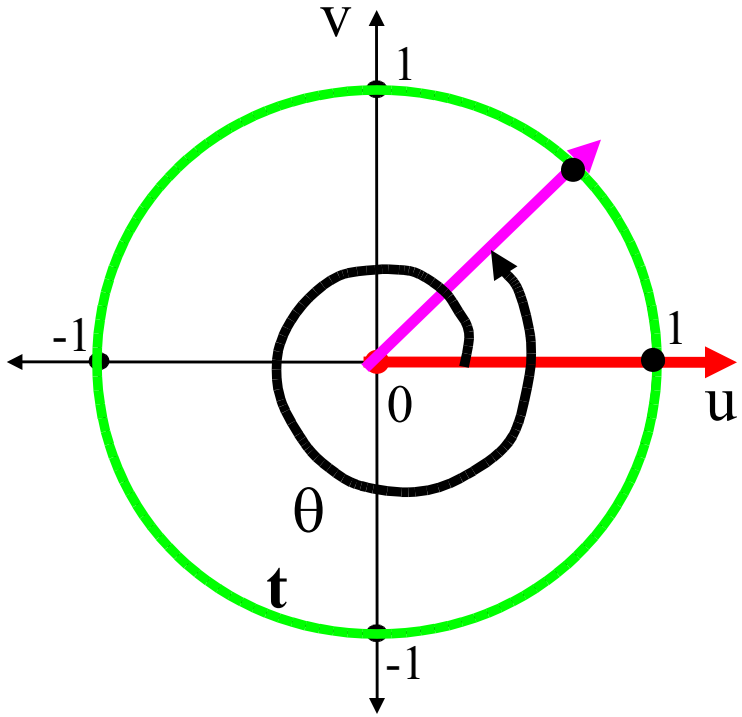

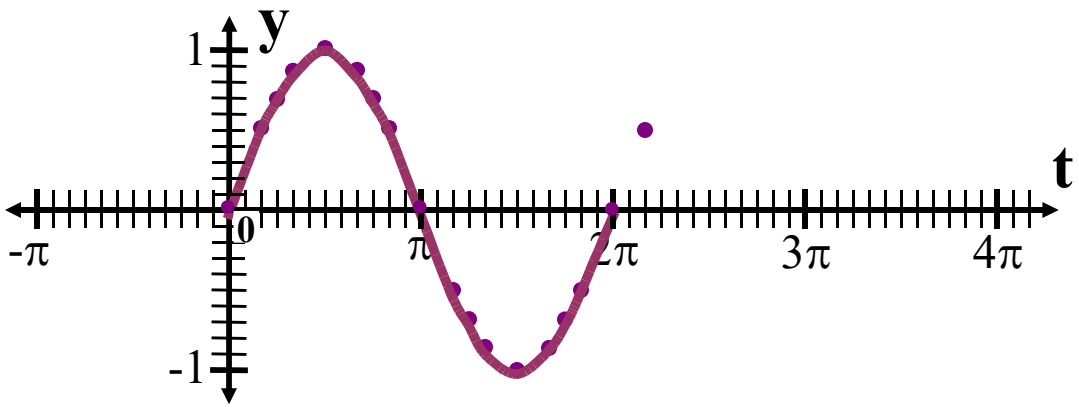

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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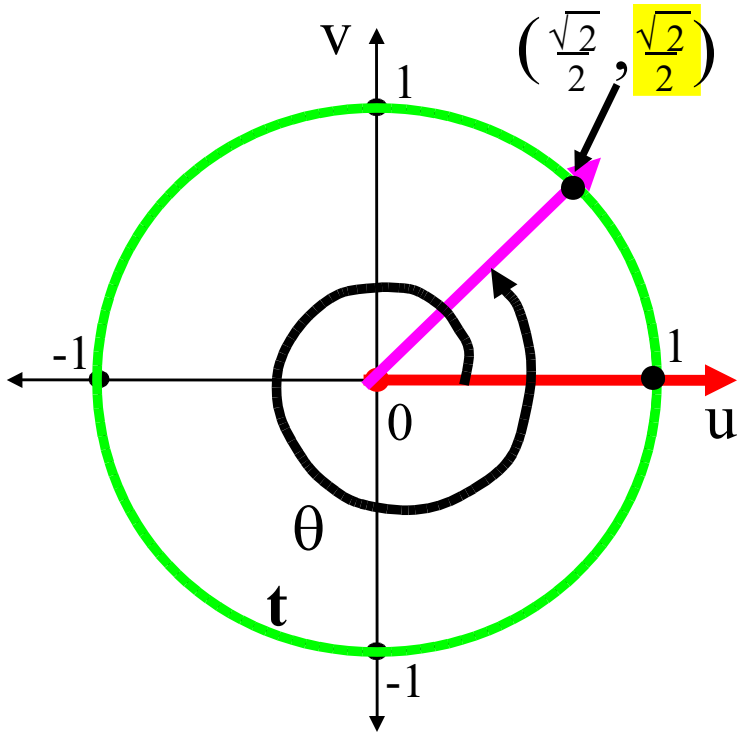

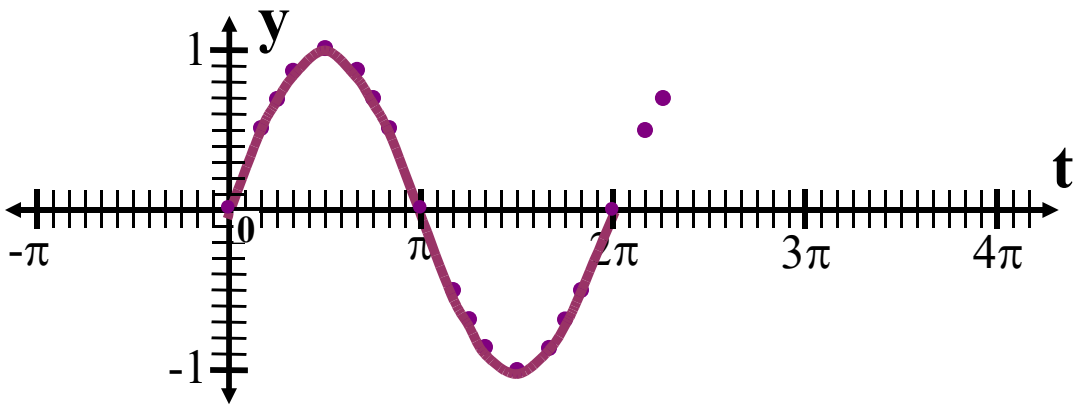

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Part 5 : The Circular Functions

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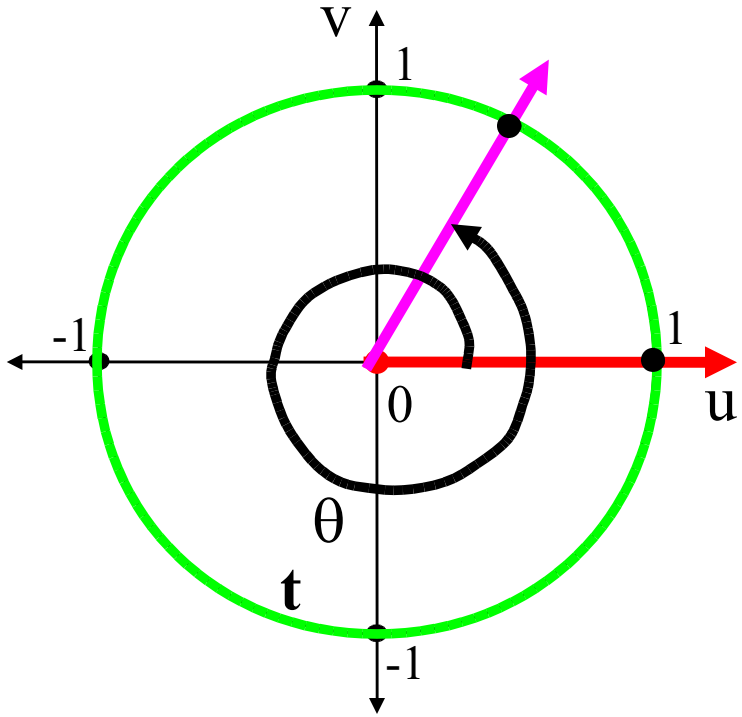

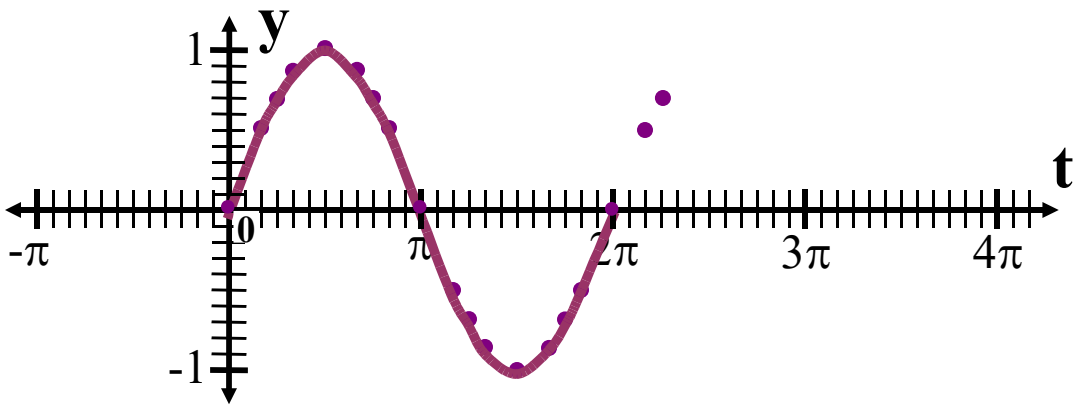

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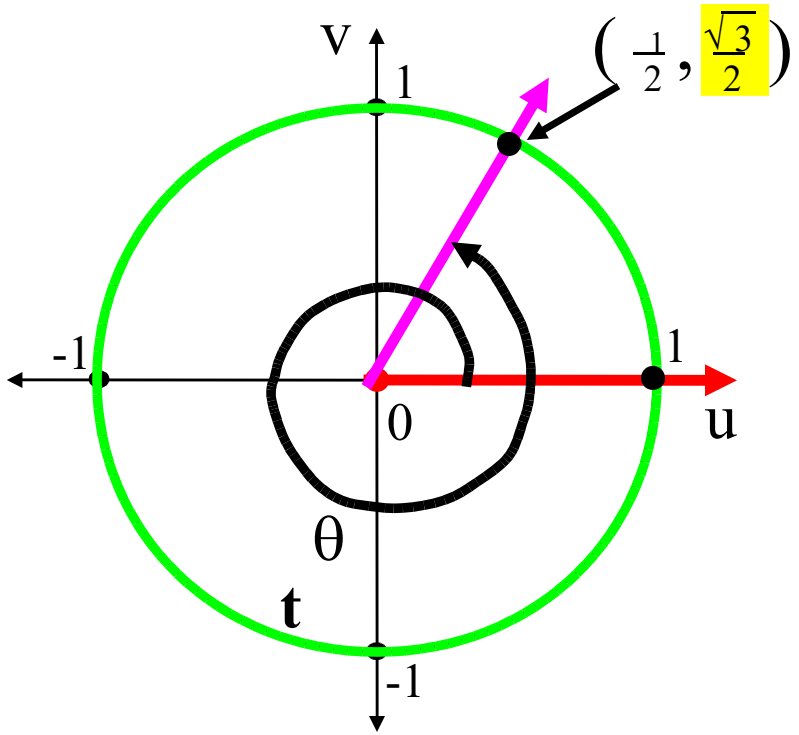
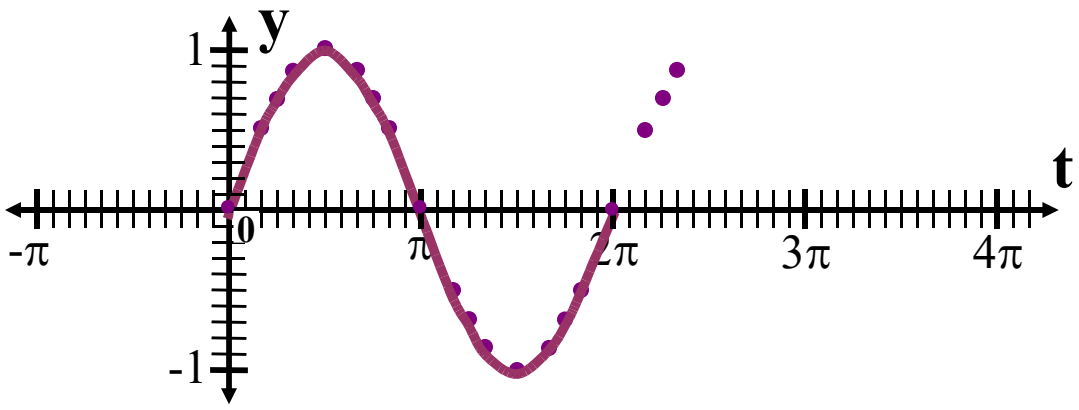
Part 5 : The Circular Functions





Sin t = v and Cos t = u

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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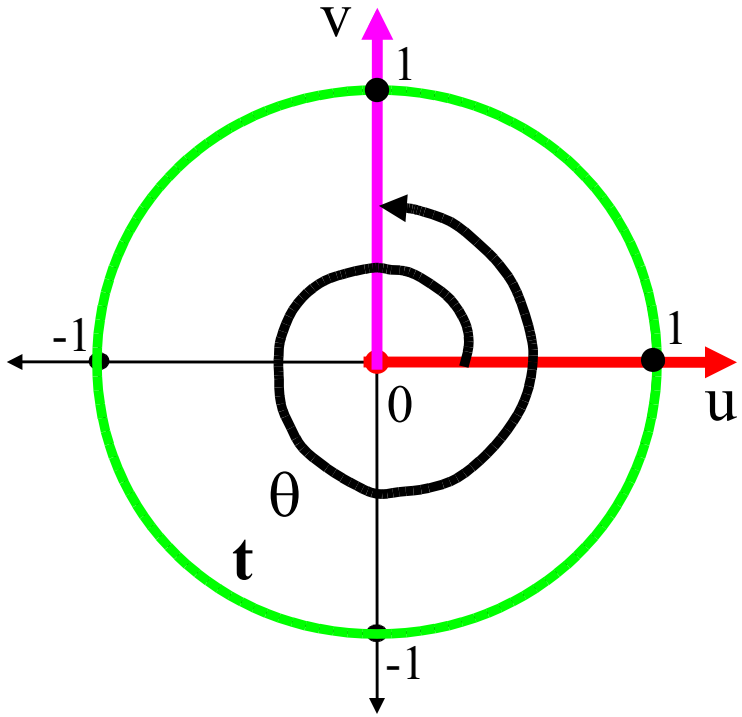

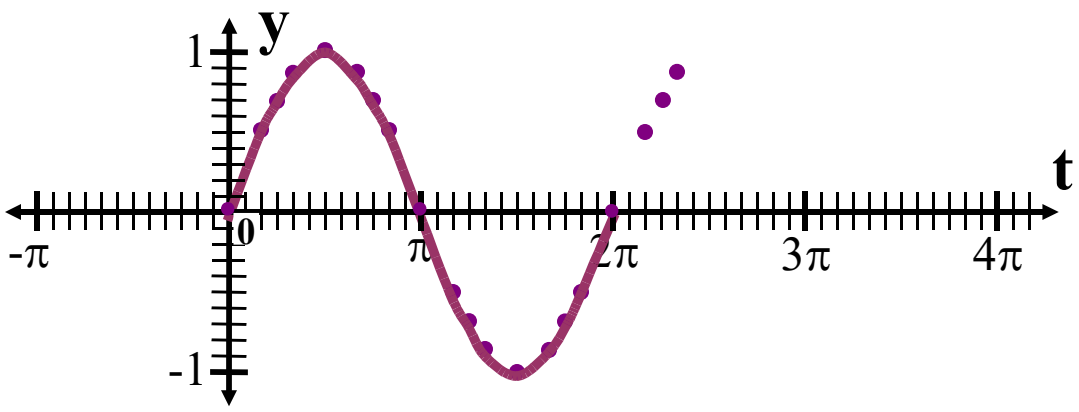

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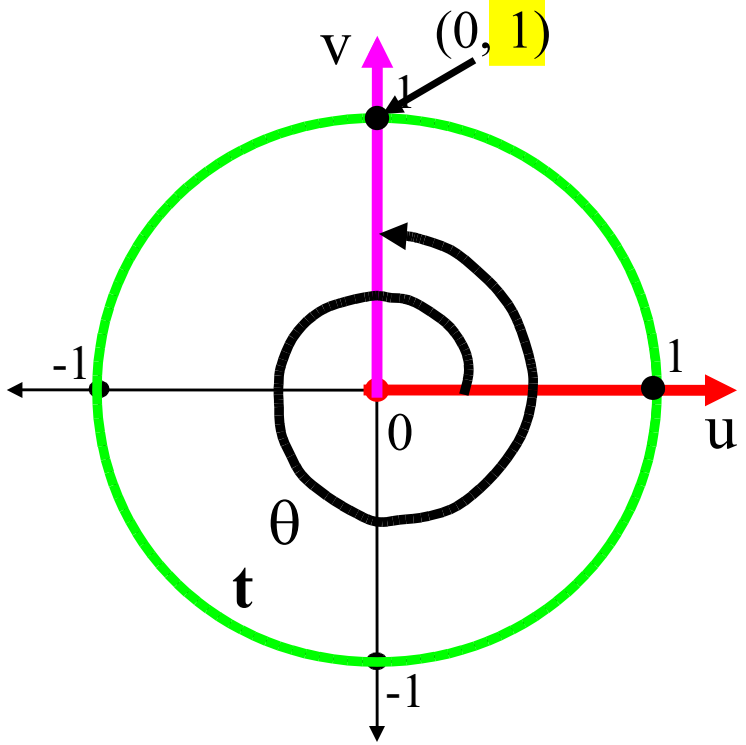
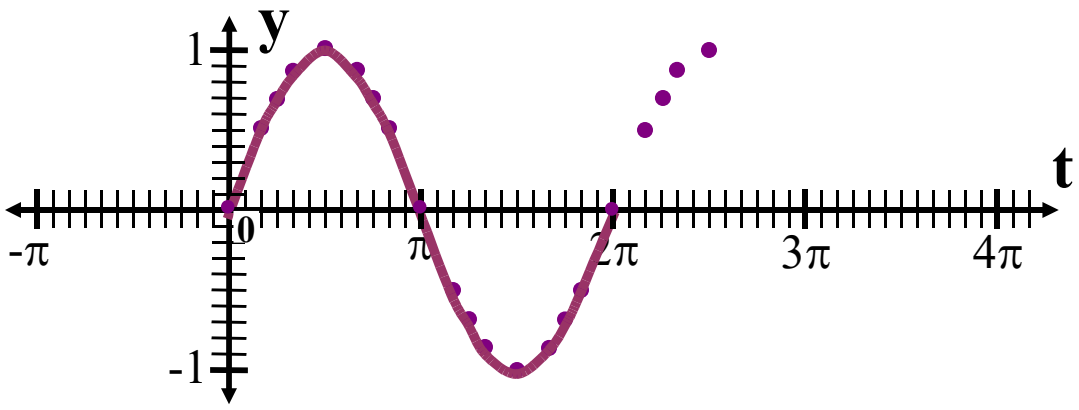
Part 5 : The Circular Functions





Sin t = v and Cos t = u

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Part 5 : The Circular Functions

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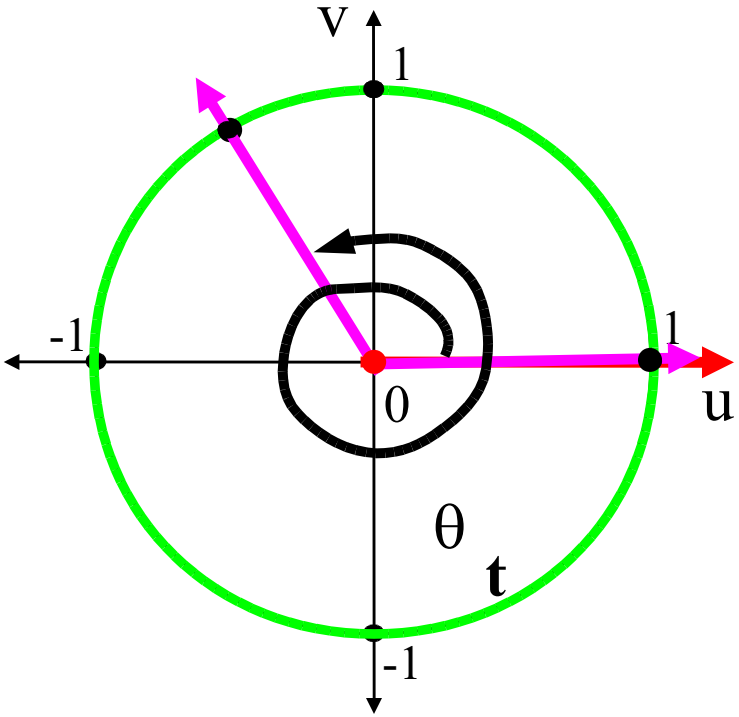

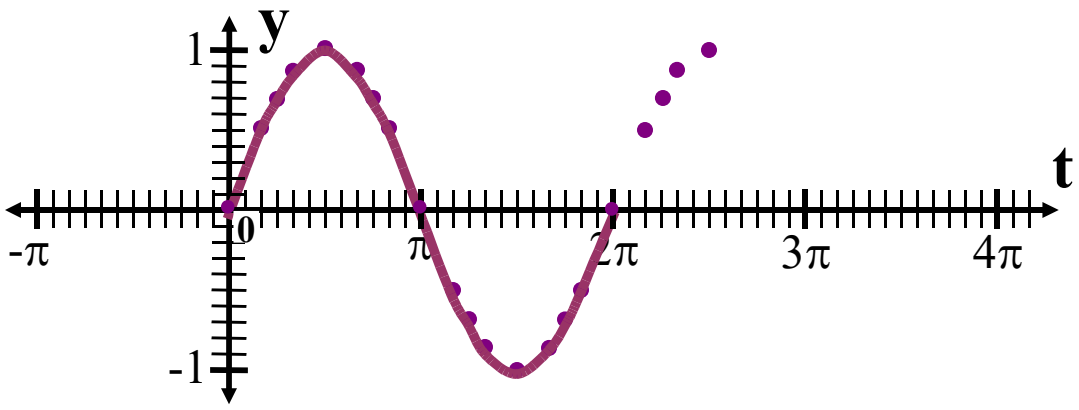

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Part 5 : The Circular Functions

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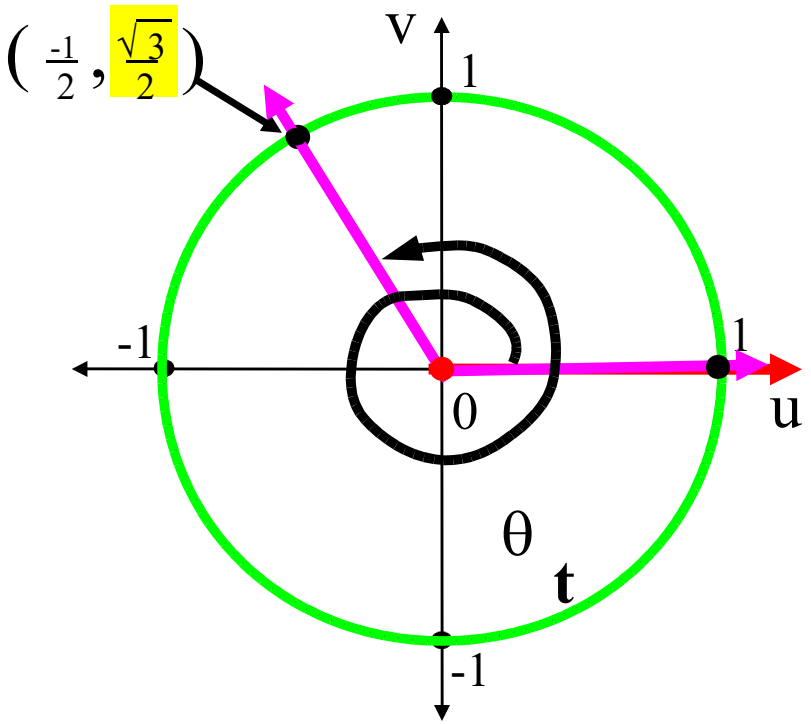

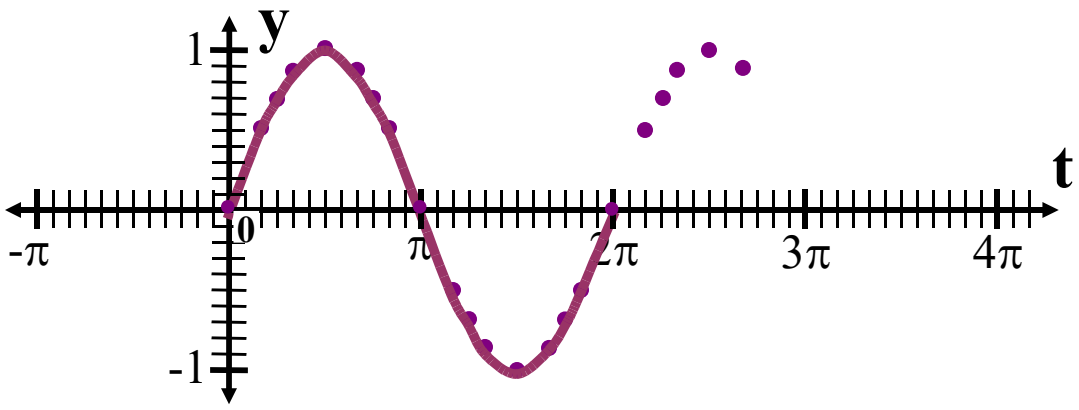

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Part 5 : The Circular Functions

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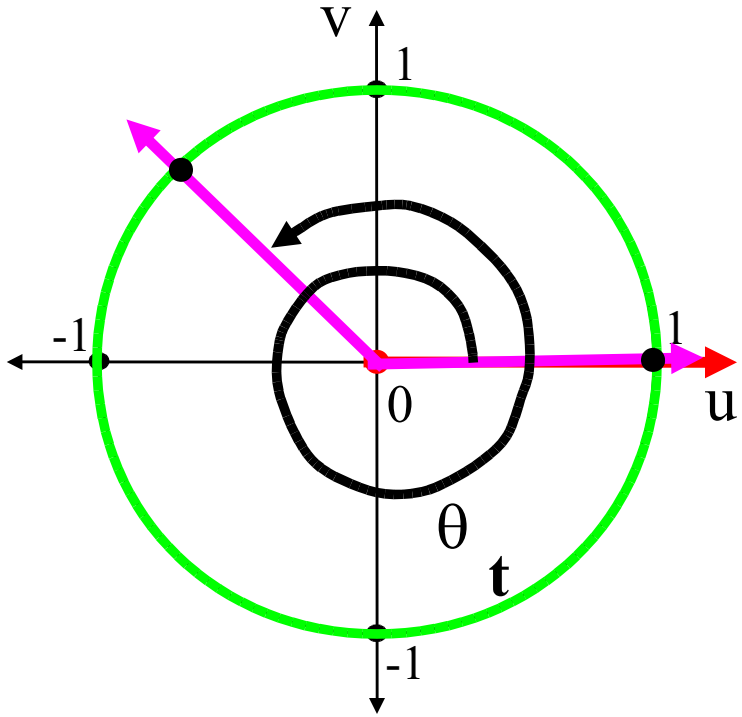

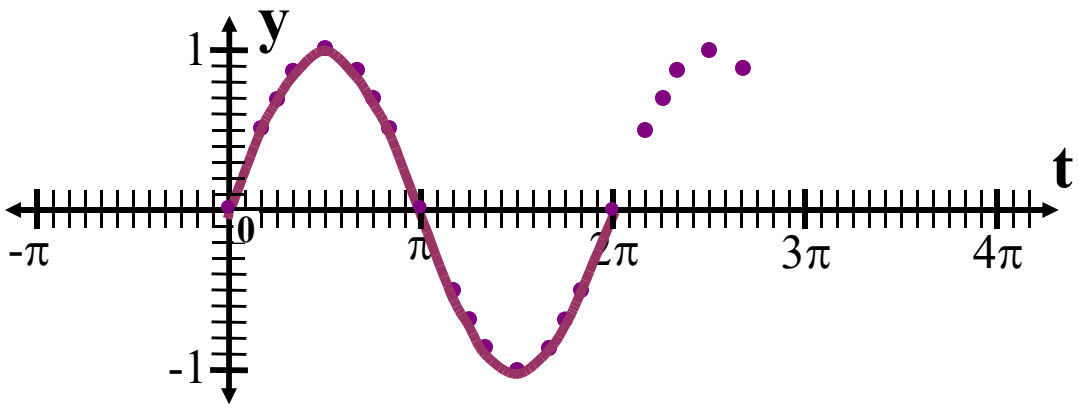

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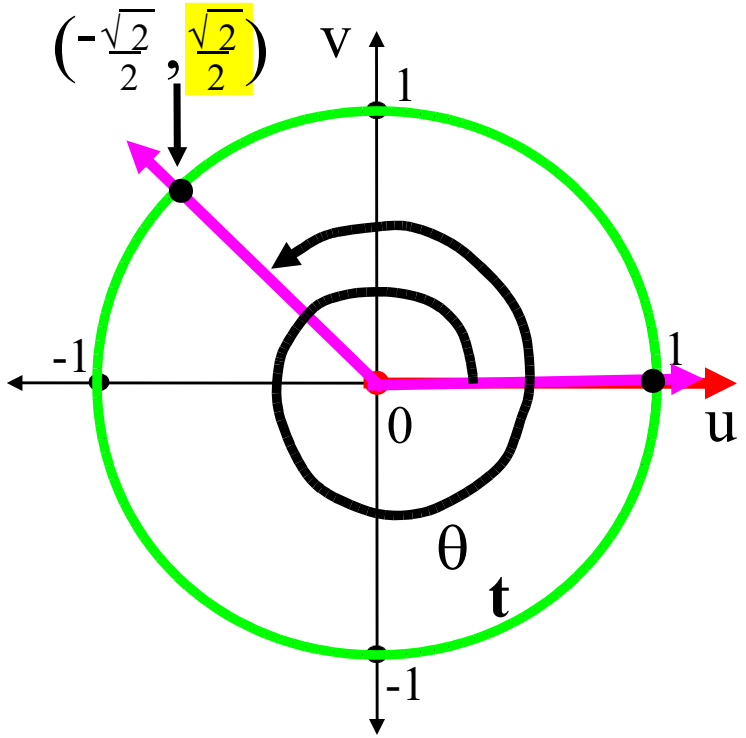
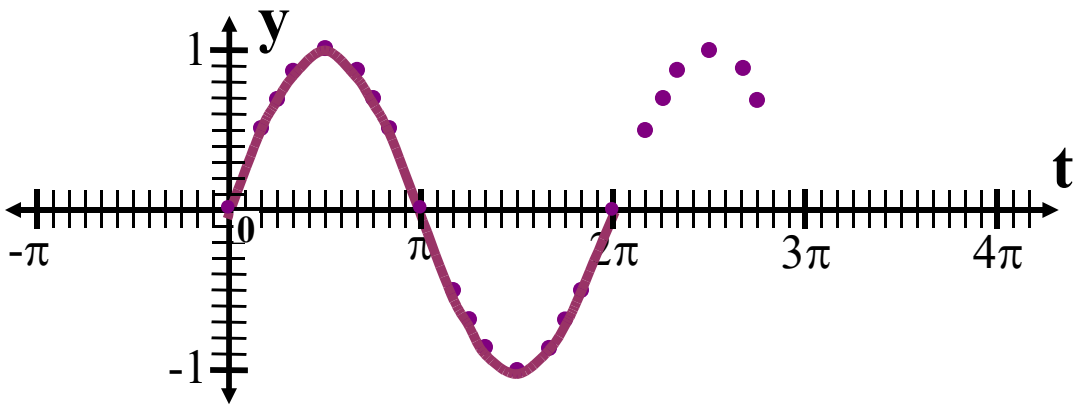
Part 5 : The Circular Functions





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Part 5 : The Circular Functions

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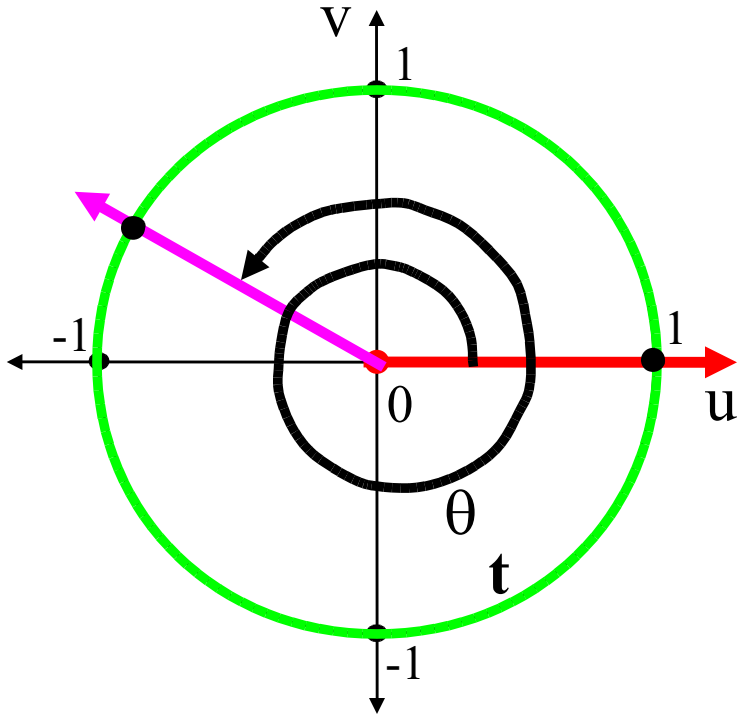

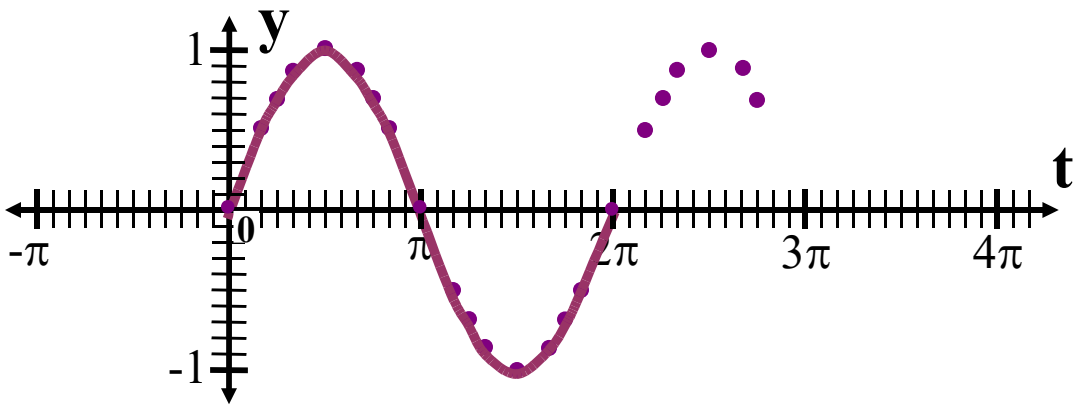

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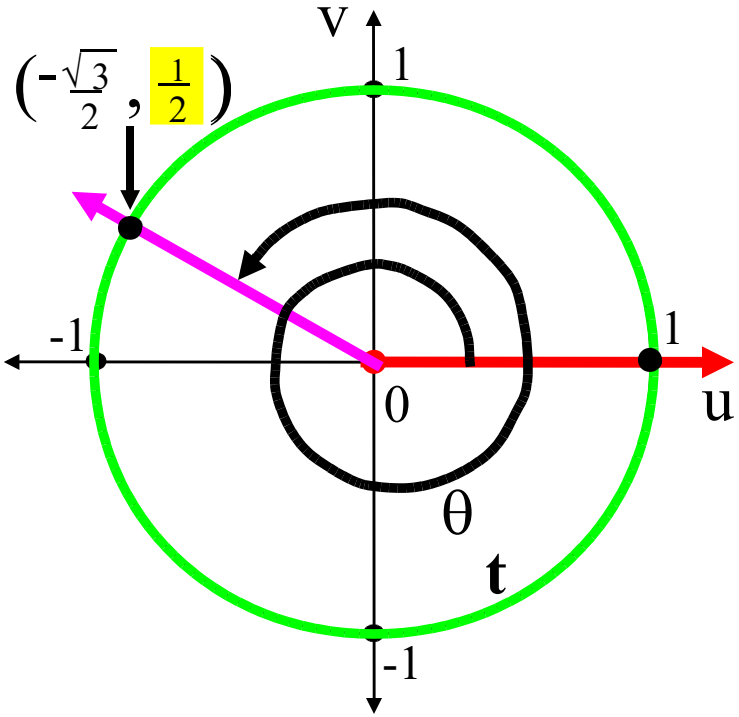

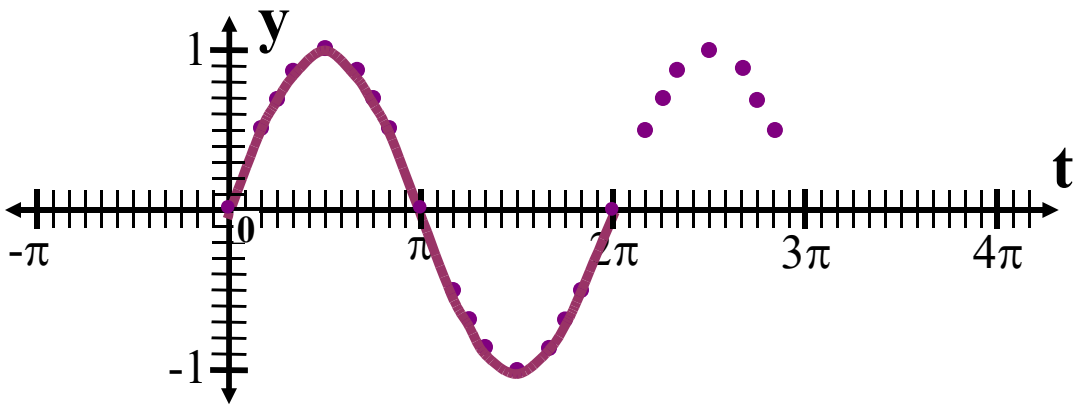

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Part 5 : The Circular Functions

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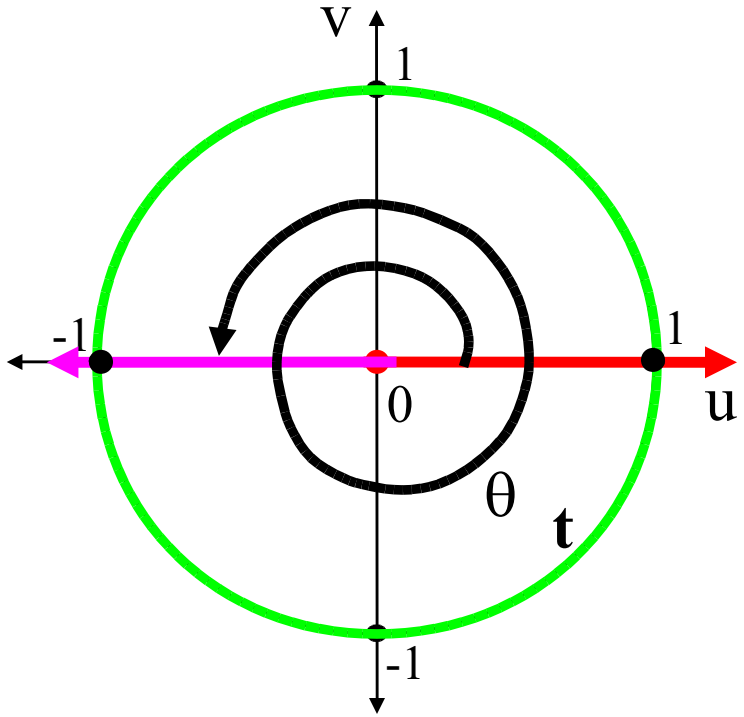

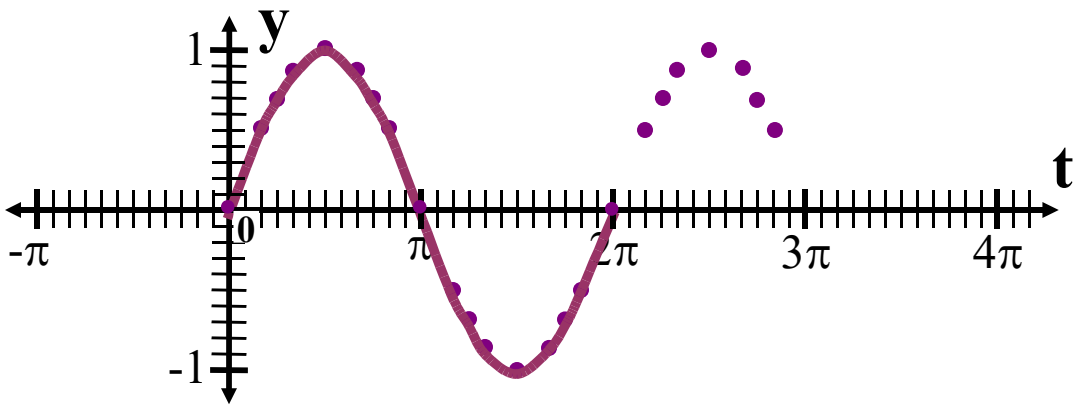

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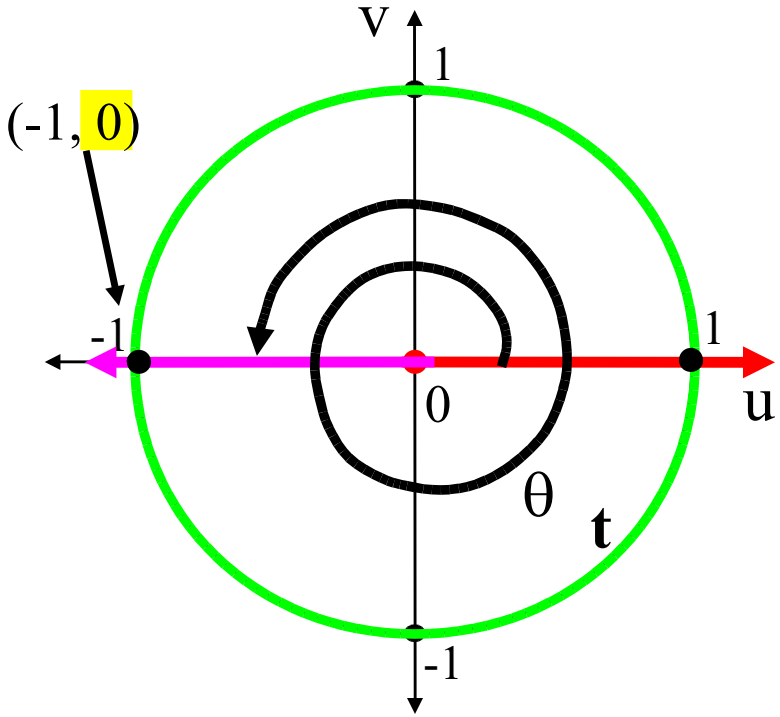
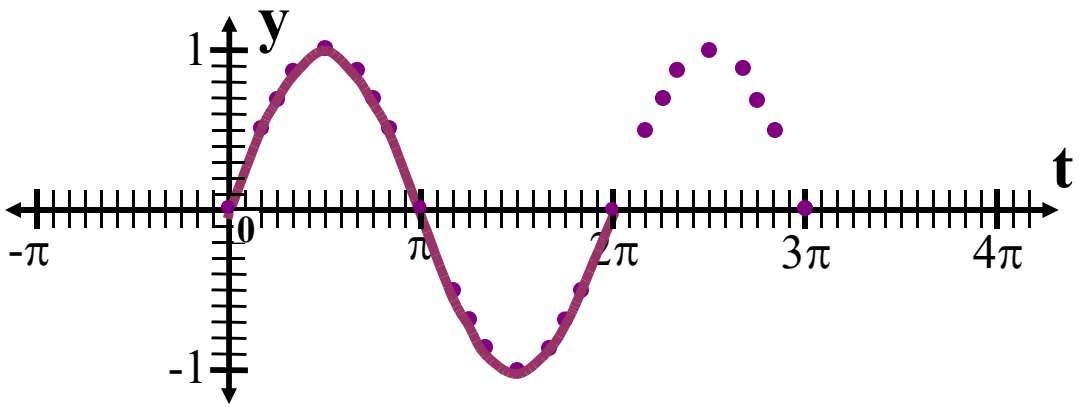
Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

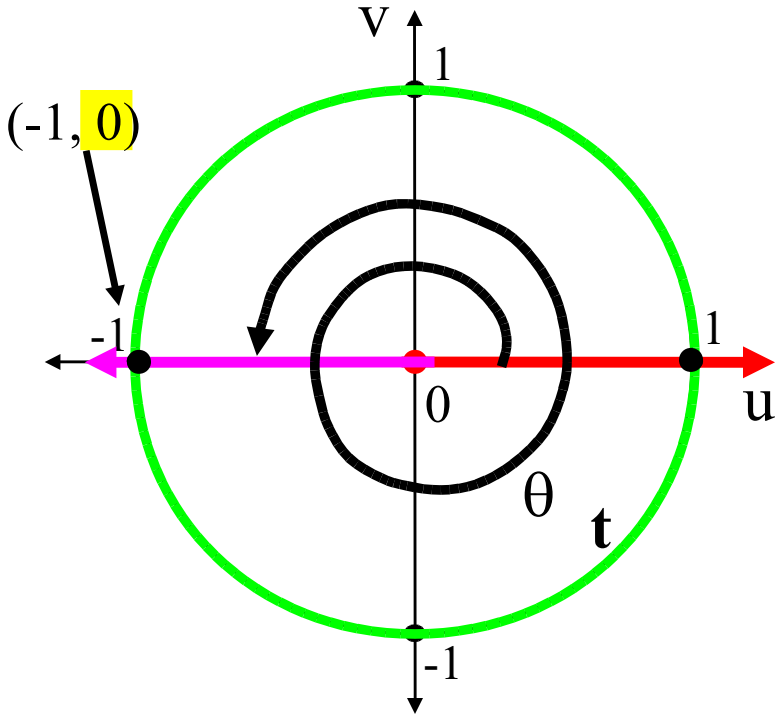
y = Sin t and y = Cos t

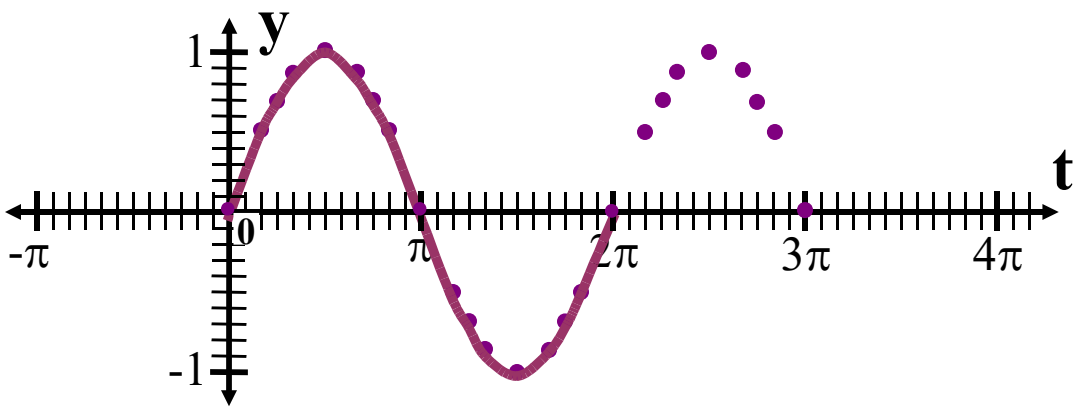
θ	t	Sin t
360°	2π	0
390°	$\frac{13\pi}{6}$	1/2
405°	$\frac{9\pi}{4}$	$\sqrt{2}/2$
420°	$\frac{7\pi}{3}$	$\sqrt{3}/2$
450°	$\frac{5\pi}{2}$	1
480°	$\frac{8\pi}{3}$	$\sqrt{3}/2$
495°	$\frac{11\pi}{4}$	$\sqrt{2}/2$
510°	$\frac{17\pi}{6}$	1/2
540°	3π	0

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

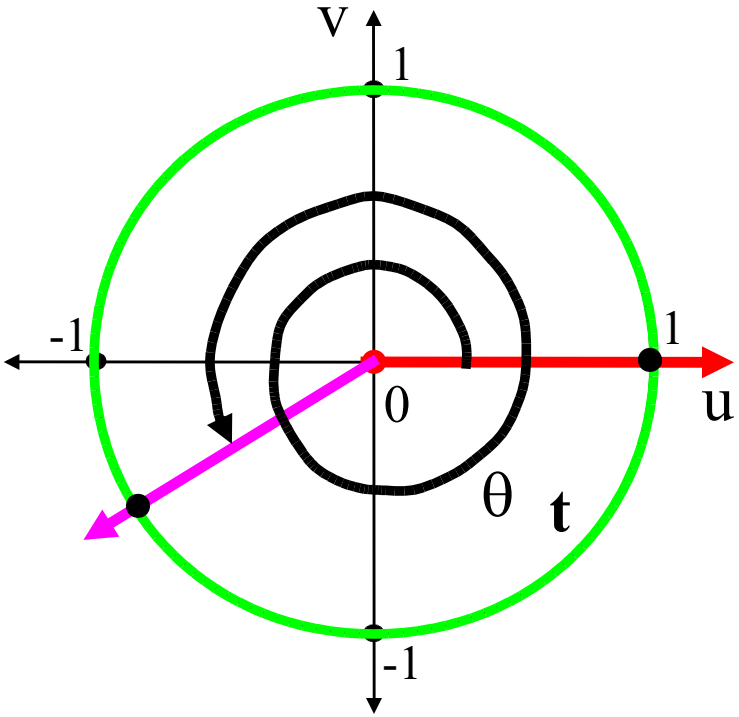
y = Sin t and **y = Cos t**

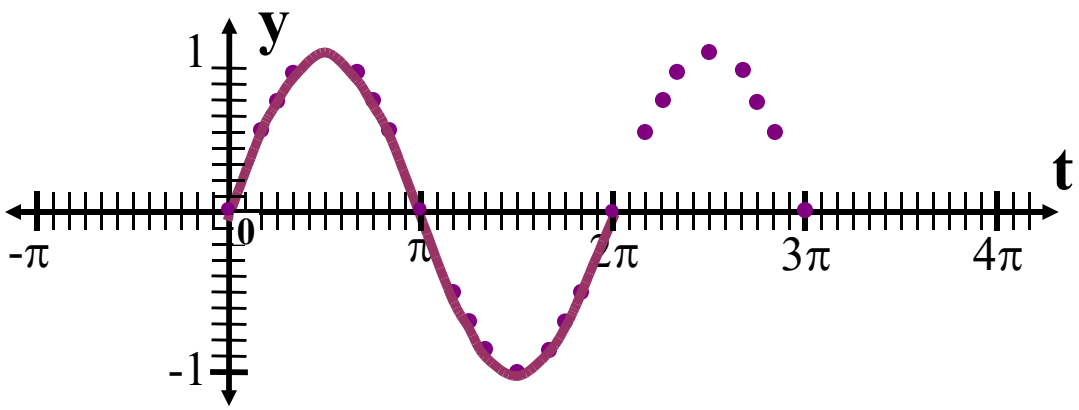
θ	t	Sin t
540°	3π	0
570°		
585°		
600°		
630°		
660°		
675°		
690°		
720°		

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

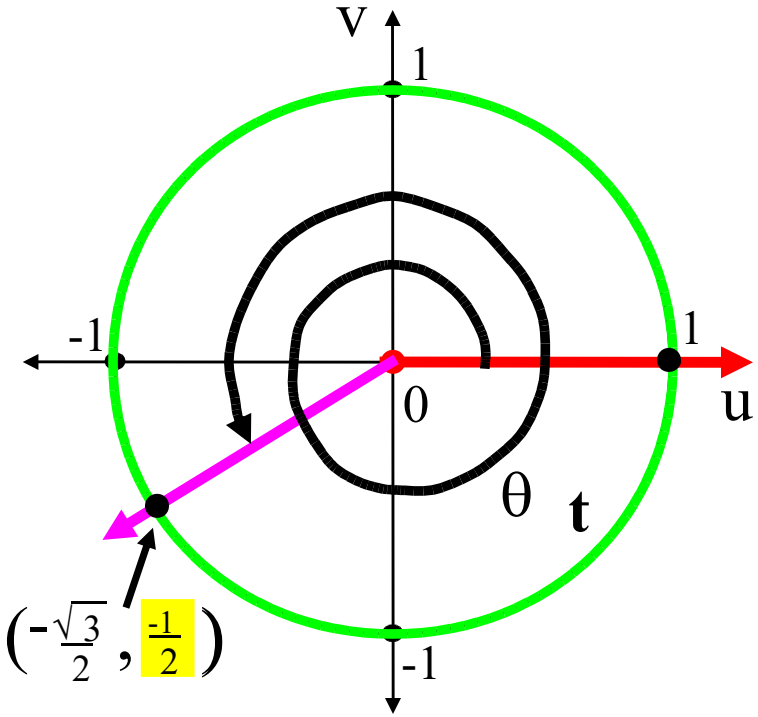
y = Sin t and **y = Cos t**

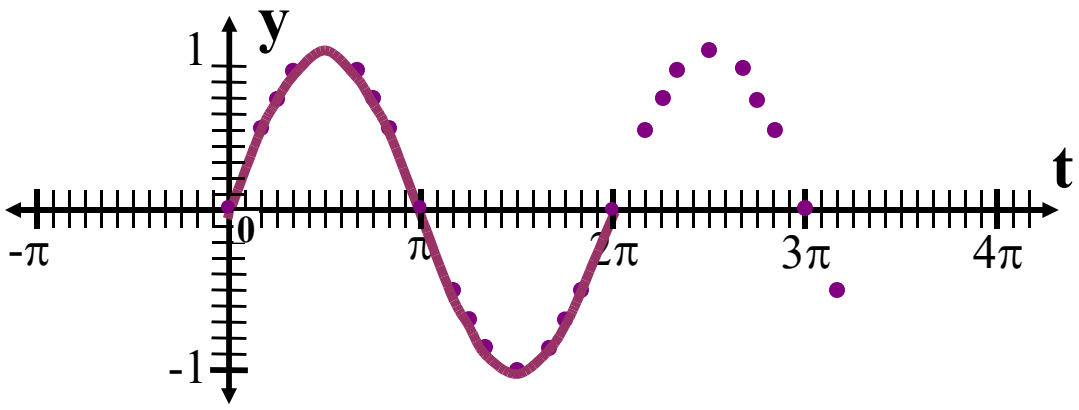
θ	t	Sin t
540°	3π	0
570°	$\frac{19\pi}{6}$	
585°		
600°		
630°		
660°		
675°		
690°		
720°		

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and **y = Cos t**

θ	t	Sin t
540°	3π	0
570°	$\frac{19\pi}{6}$	-1/2
585°		
600°		
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660°		
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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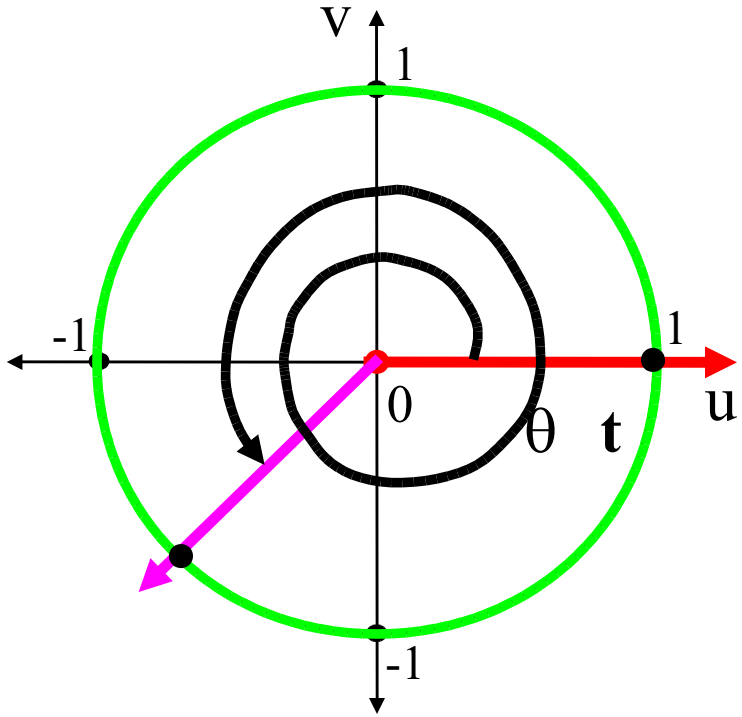

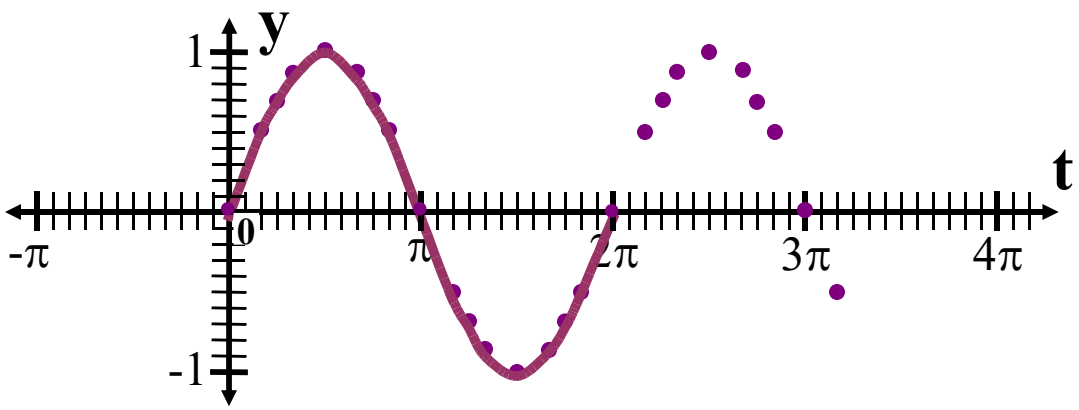

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600°		
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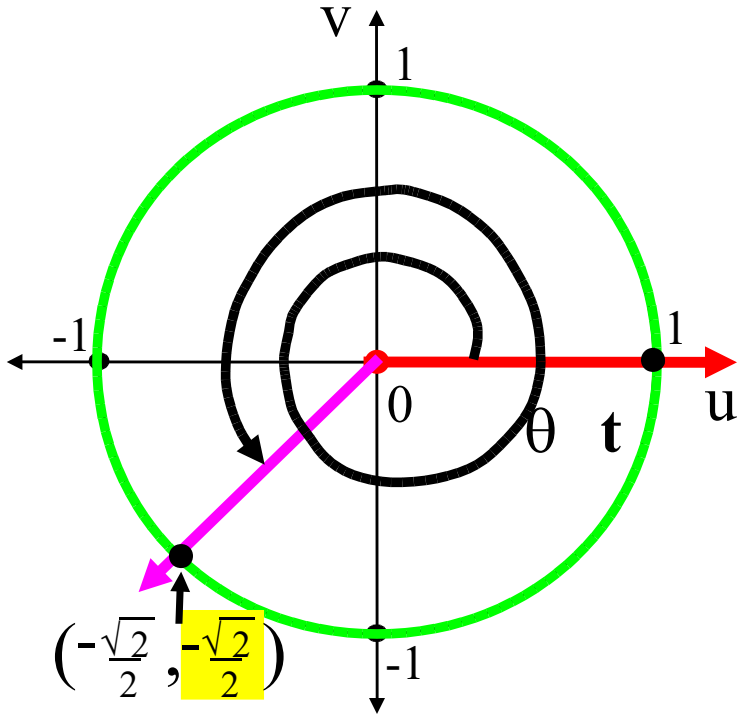
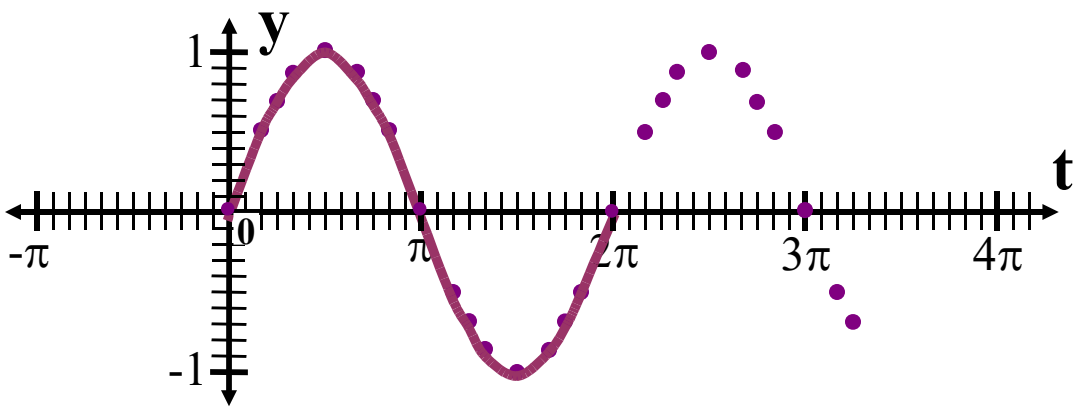
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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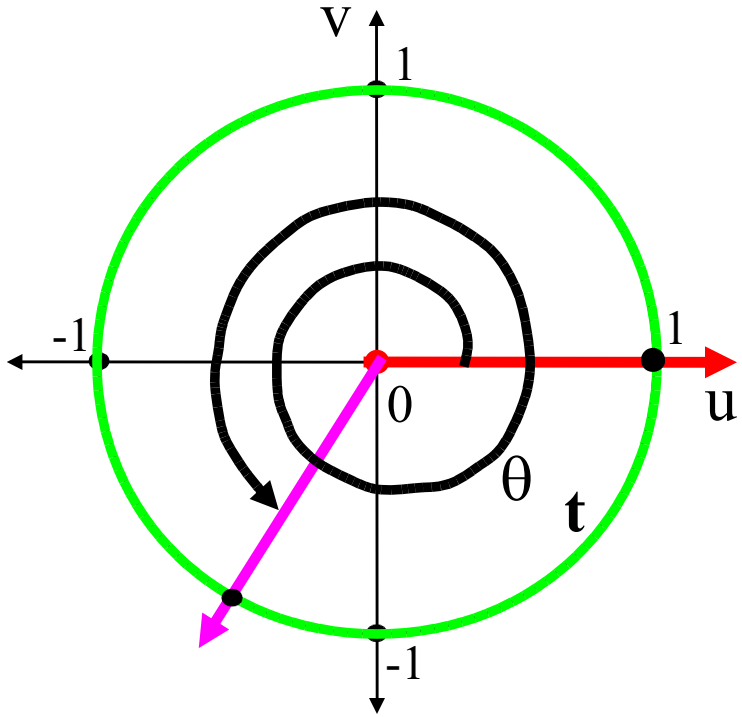
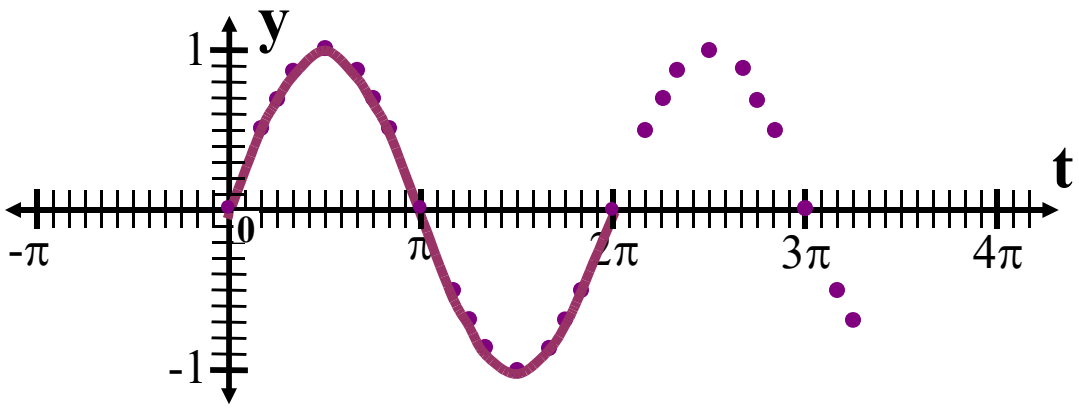
630°		
660°		
675°		
690°		
720°		

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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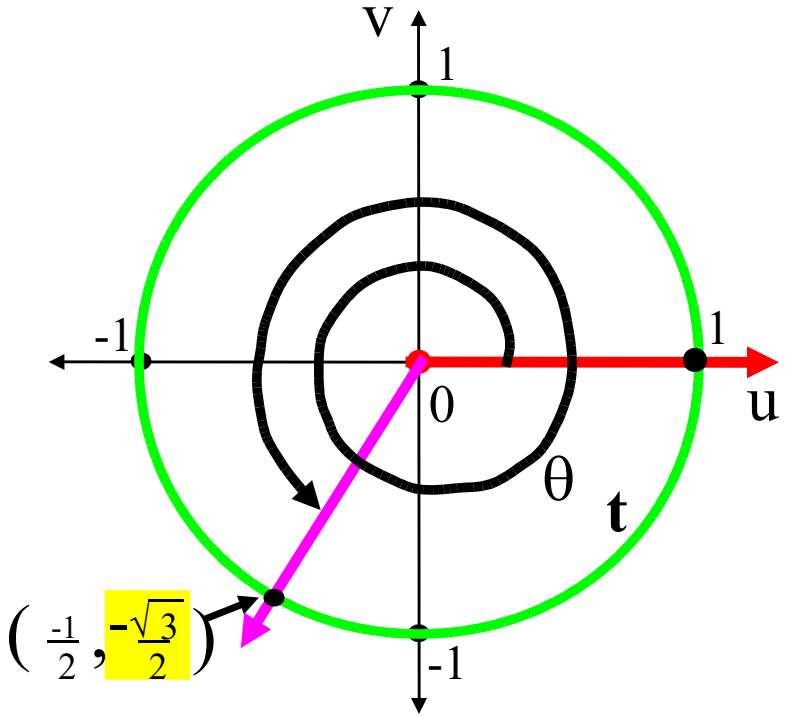

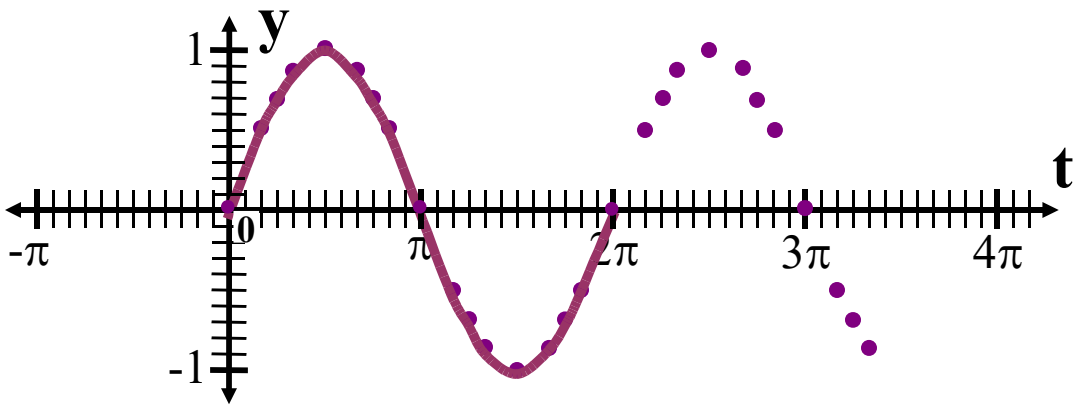

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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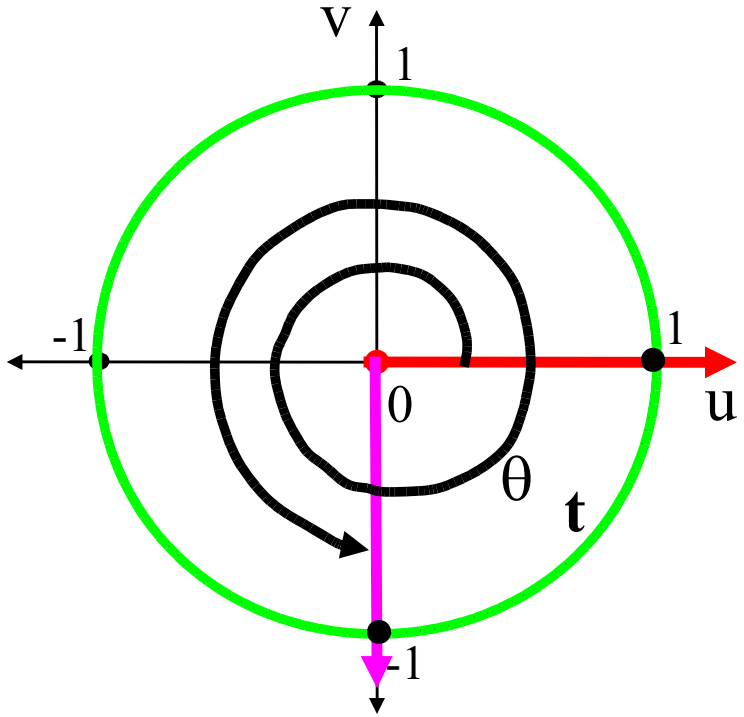

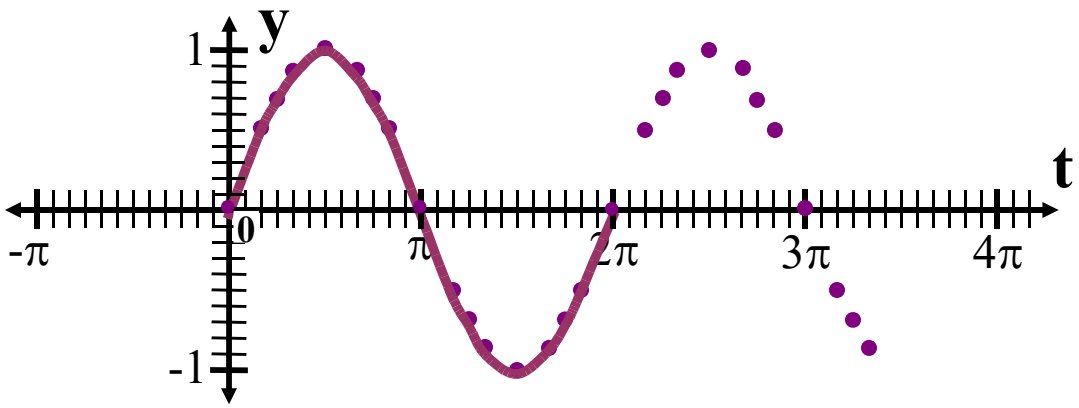

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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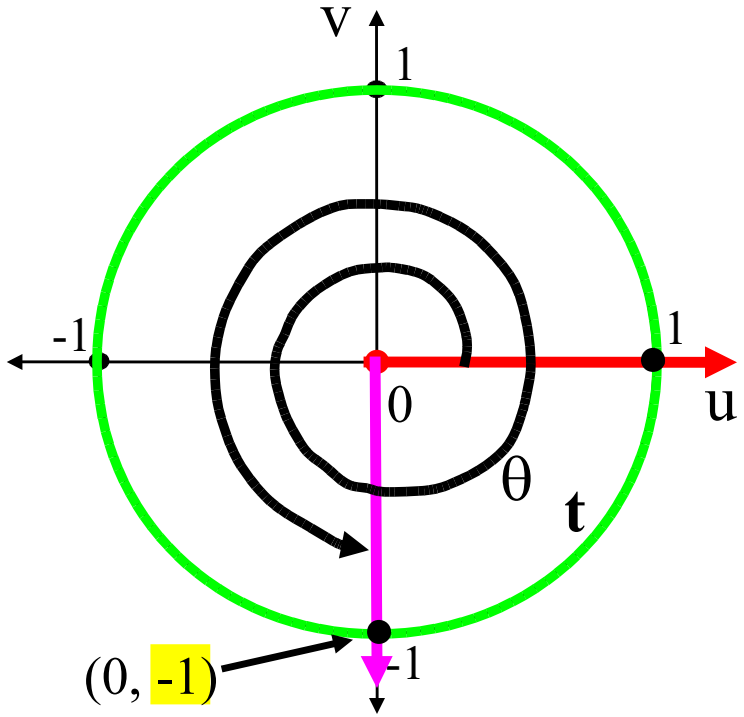

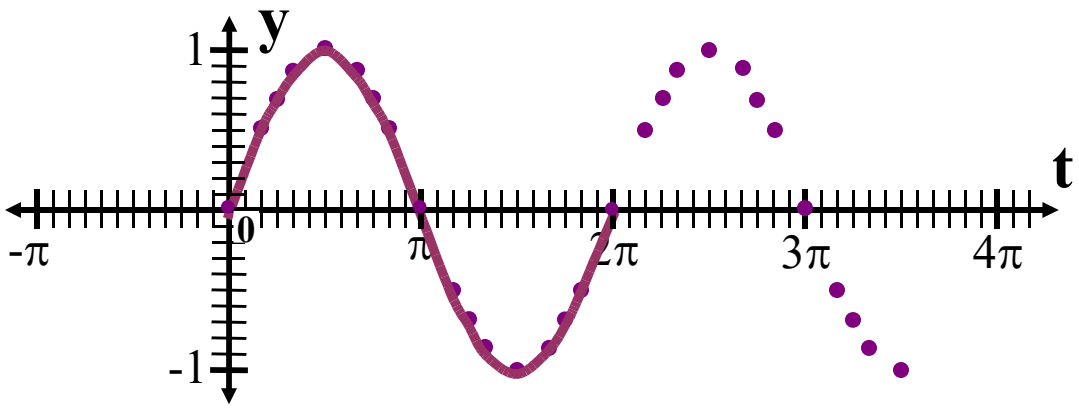

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690°		
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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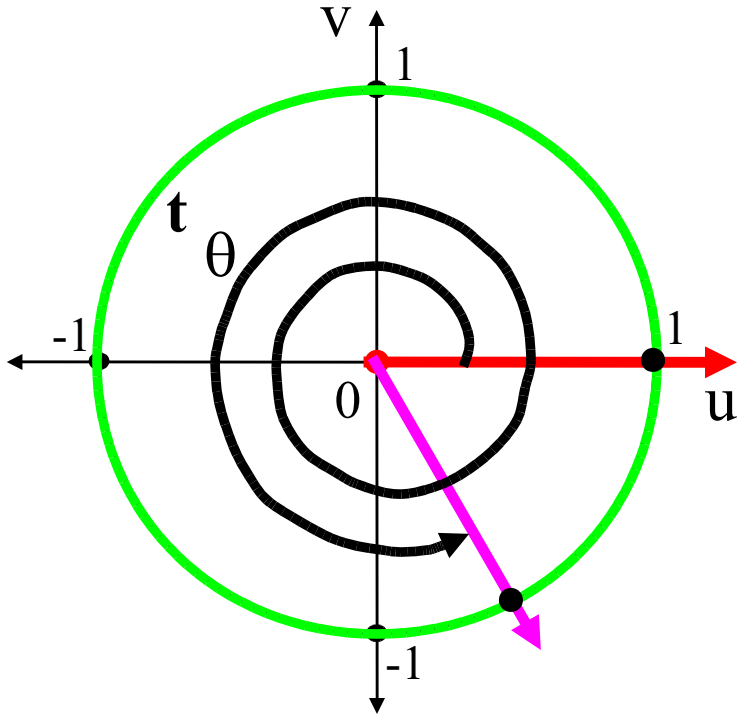

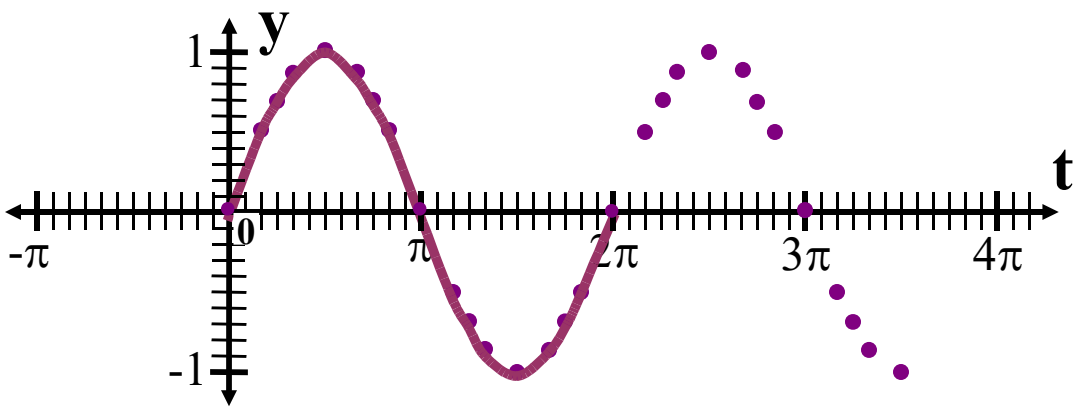

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Part 5 : The Circular Functions

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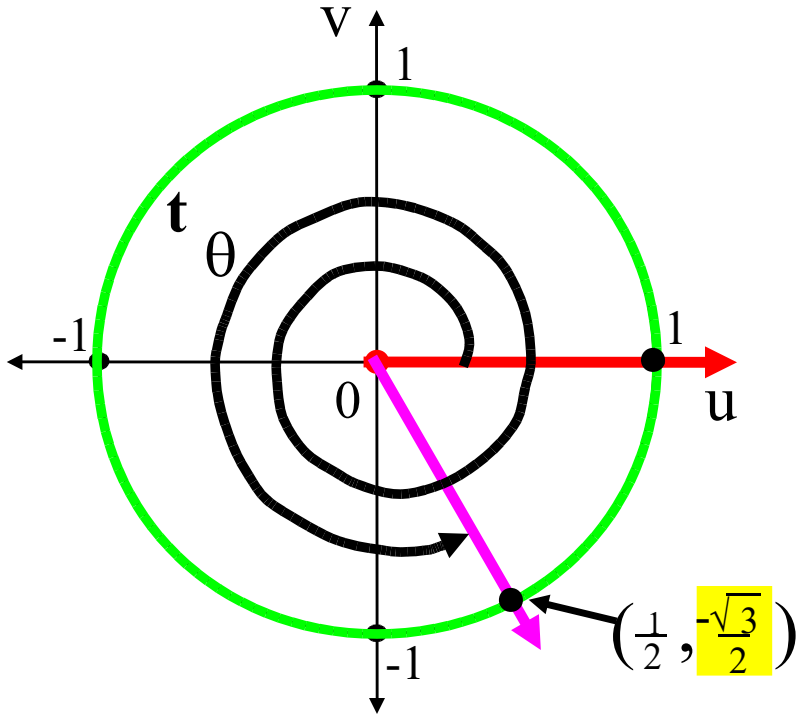

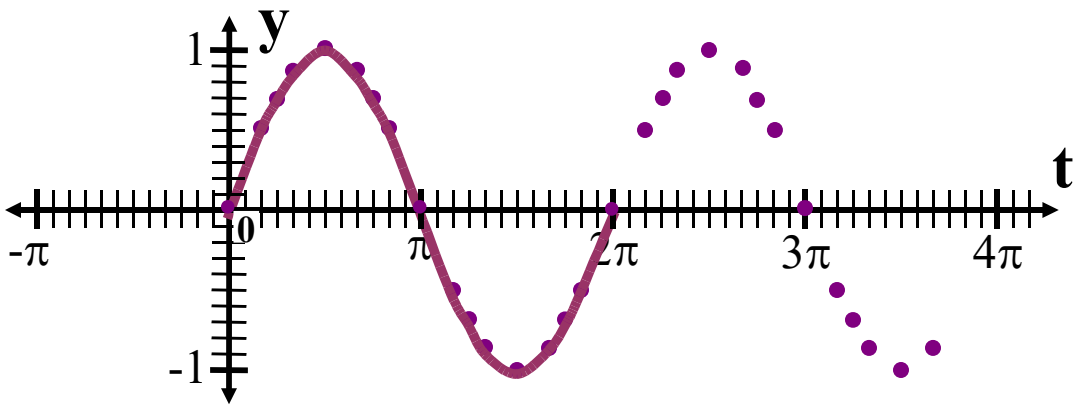

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Part 5 : The Circular Functions

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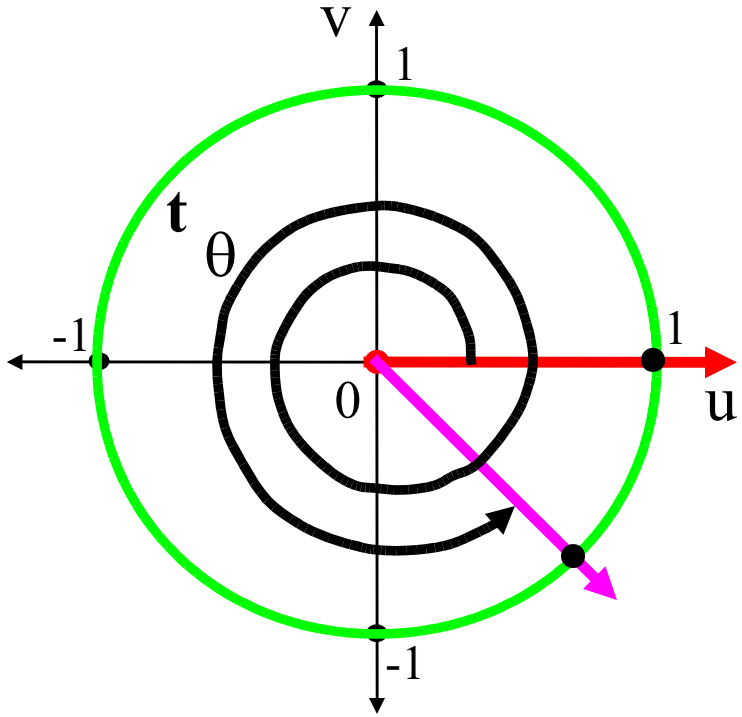

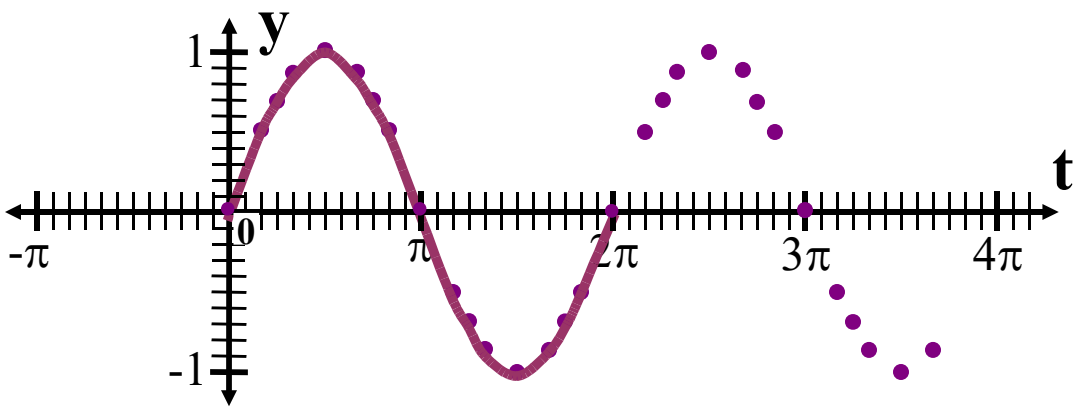

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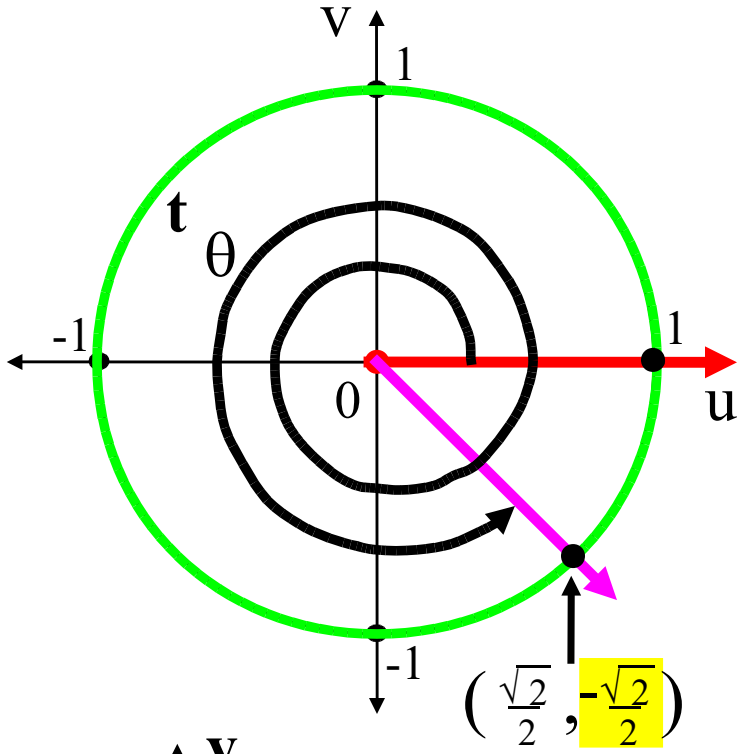
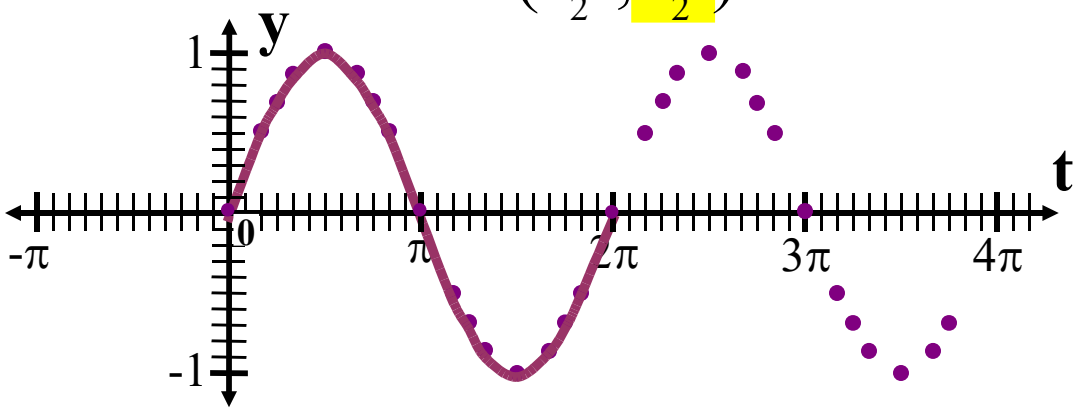
690°		
720°		

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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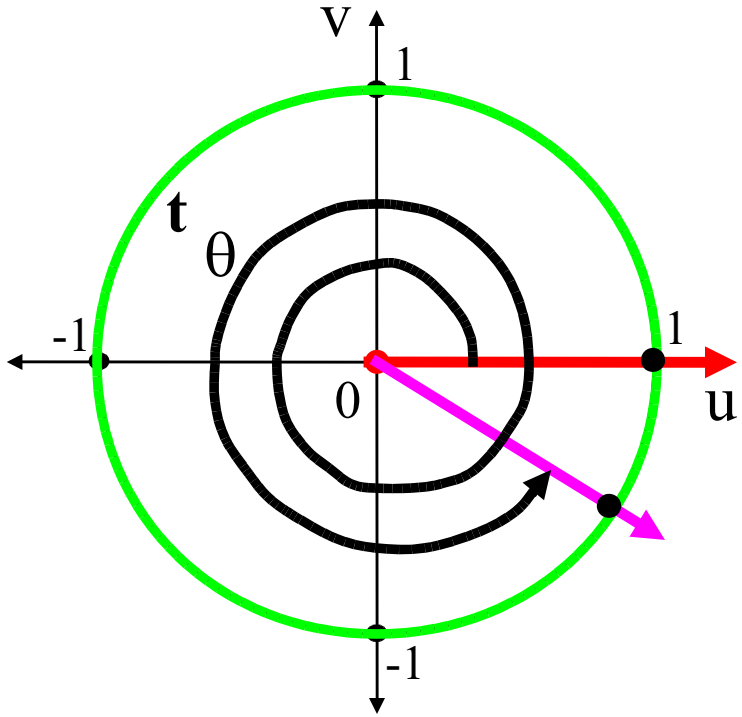
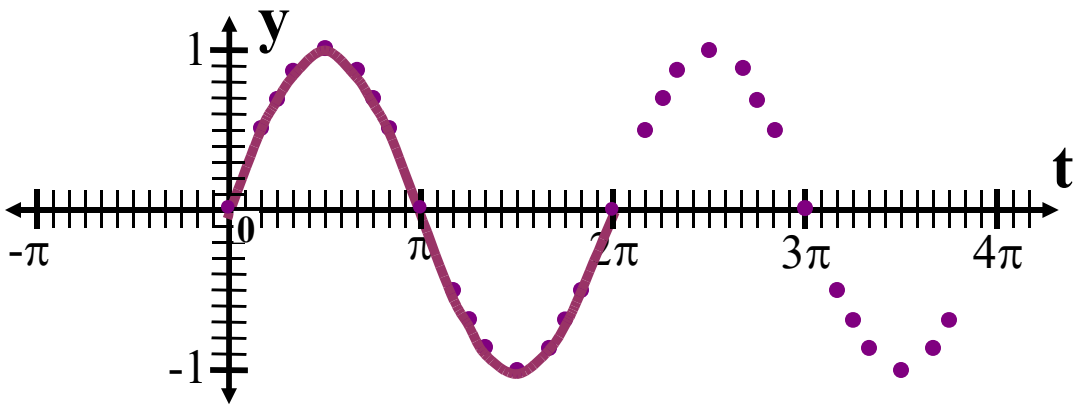
660°	$\frac{11\pi}{3}$	$-\sqrt{3}/2$
675°	$\frac{15\pi}{4}$	$-\sqrt{2}/2$
690°		
720°		

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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720°		

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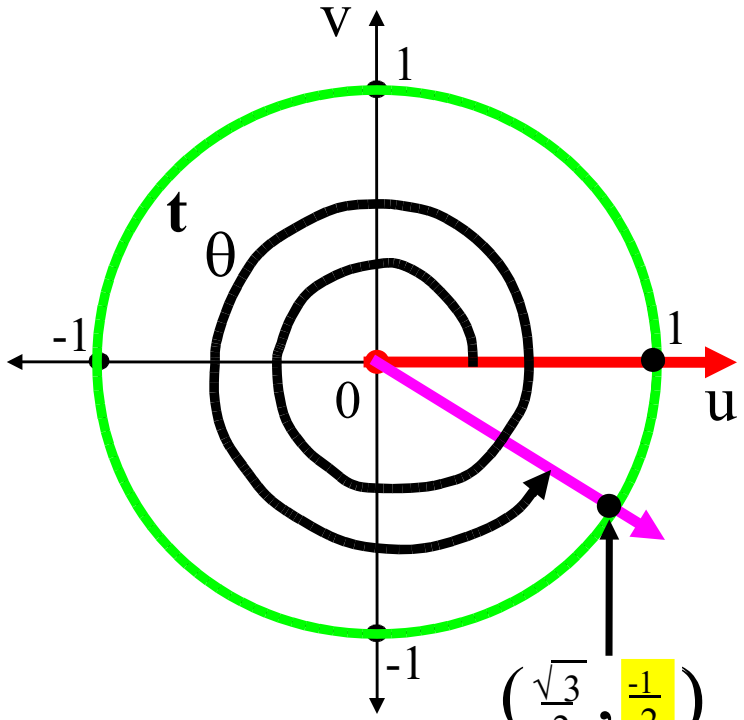
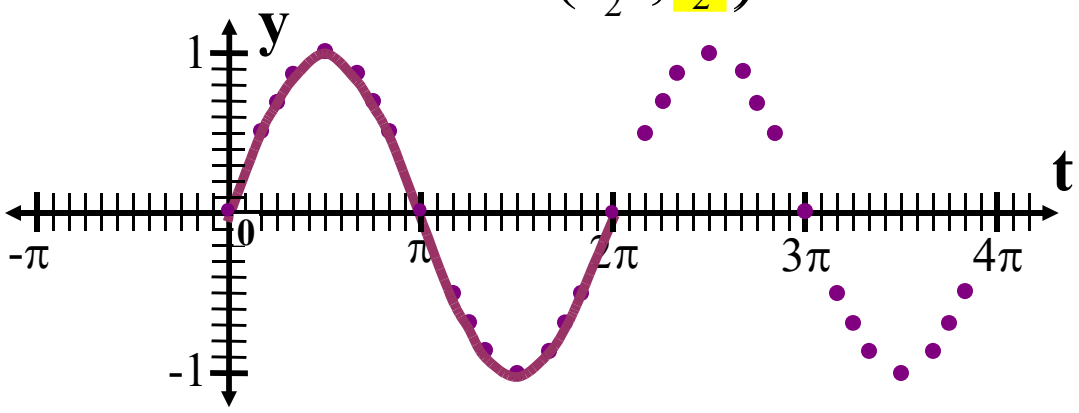
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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720°		

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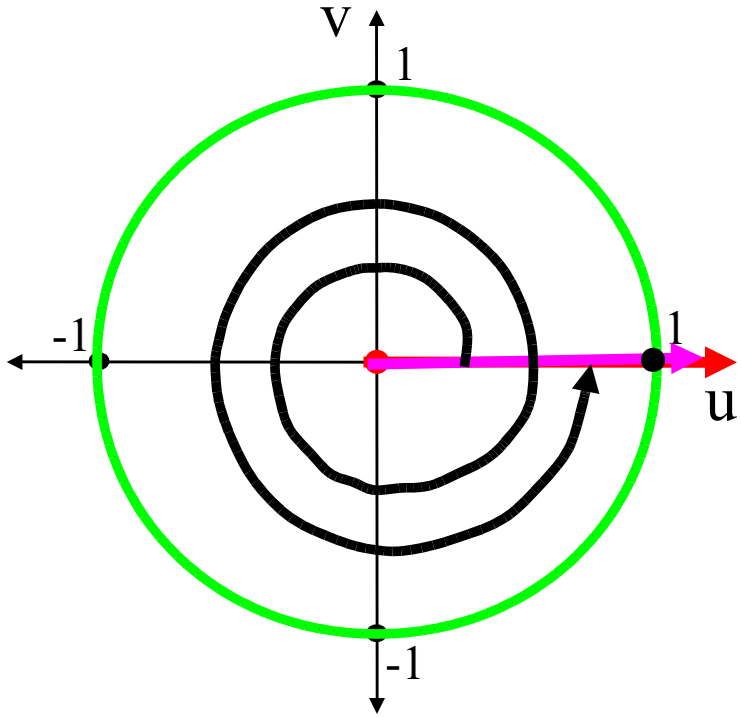
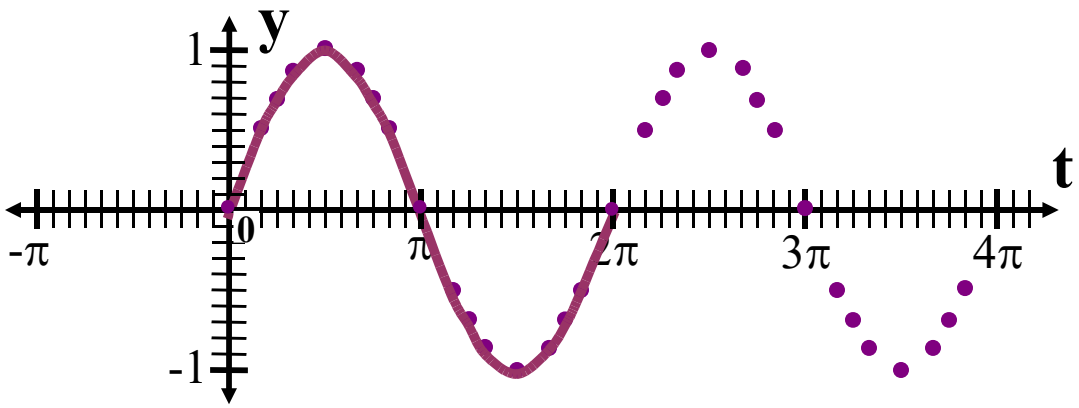
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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690°	$\frac{23\pi}{6}$	-1/2
720°	4π	

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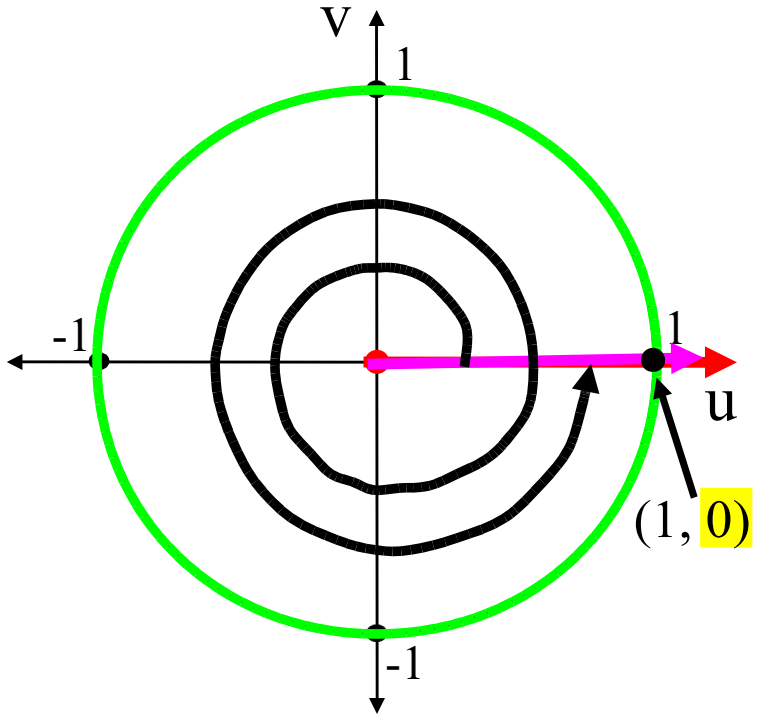
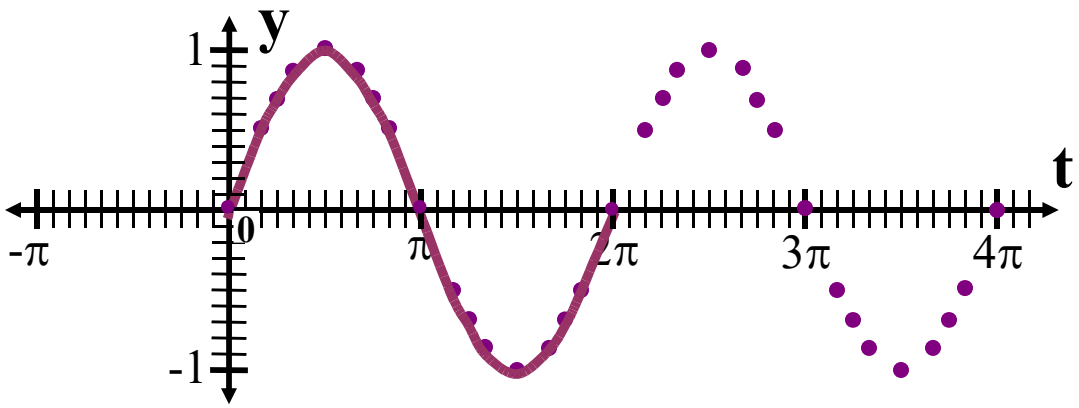
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Part 5 : The Circular Functions

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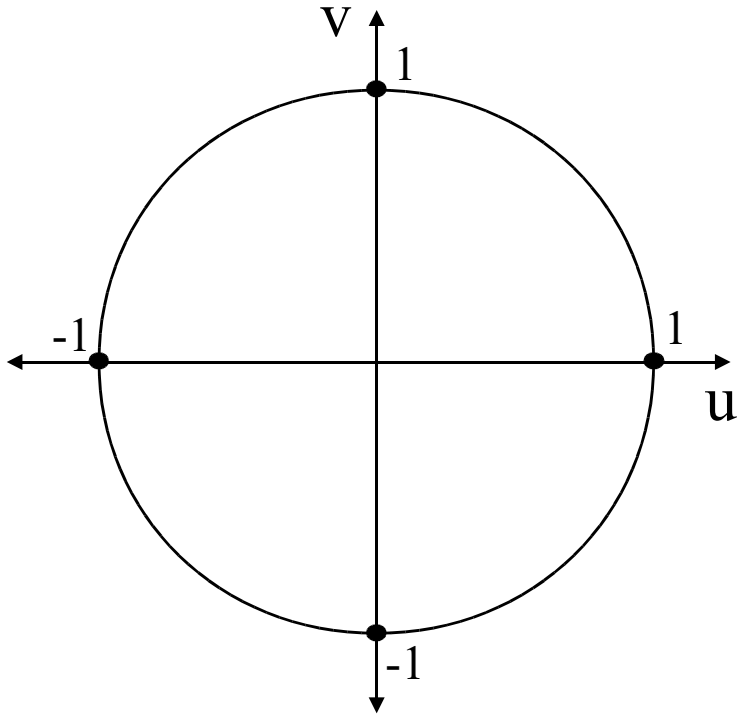

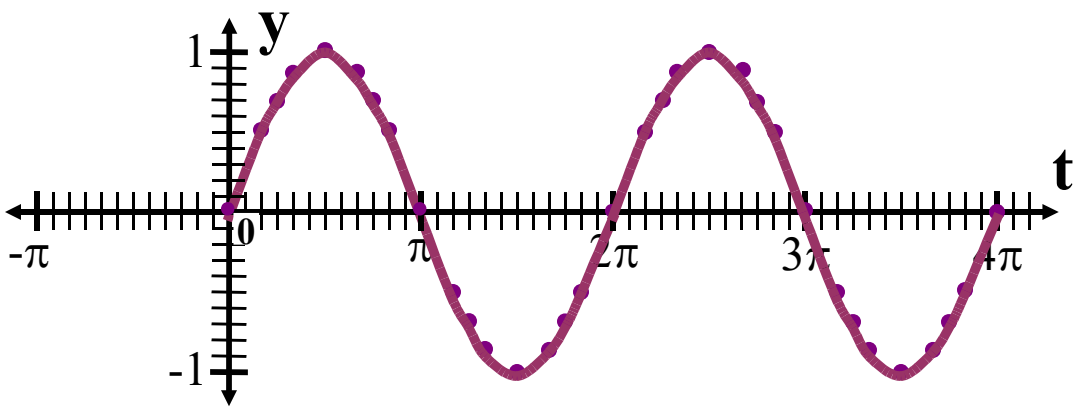

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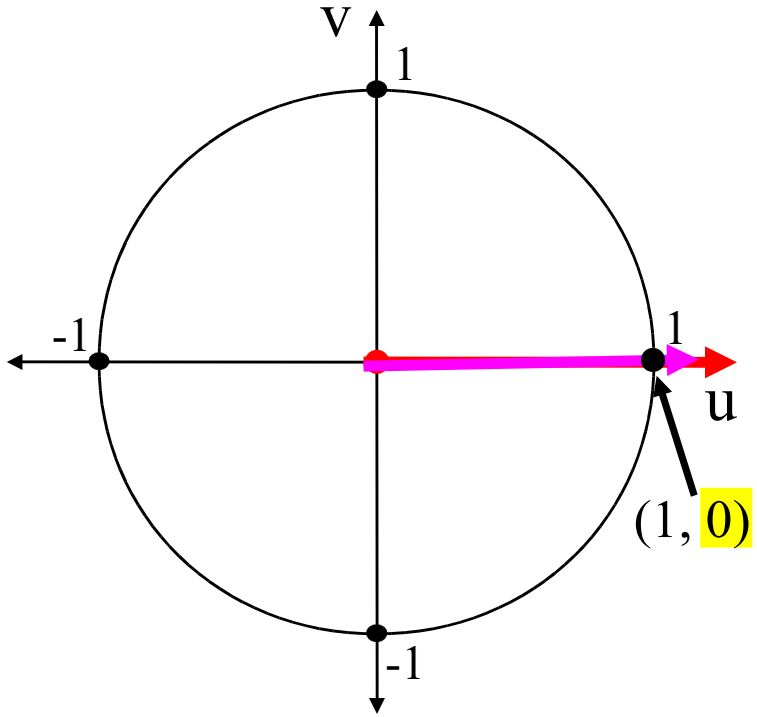
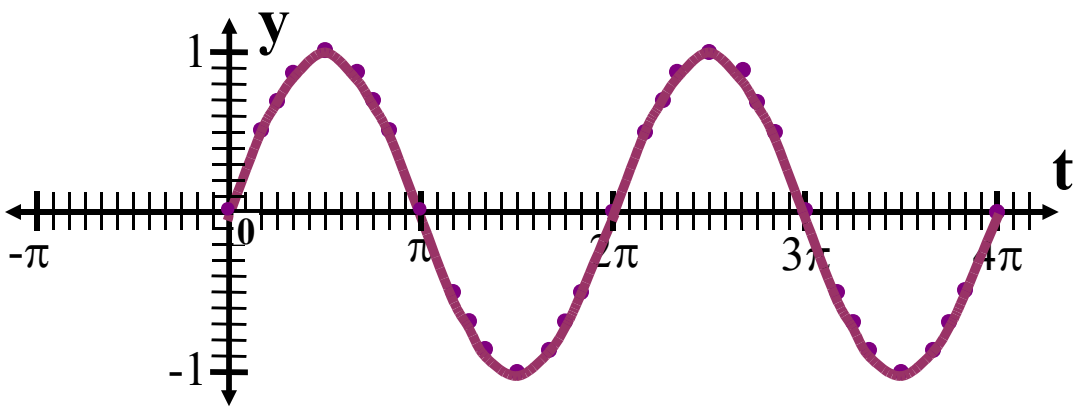
Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

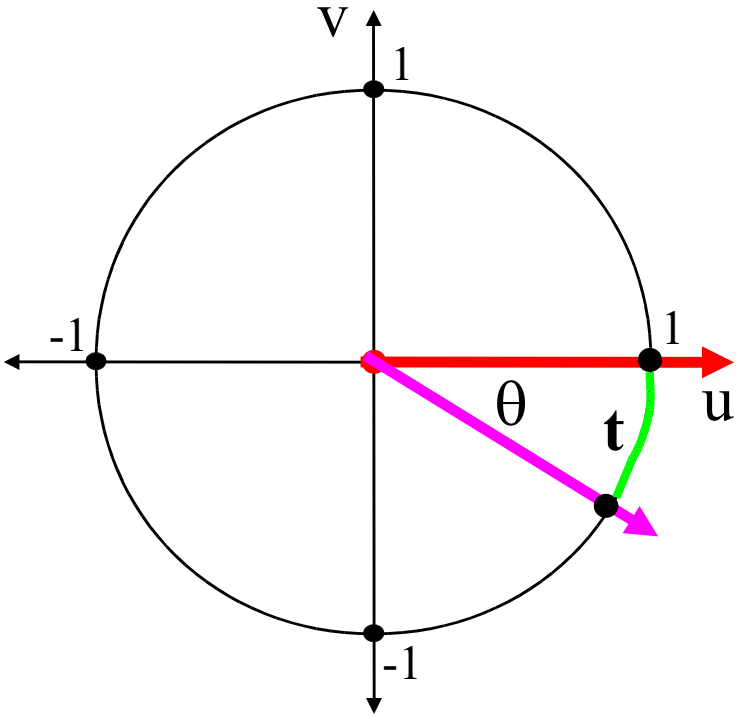
y = Sin t and y = Cos t

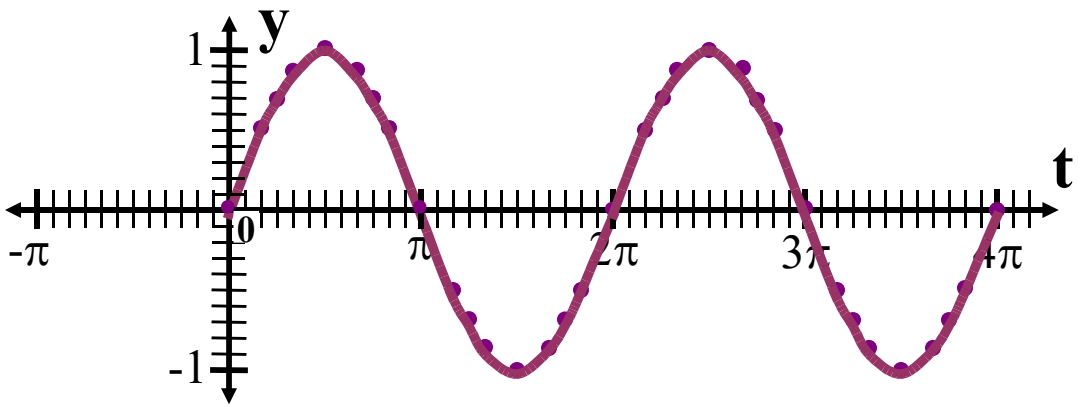
θ	t	Sin t
0°	0	0
-30°	$\frac{-\pi}{6}$	
-45°	$\frac{-\pi}{4}$	
-60°	$\frac{-\pi}{3}$	
-90°	$\frac{-\pi}{2}$	
-120°	$\frac{-2\pi}{3}$	
-135°	$\frac{-3\pi}{4}$	
-150°	$\frac{-5\pi}{6}$	
-180°	$-\pi$	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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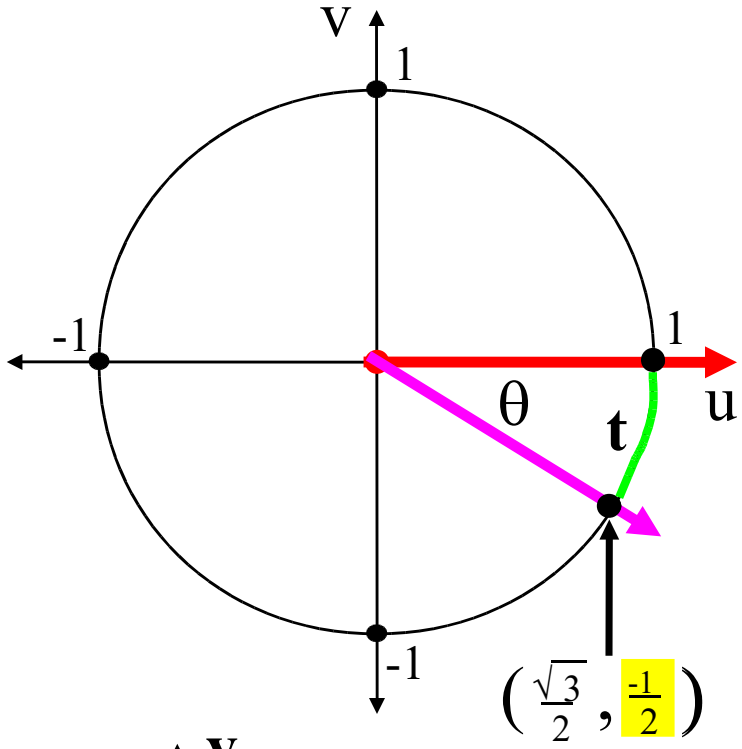

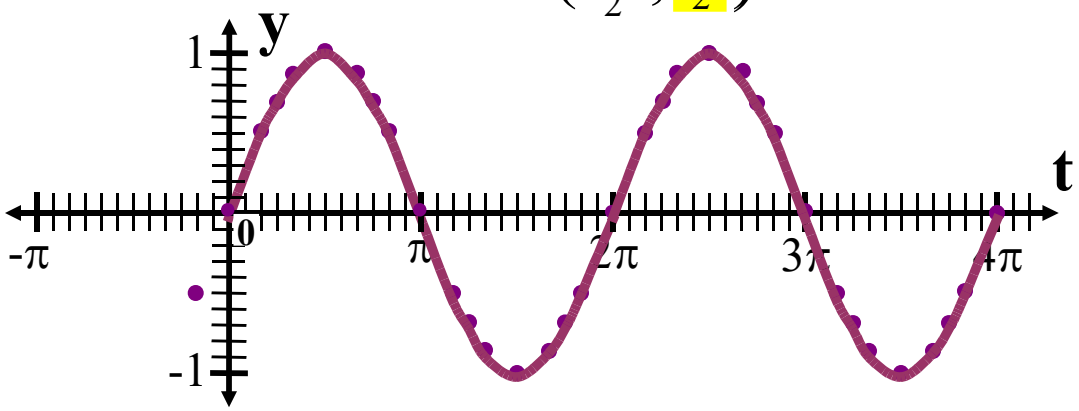

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y = Sin t and y = Cos t

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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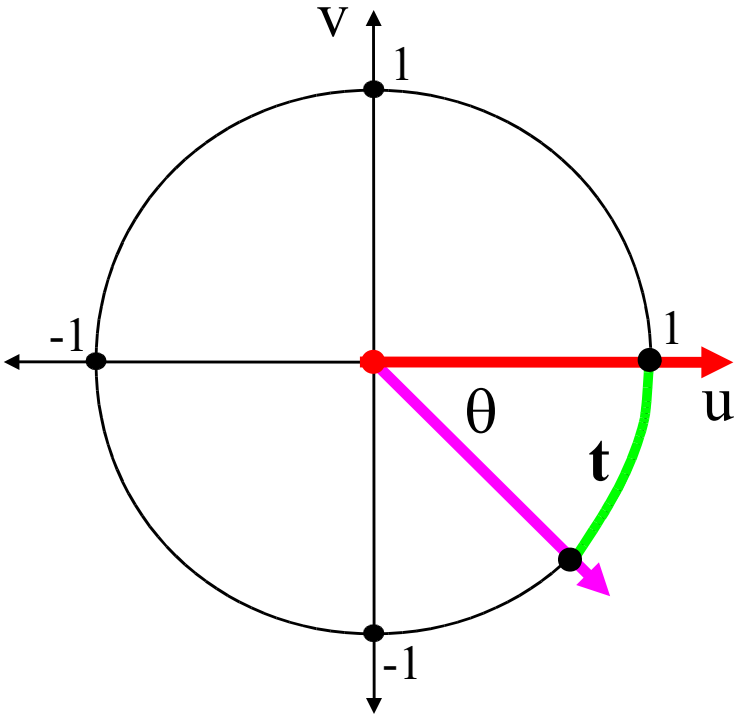

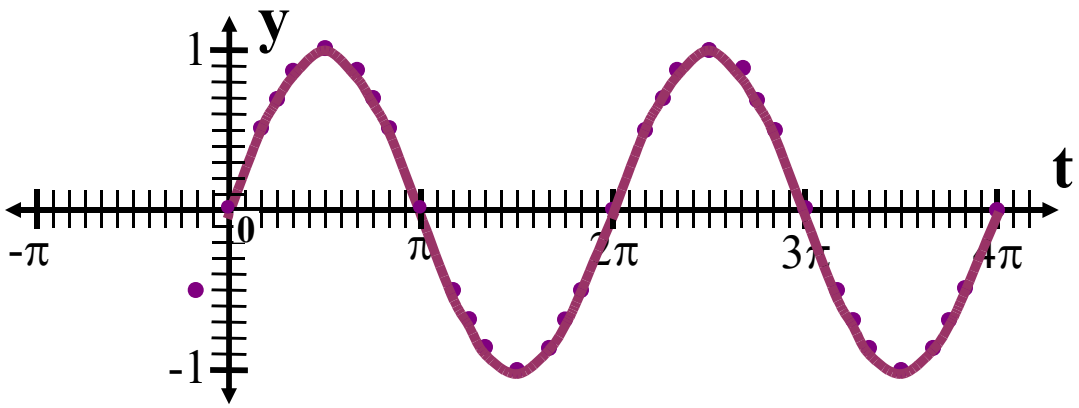

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Part 5 : The Circular Functions

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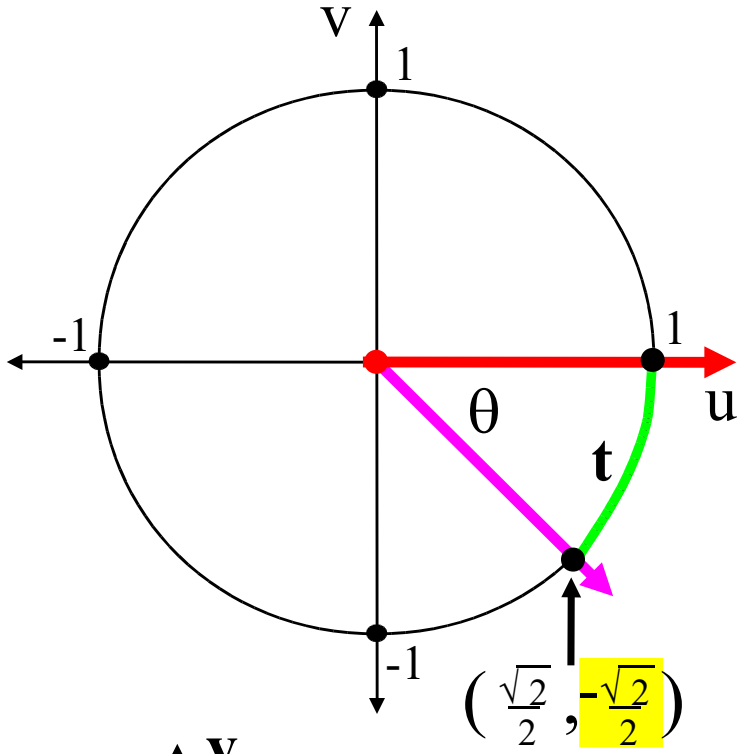

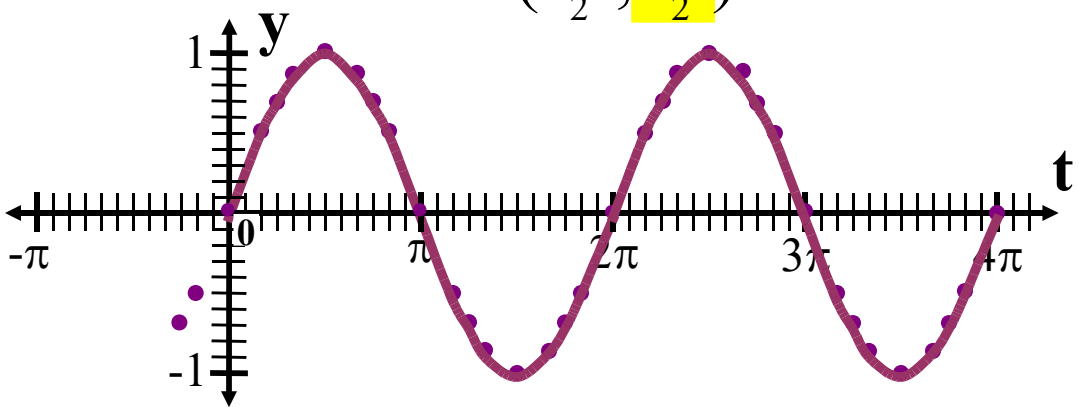

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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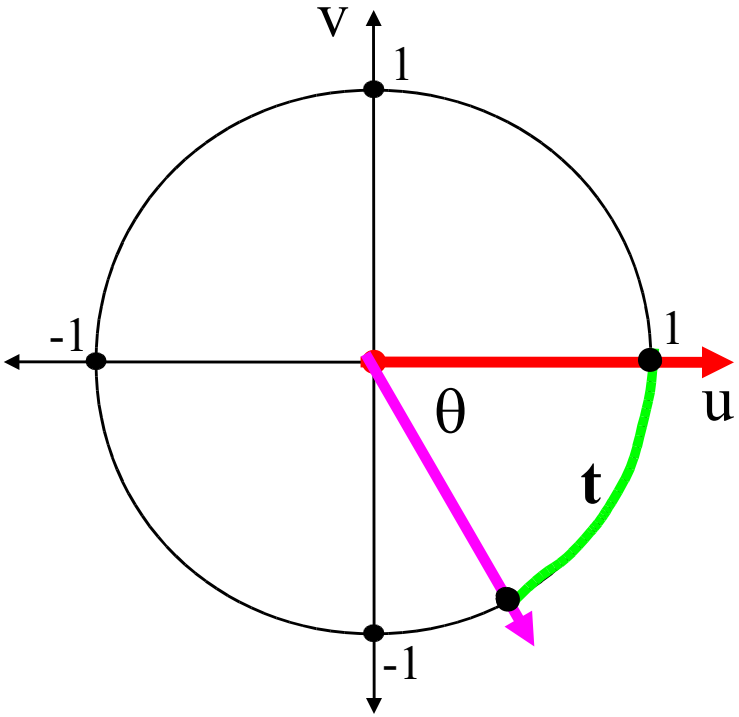

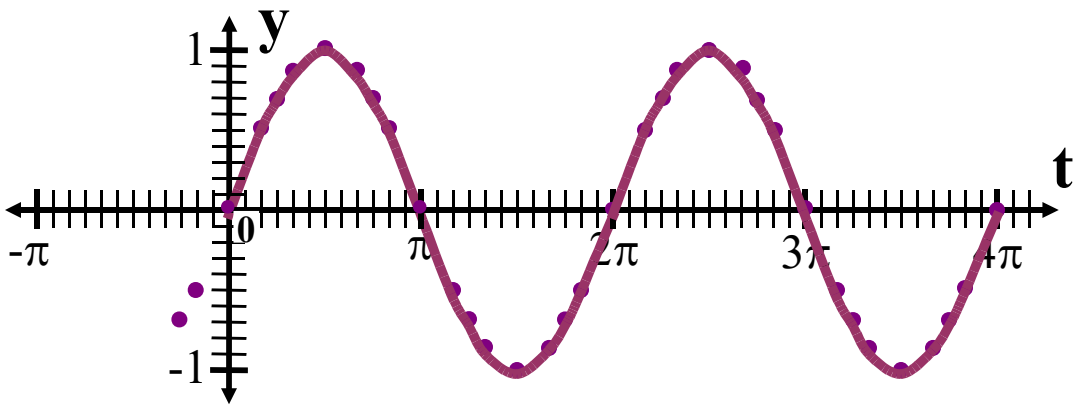

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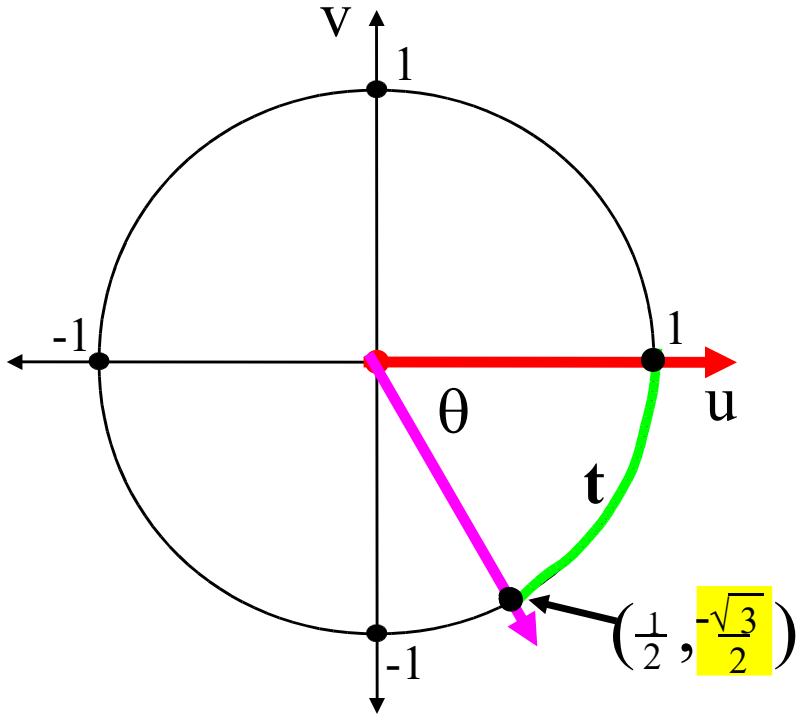
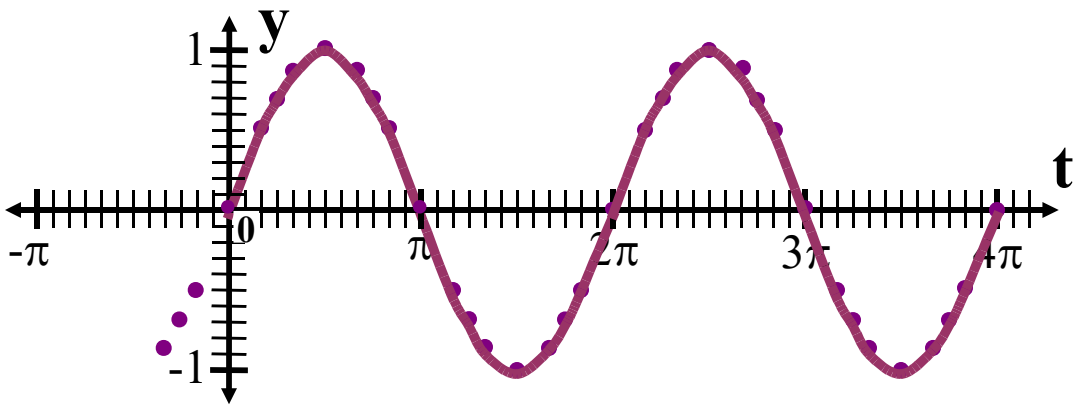
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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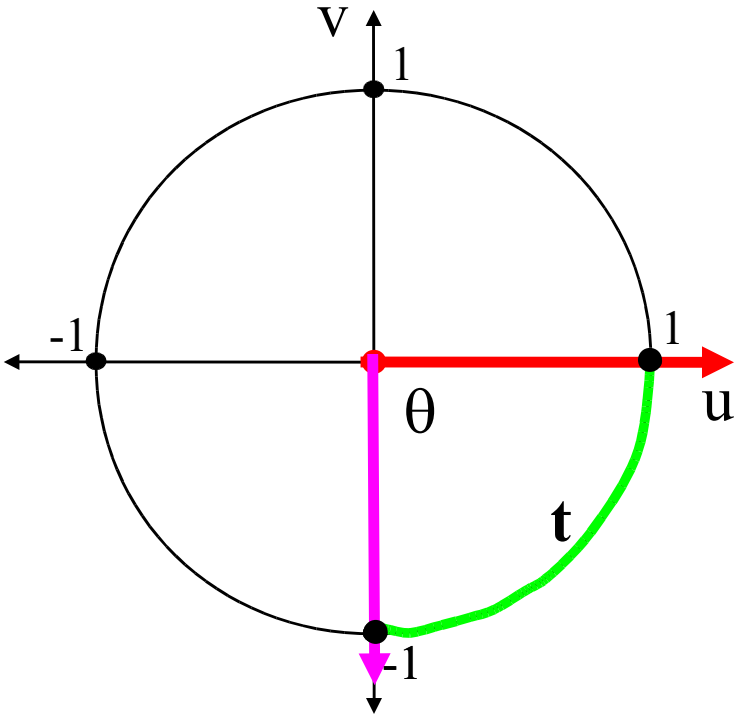

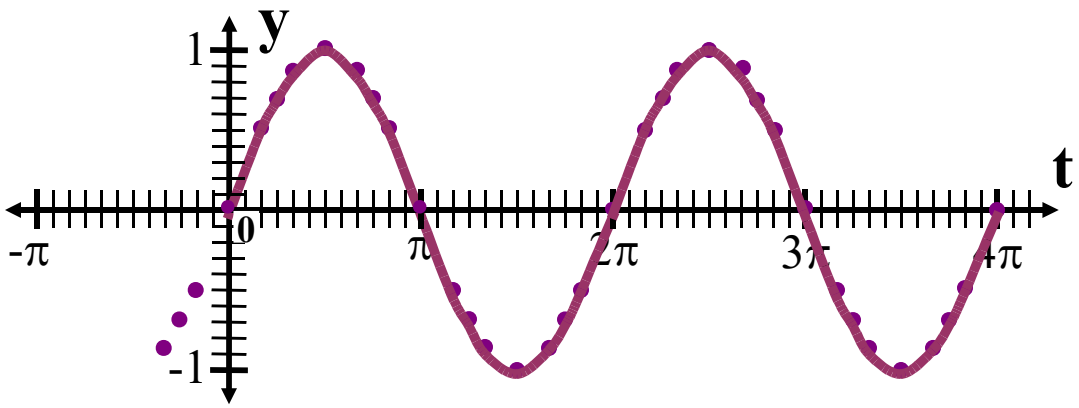

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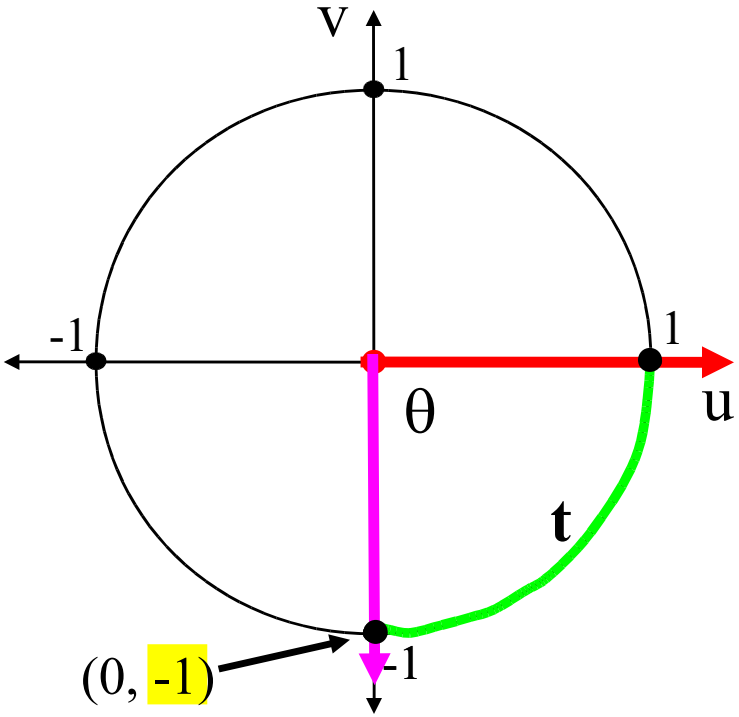
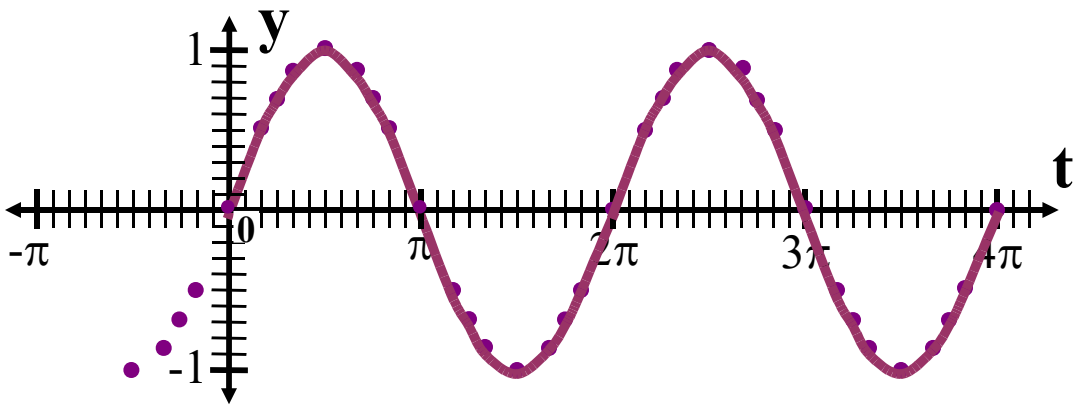
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Part 5 : The Circular Functions

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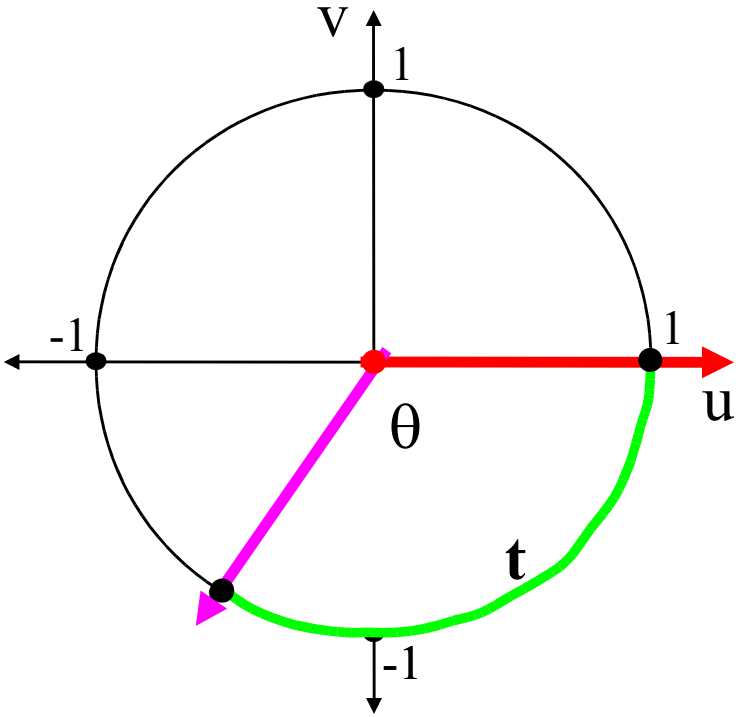

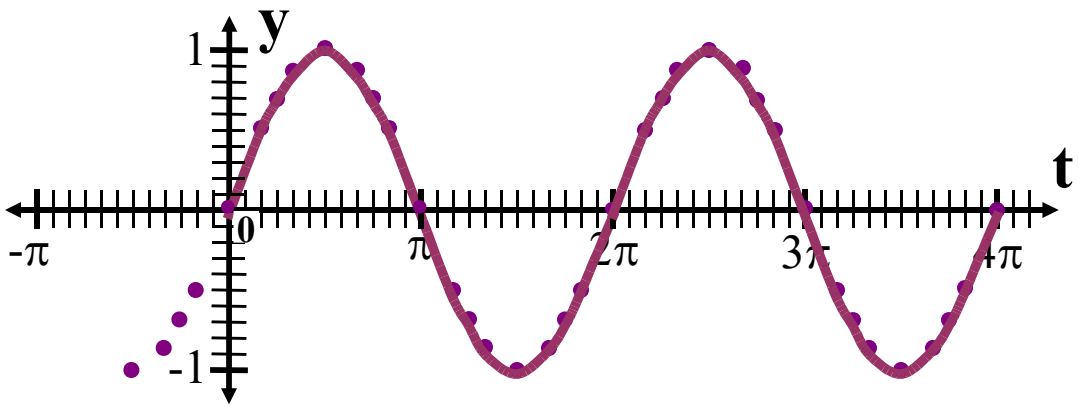

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Part 5 : The Circular Functions

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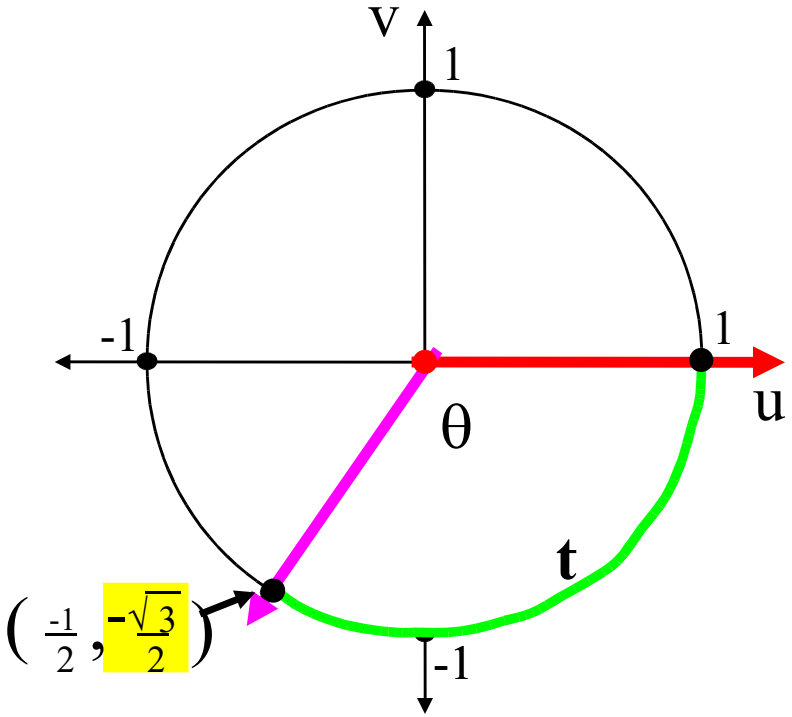

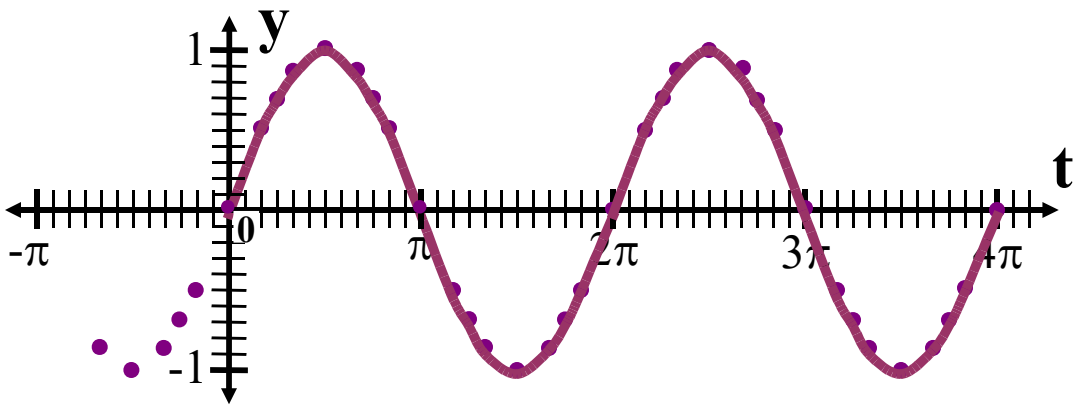

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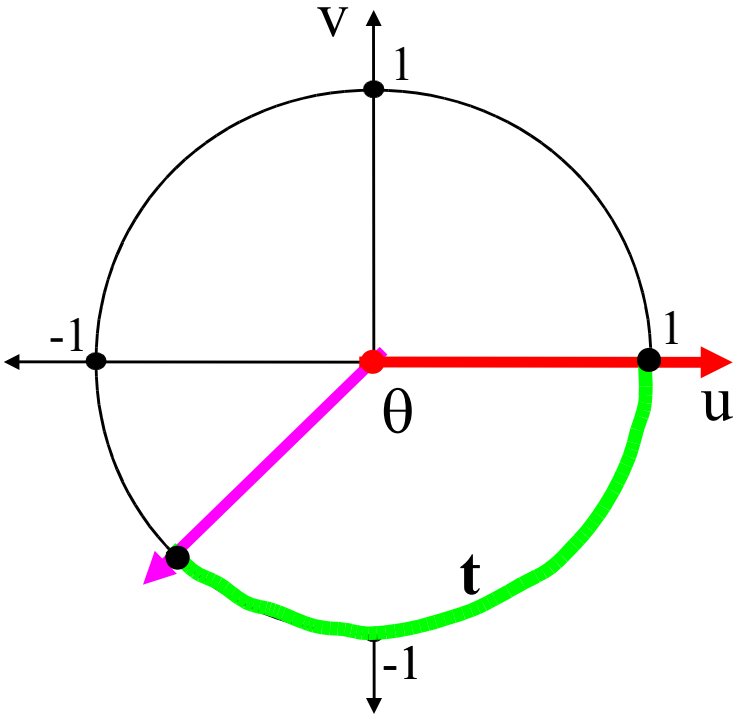
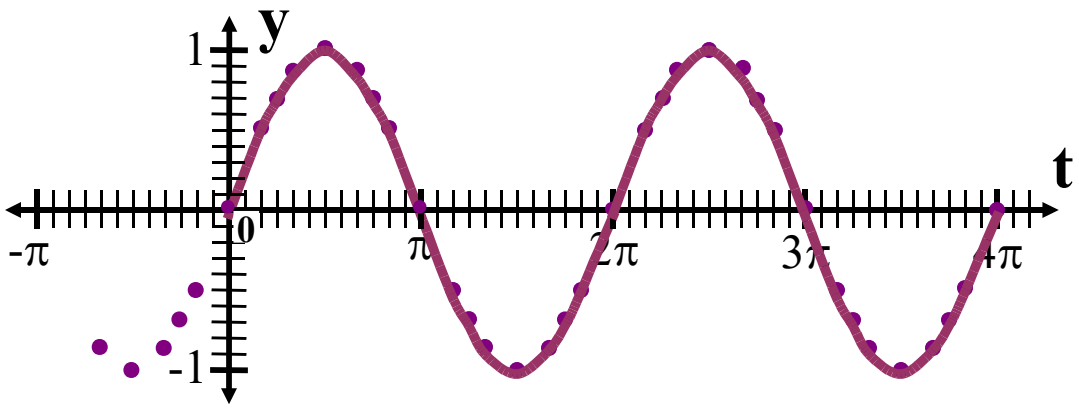
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Part 5 : The Circular Functions

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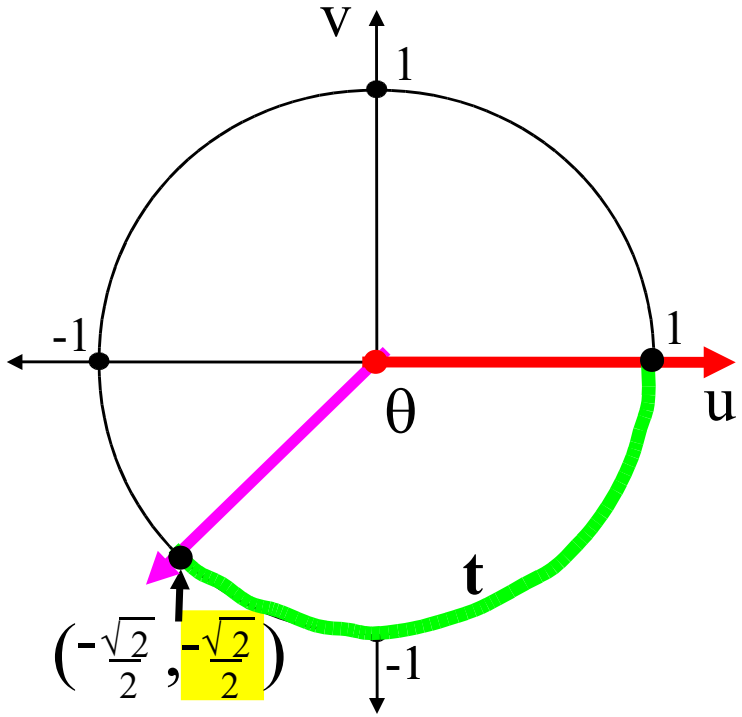

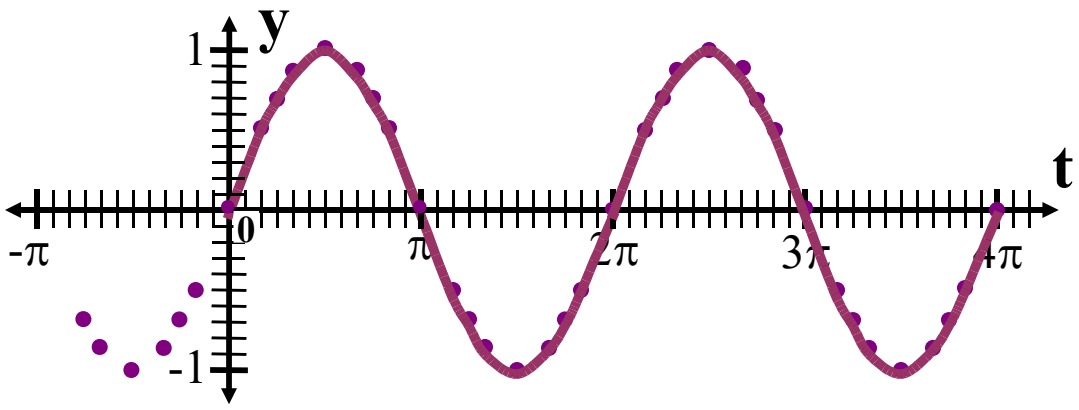

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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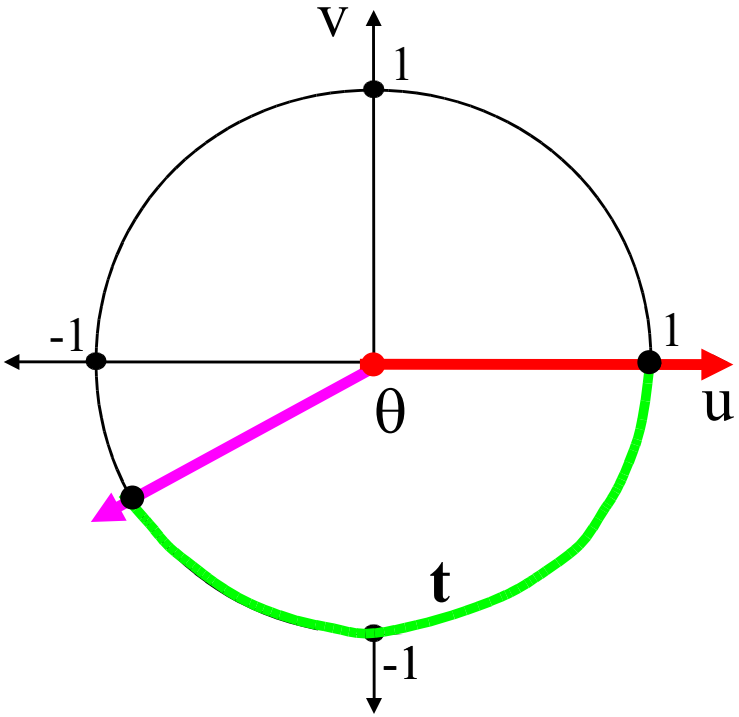

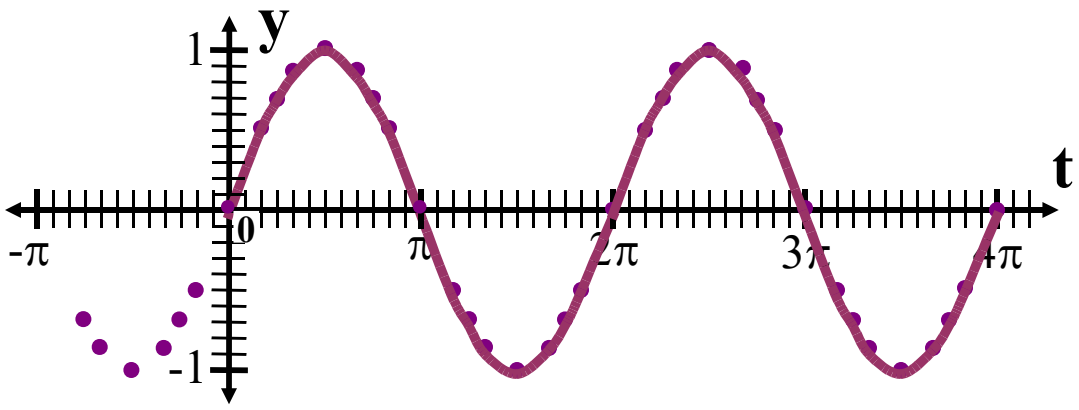

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Part 5 : The Circular Functions

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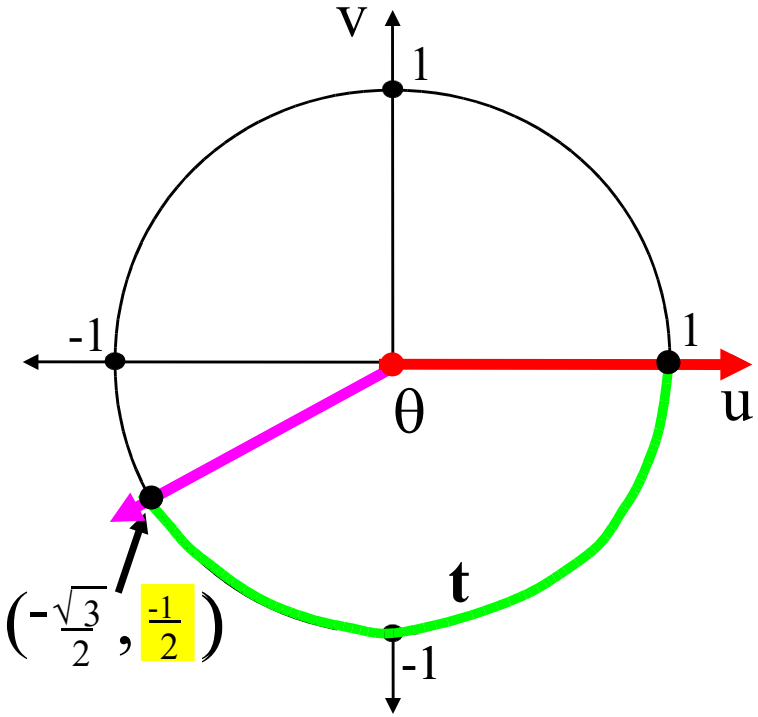

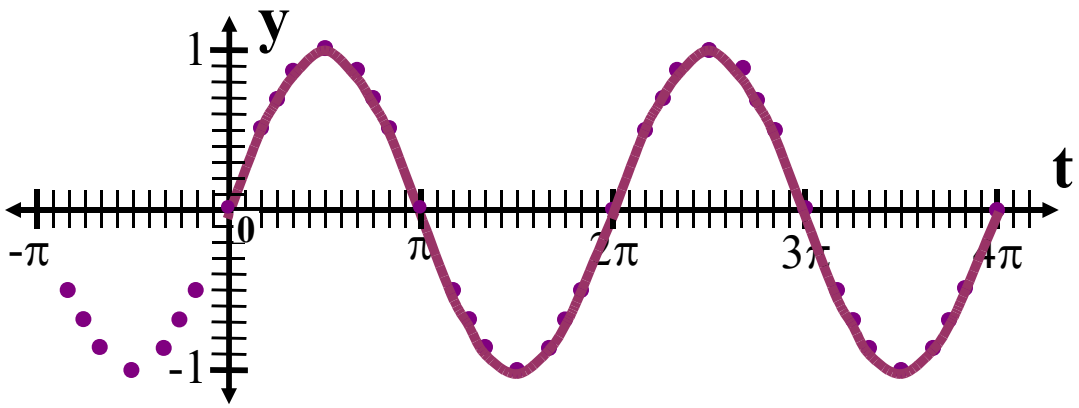

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Part 5 : The Circular Functions

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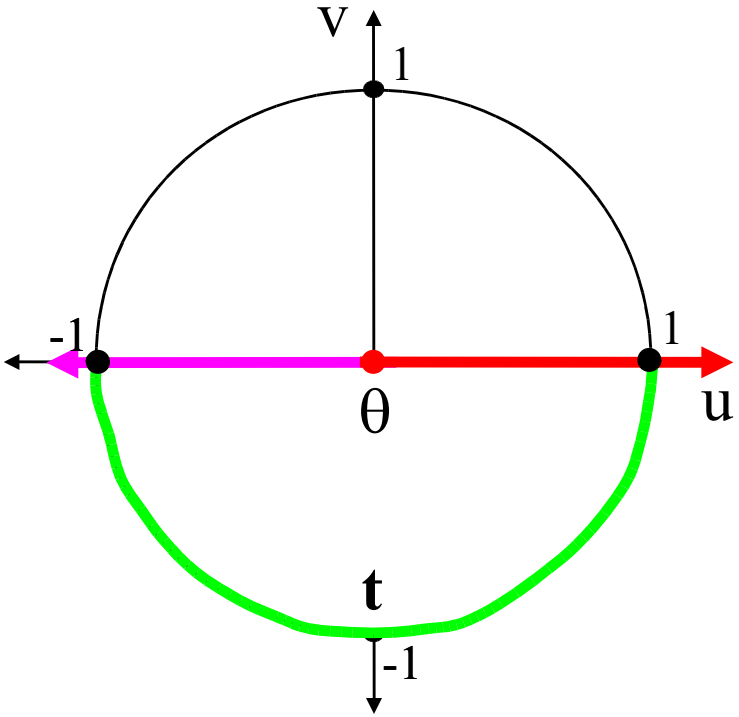

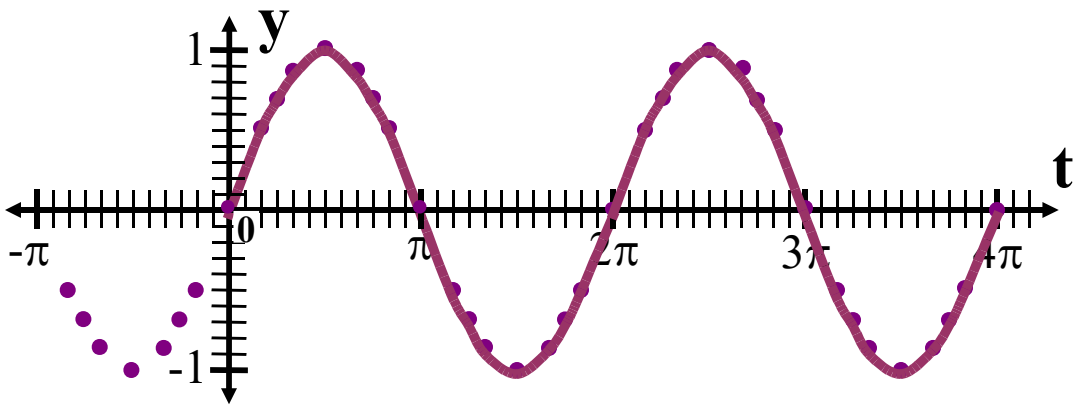

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Part 5 : The Circular Functions

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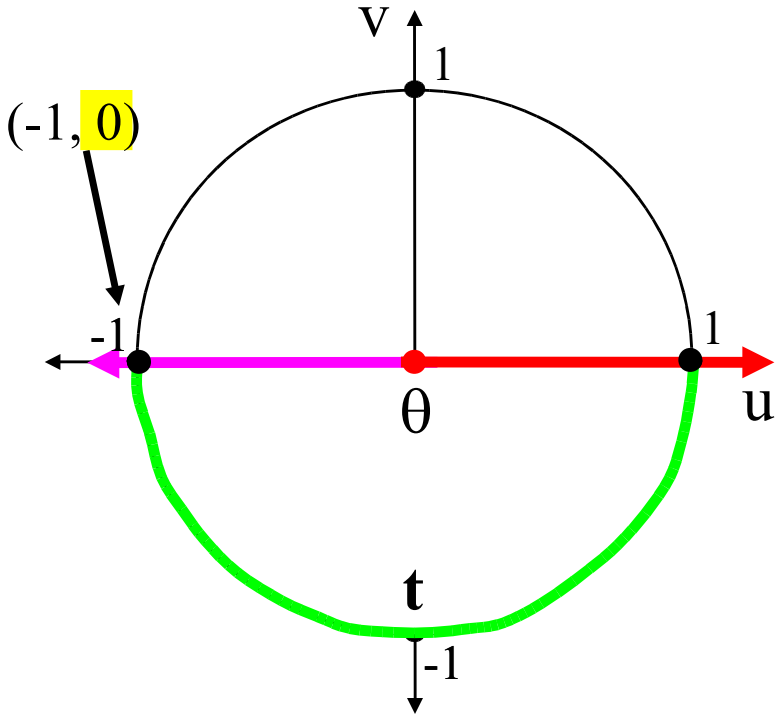

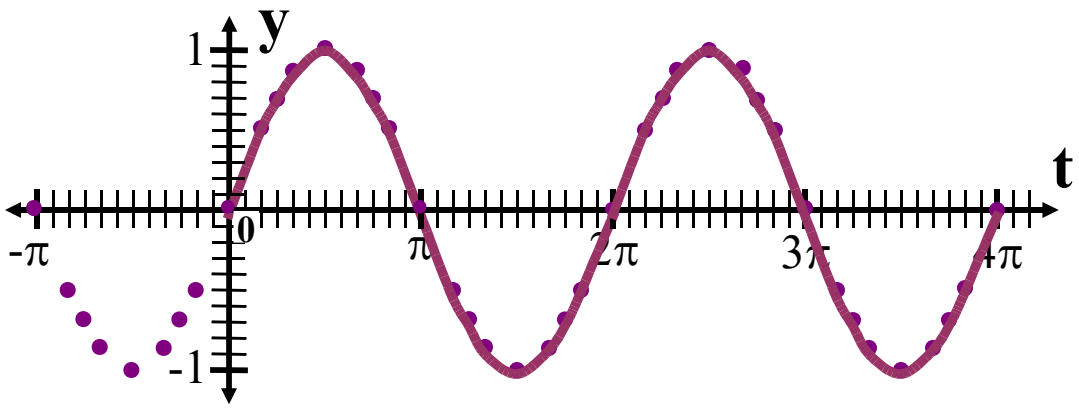

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Part 5 : The Circular Functions

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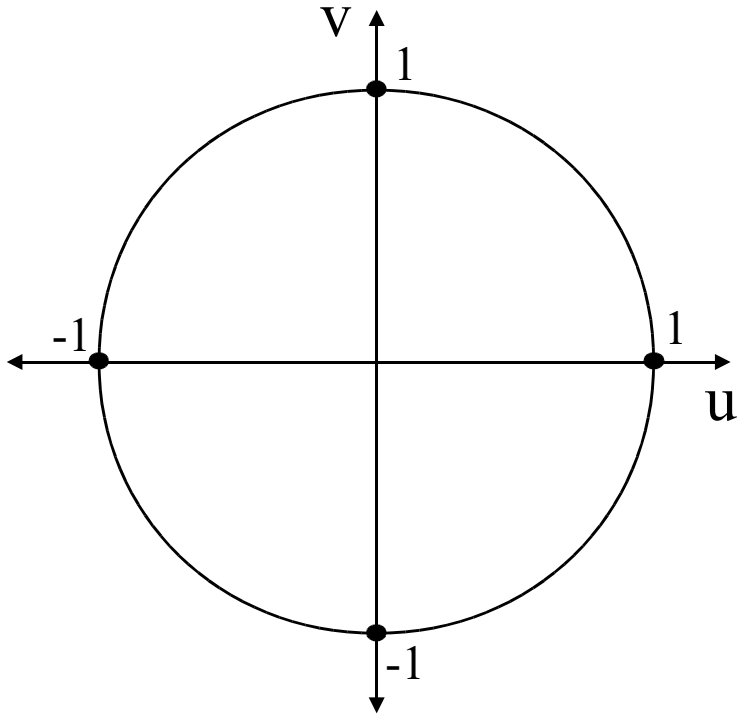

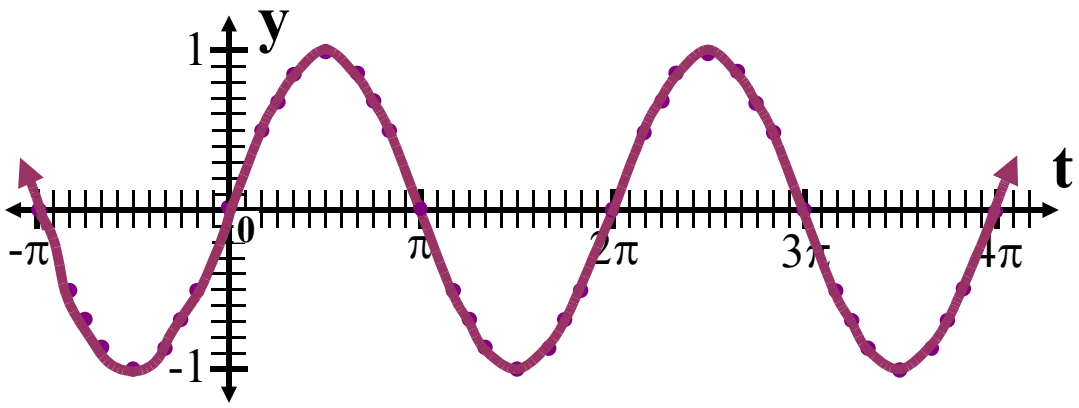

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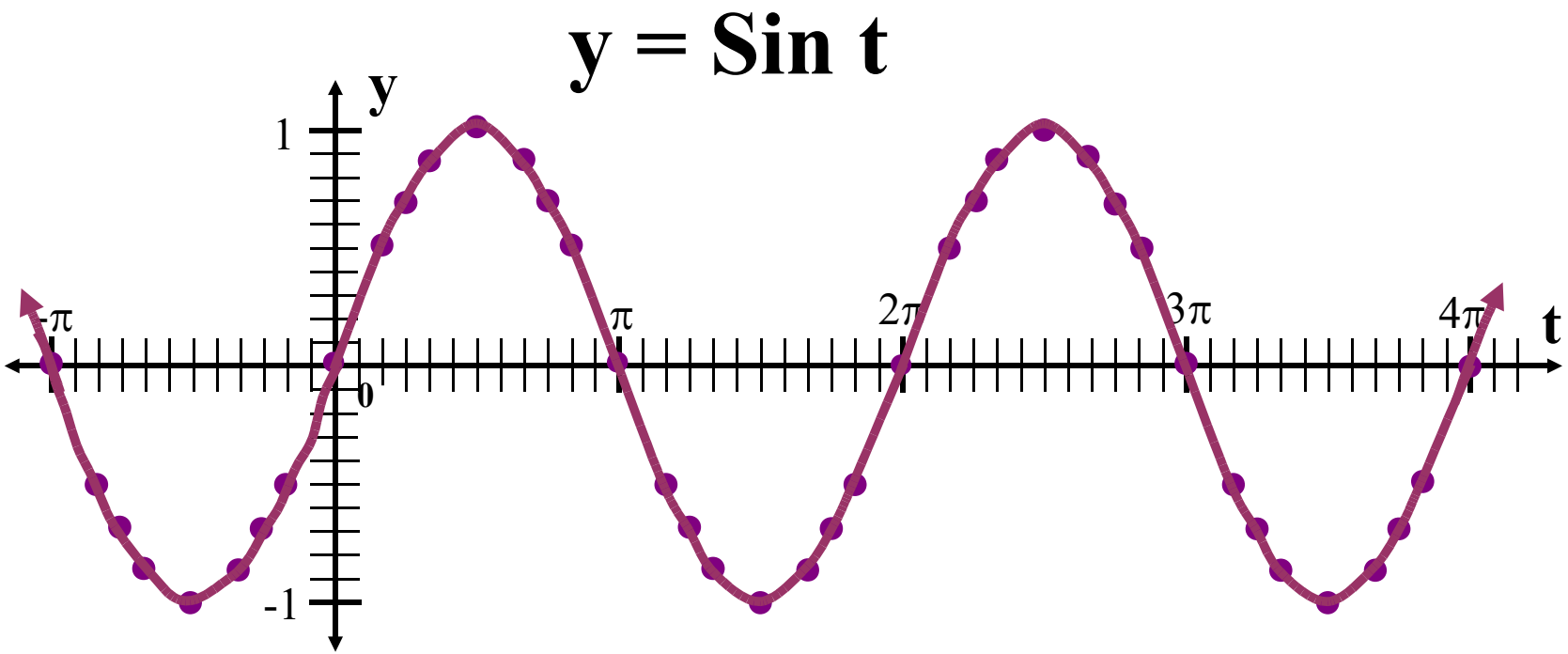
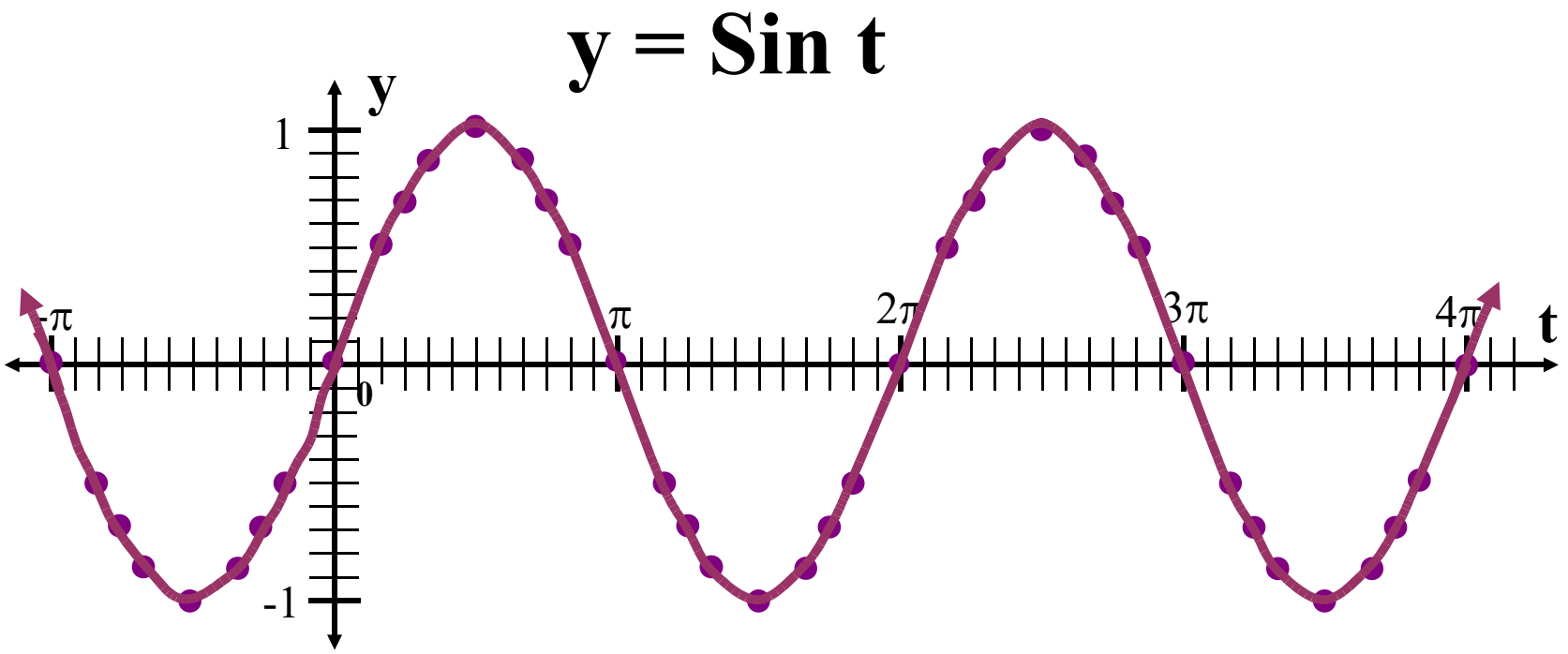
-150°	$\frac{-5\pi}{6}$	-1/2
-180°	$-\pi$	0

Teach Yourself Trigonometry



Teach Yourself Trigonometry

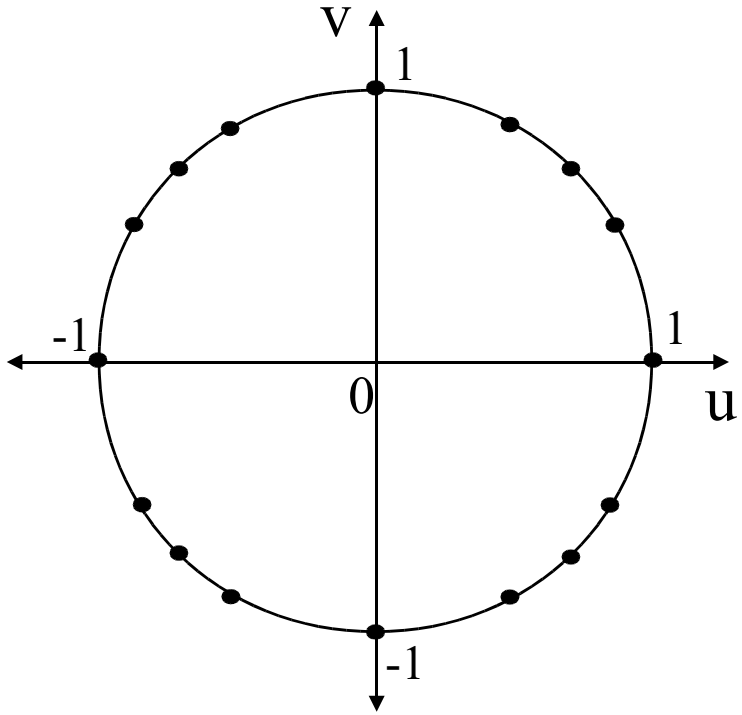


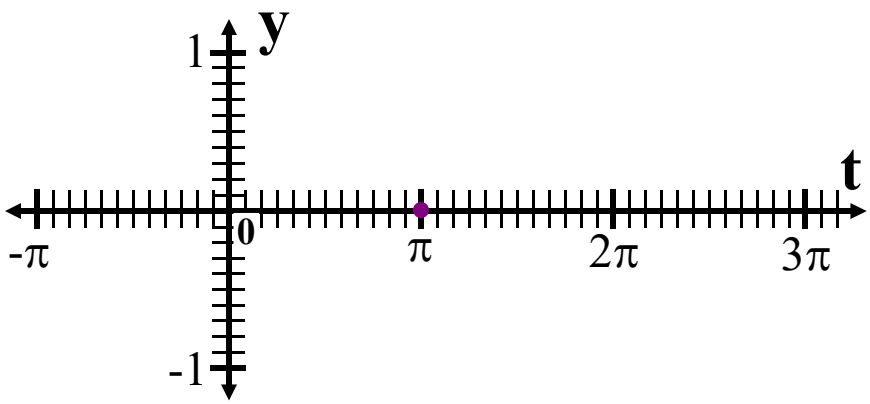
Now, we will graph the cosine function.

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

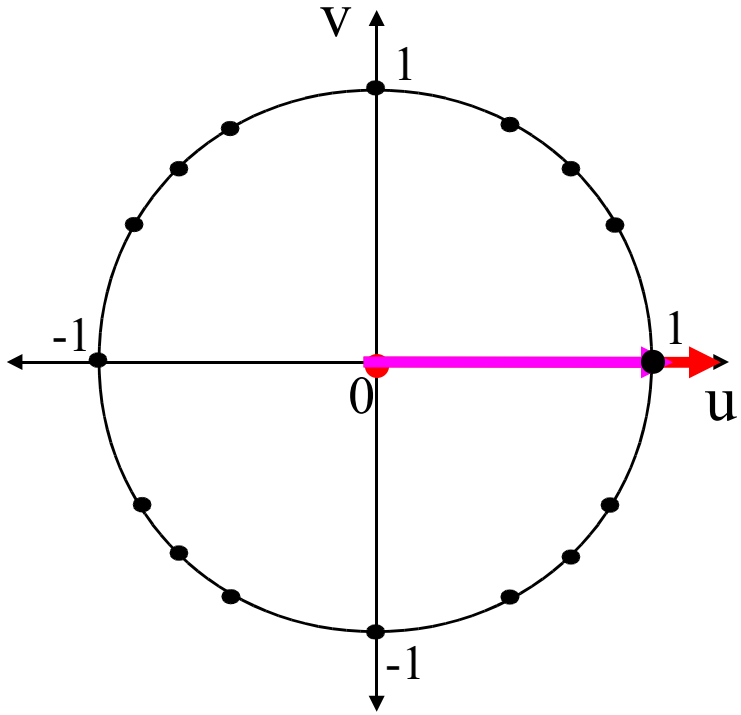
y = Sin t and y = Cos t

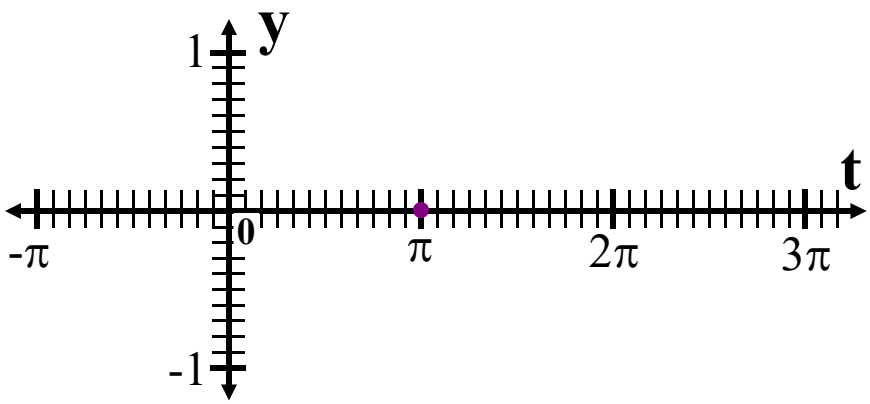
θ	t	Cos t
0°	0	
30°	π/6	
45°	π/4	
60°	π/3	
90°	π/2	
120°	2π/3	
135°	3π/4	
150°	5π/6	
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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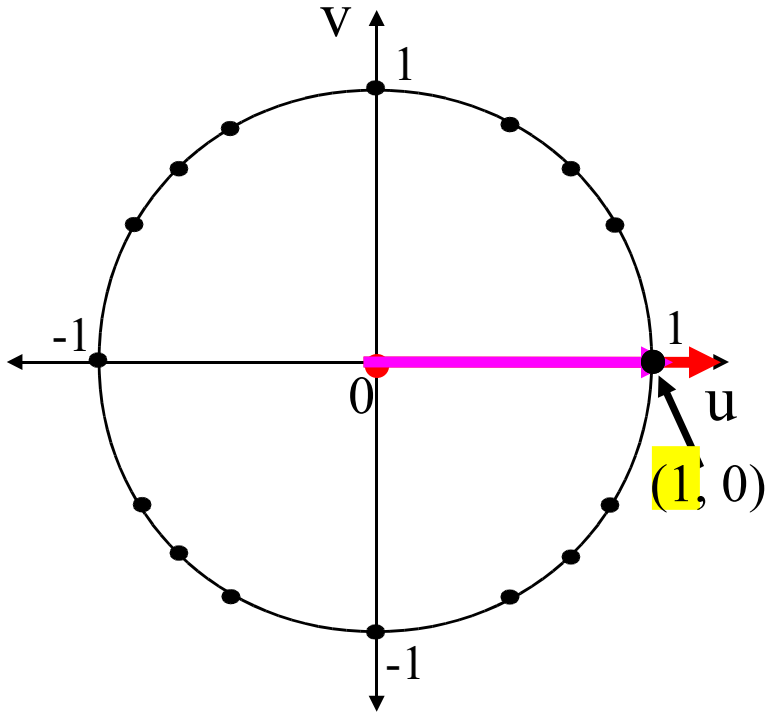
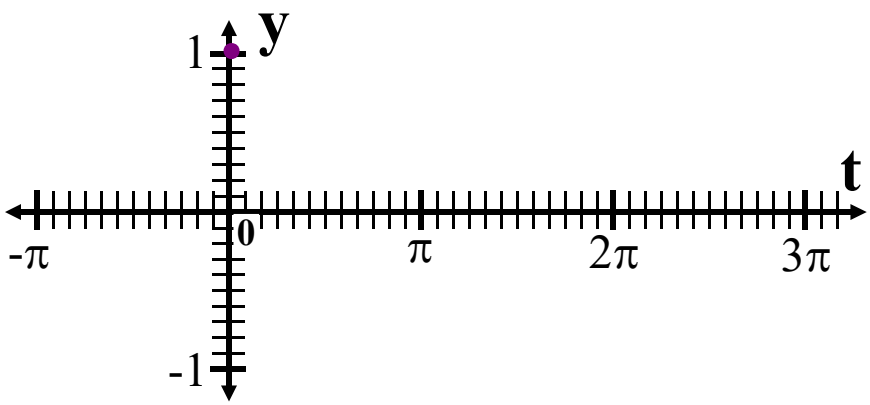
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

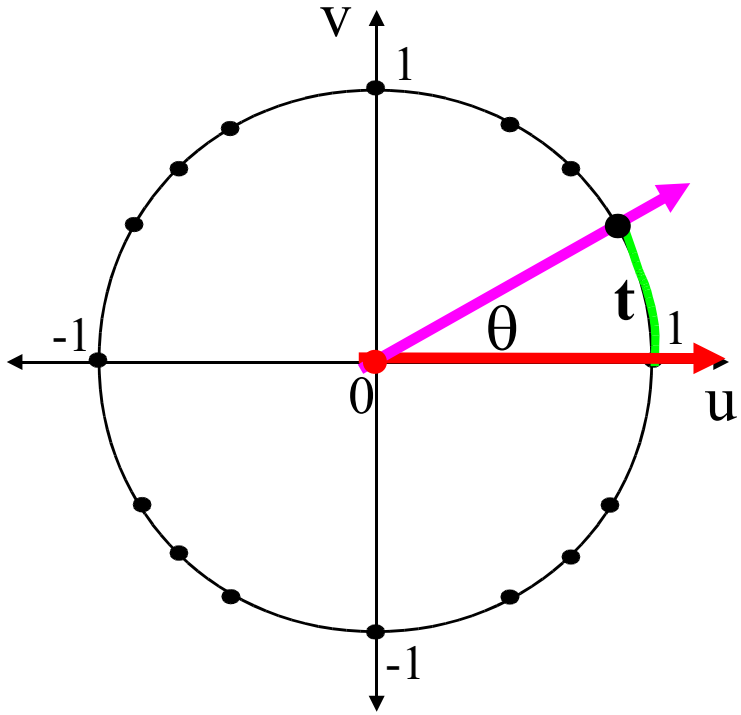
y = Sin t and y = Cos t

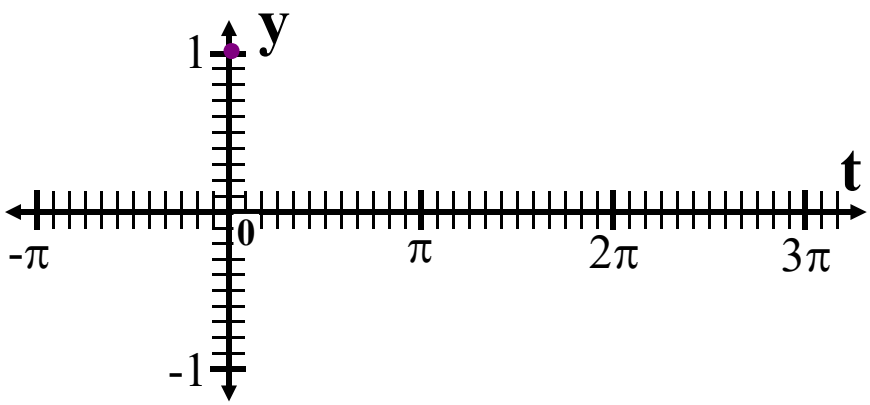
θ	t	Cos t
0°	0	1
30°	π/6	
45°	π/4	
60°	π/3	
90°	π/2	
120°	2π/3	
135°	3π/4	
150°	5π/6	
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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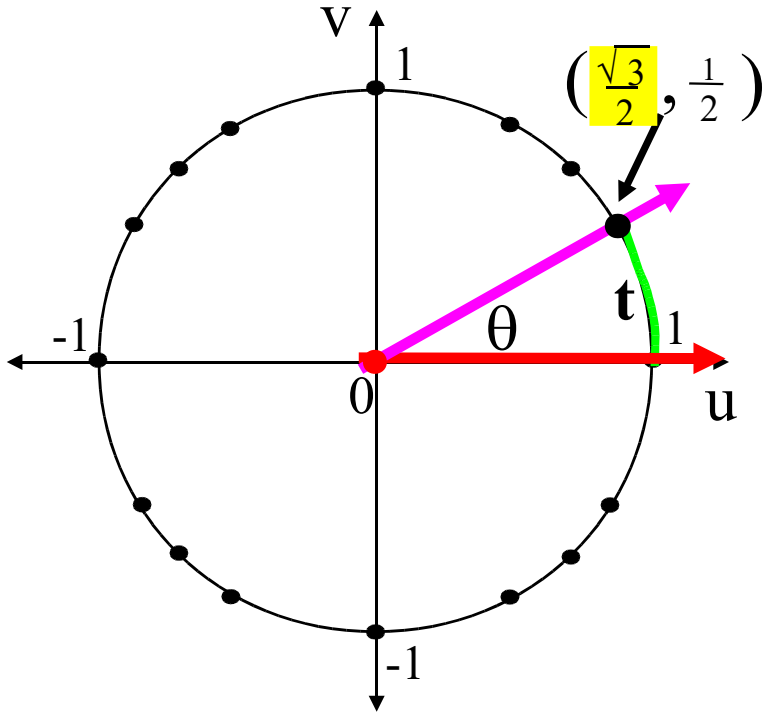

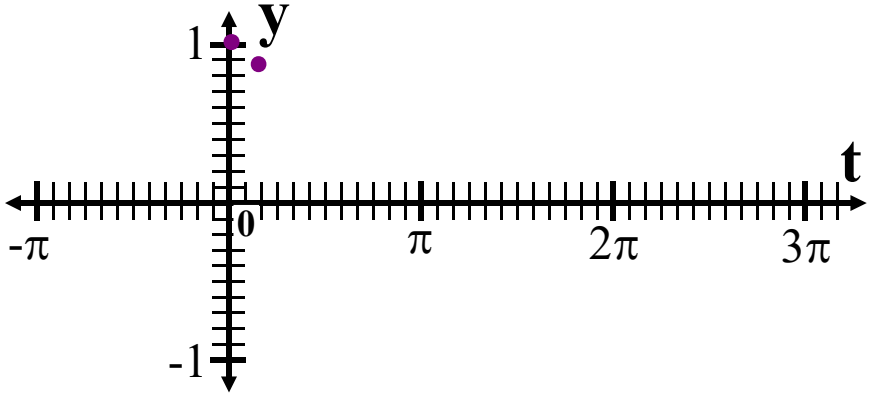

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
0°	0	1
30°	π/6	$\sqrt{3}/2$
45°	π/4	
60°	π/3	
90°	π/2	
120°	2π/3	
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150°	5π/6	
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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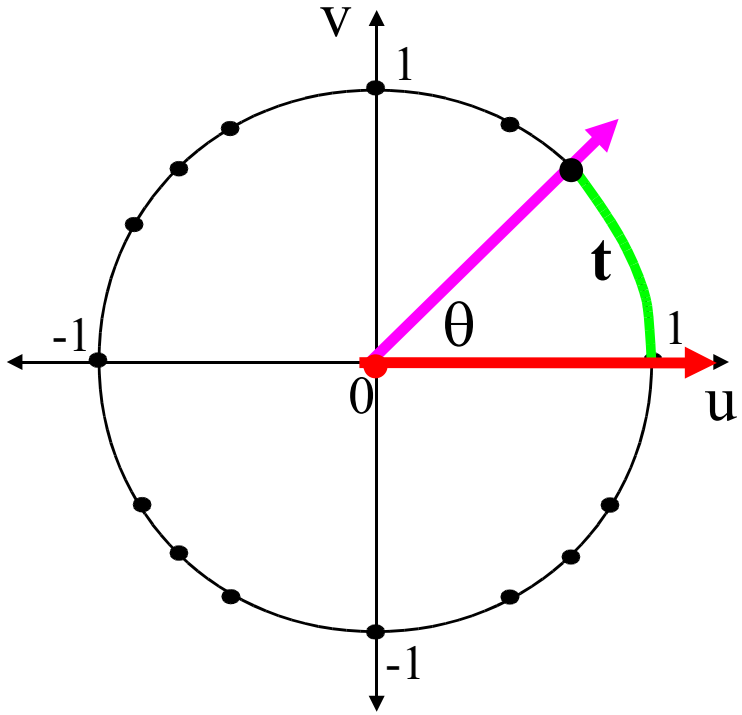

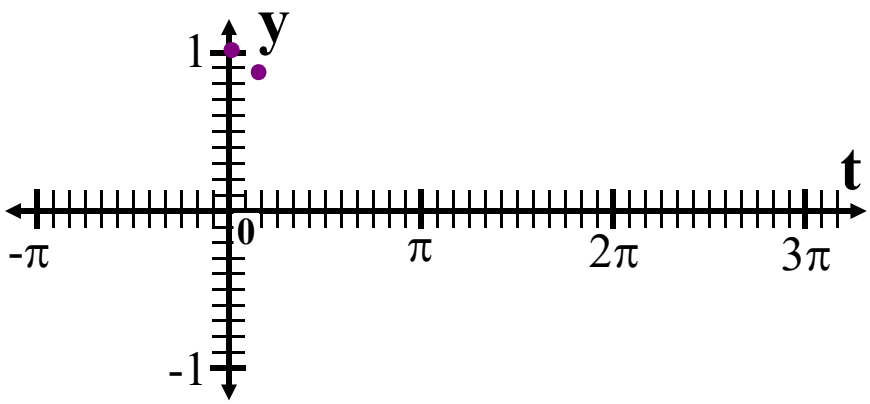

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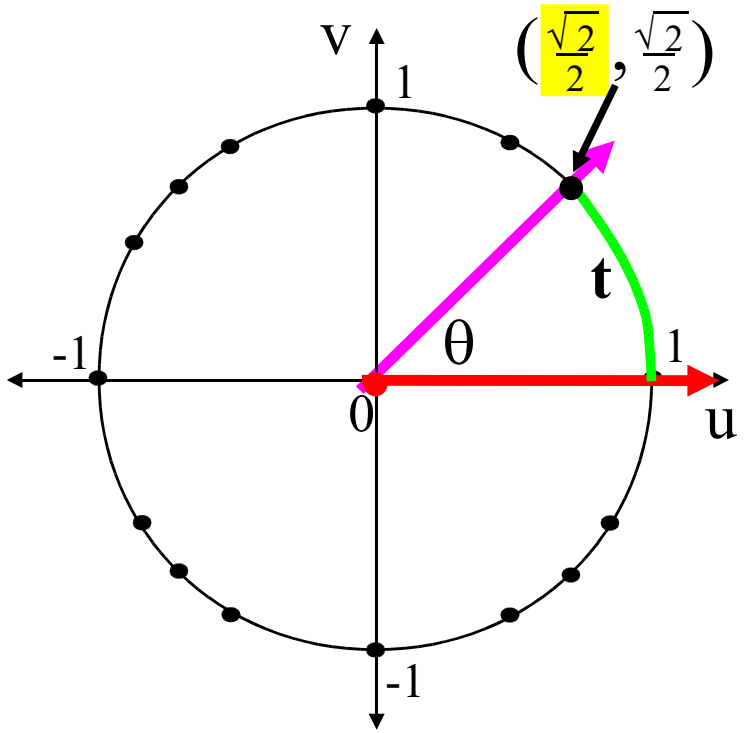
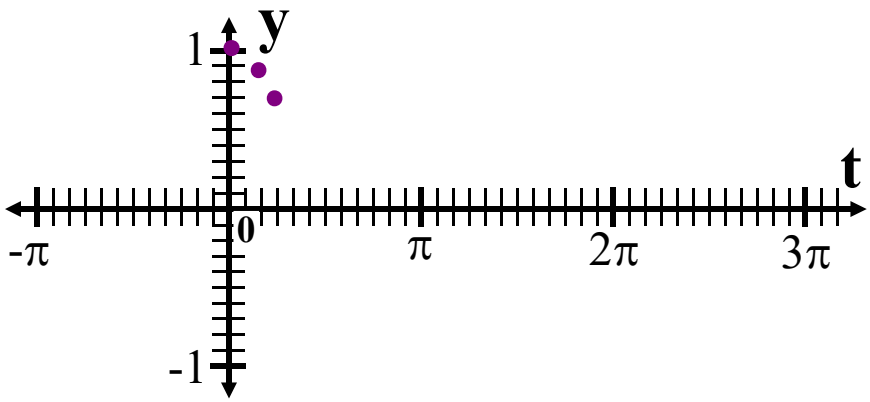
Teach Yourself Trigonometry

Part 5 : The Circular Functions





Sin t = v and Cos t = u

The Circular Functions

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60°	π/3	
90°	π/2	
120°	2π/3	
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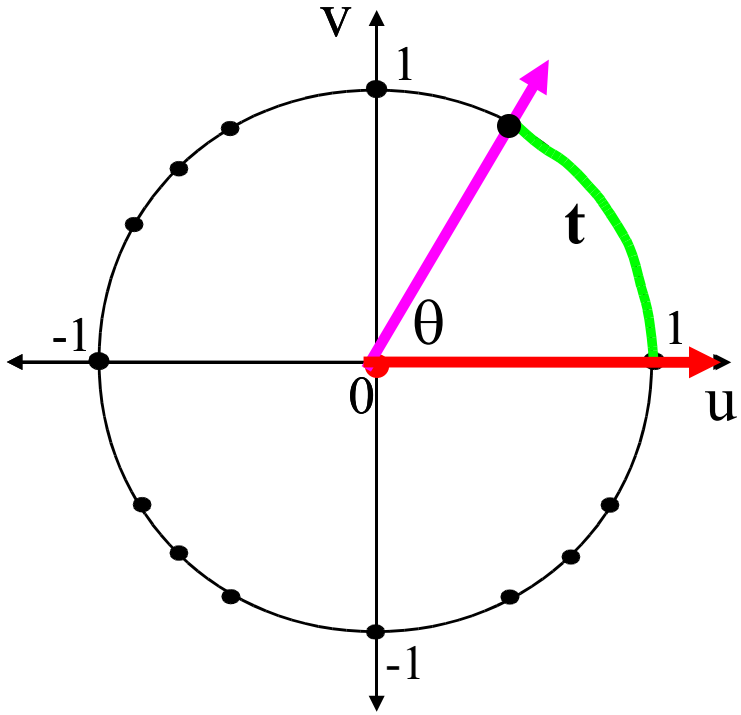
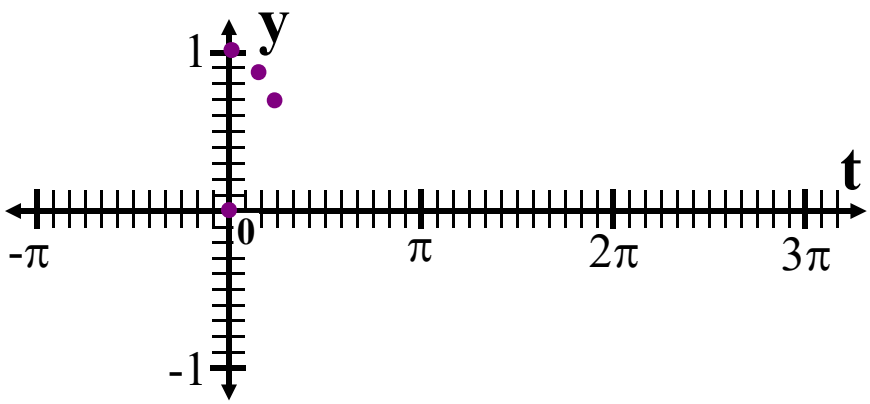
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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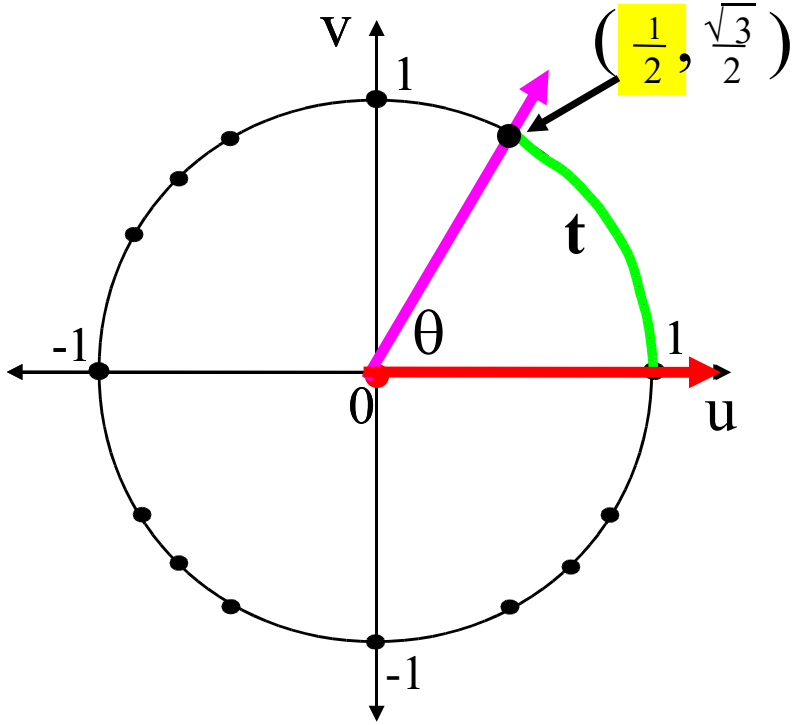
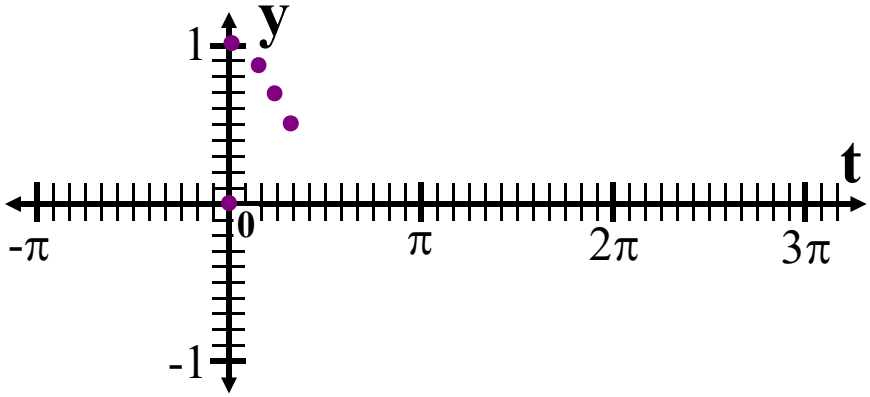
Teach Yourself Trigonometry

Part 5 : The Circular Functions





Sin t = v and Cos t = u

The Circular Functions

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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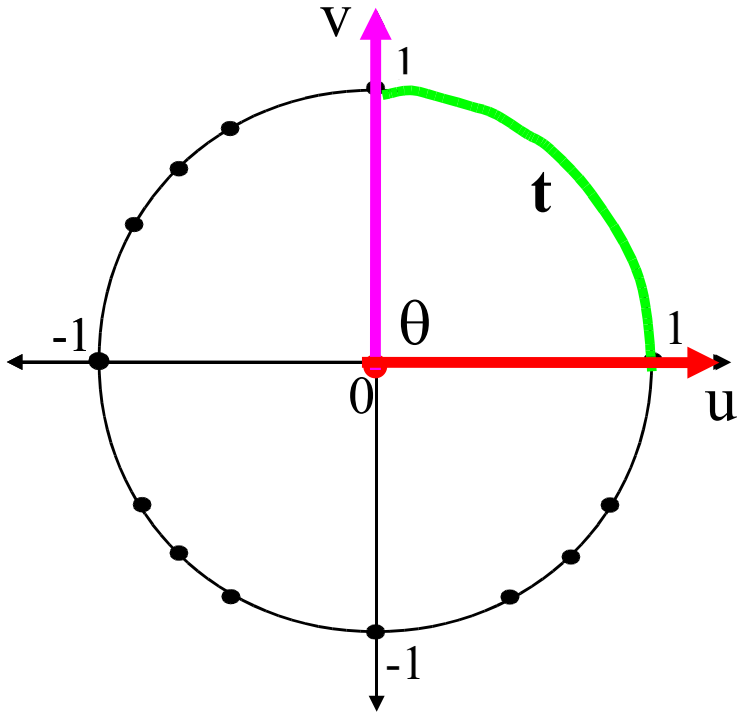

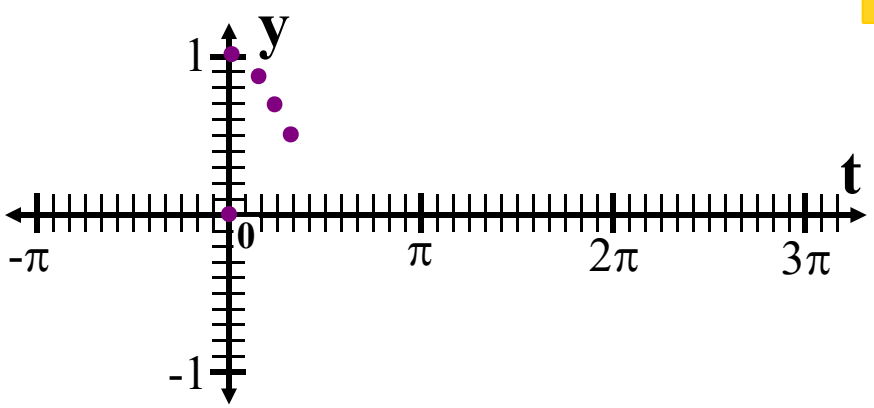

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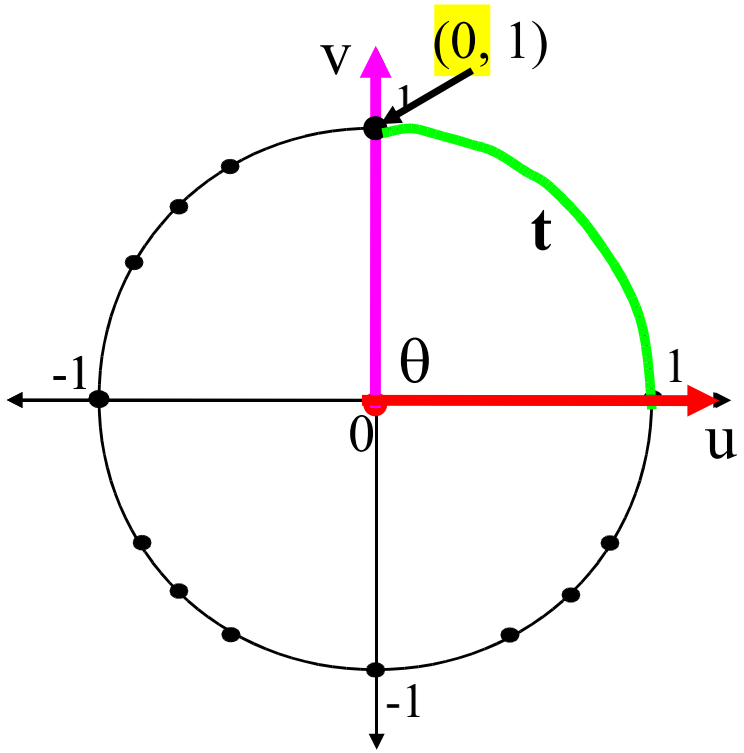
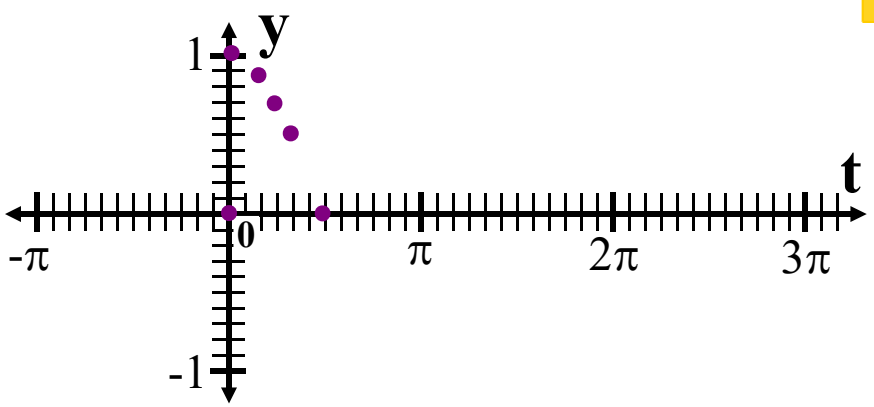
Part 5 : The Circular Functions





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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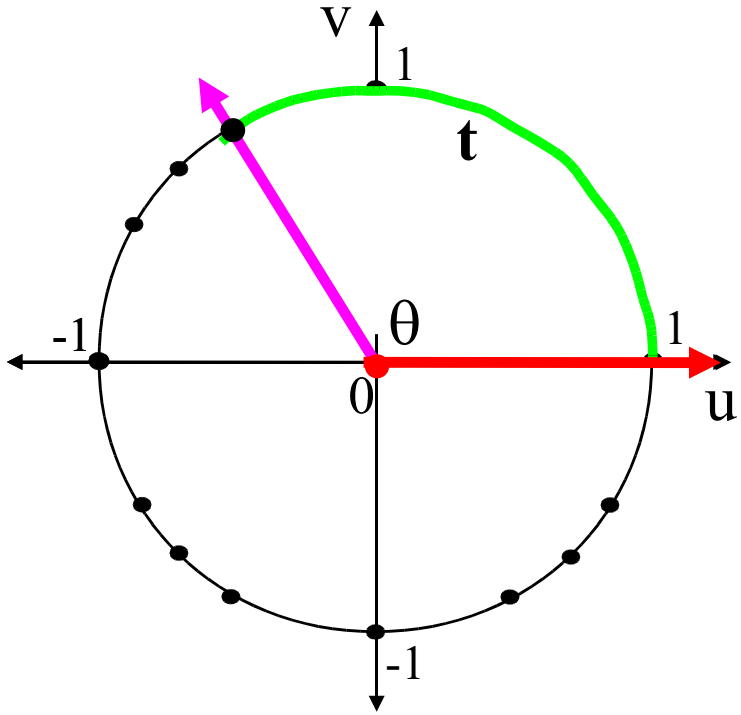

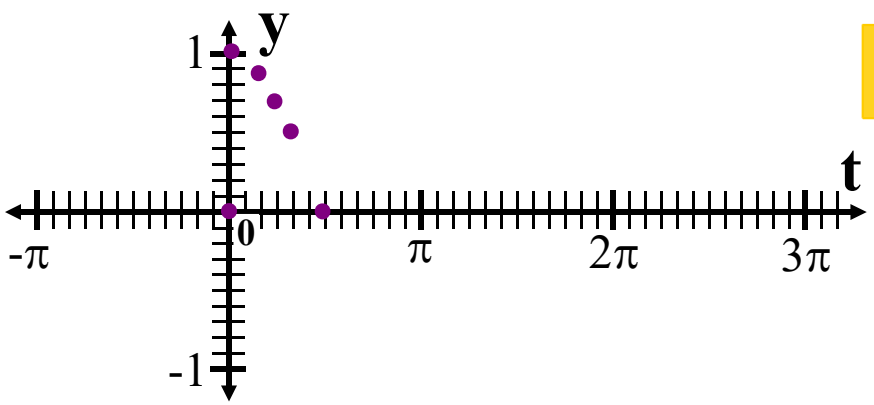

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Part 5 : The Circular Functions

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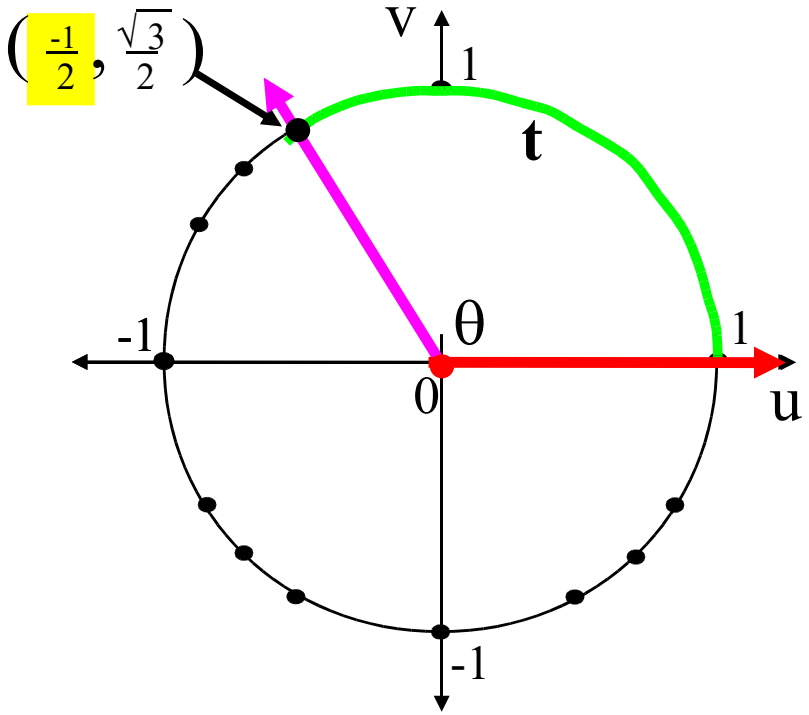

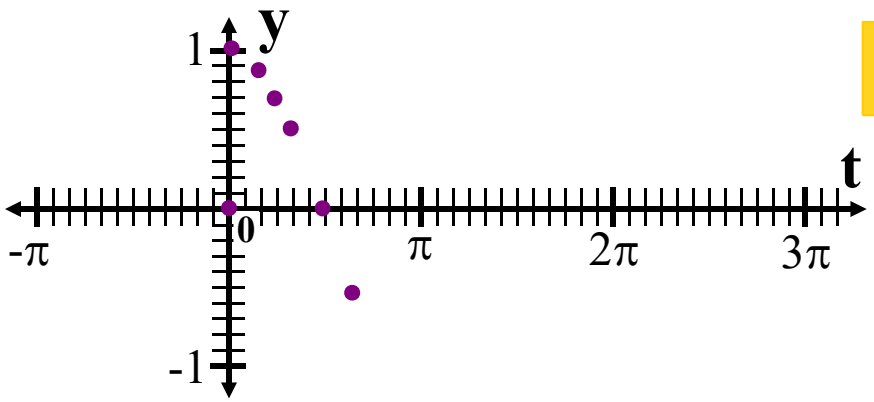

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0°	0	1
30°	π/6	√3/2
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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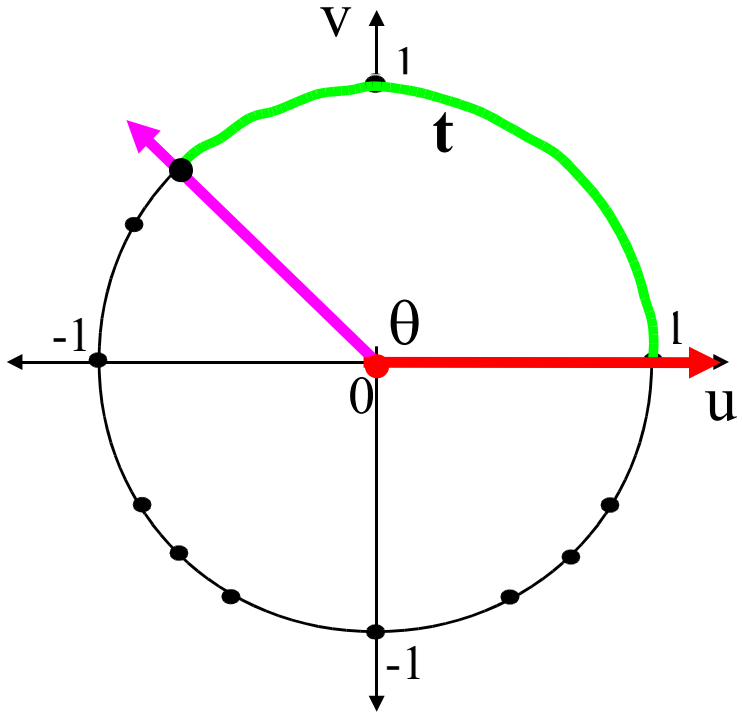

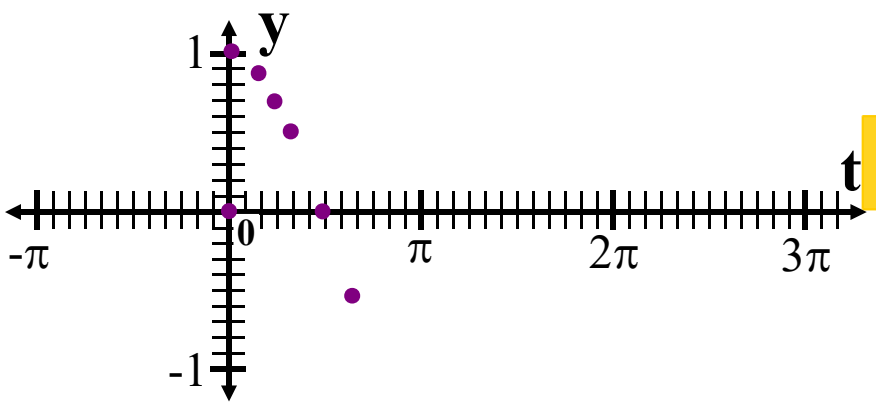

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180°	π	

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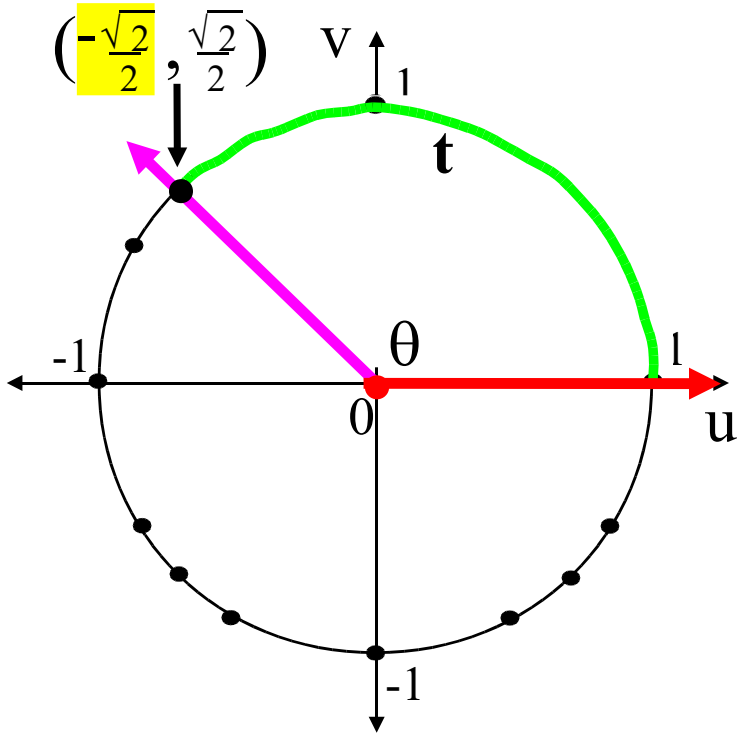
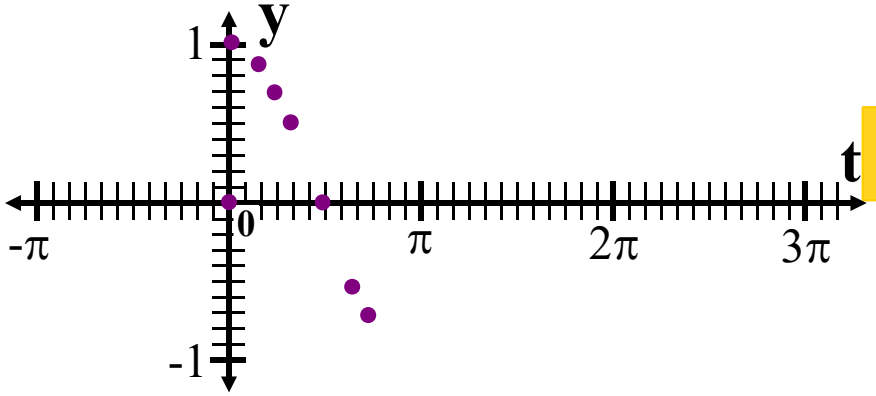
Part 5 : The Circular Functions





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150°	5π/6	
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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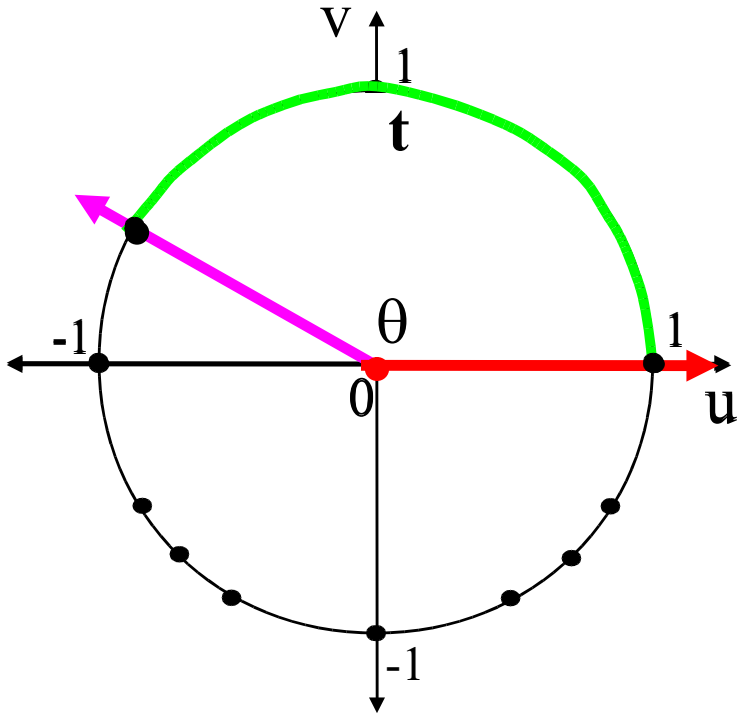

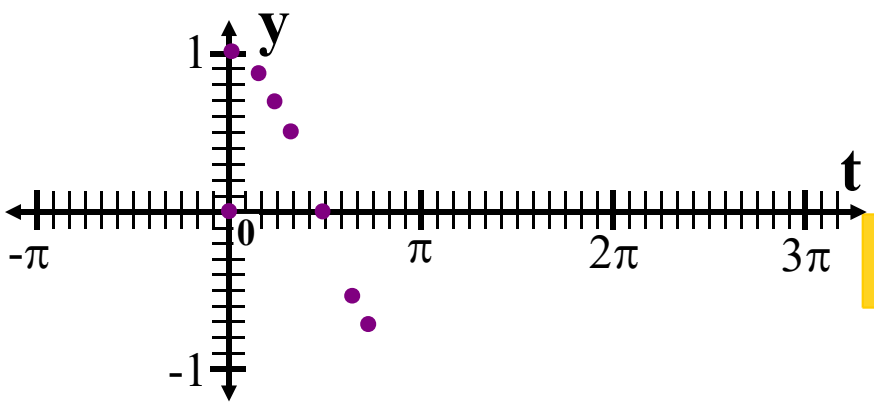

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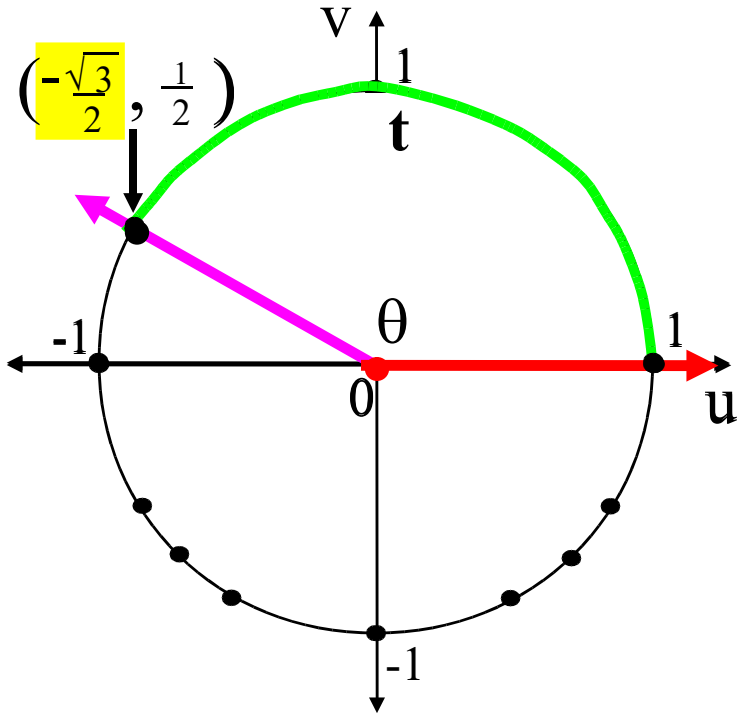
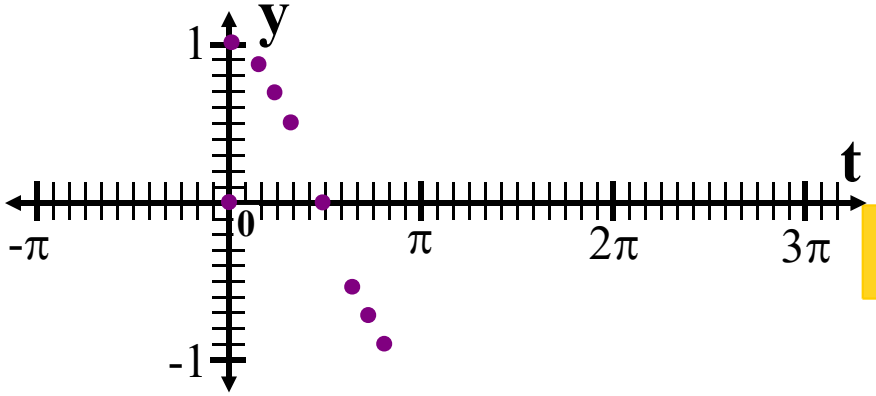
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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150°	5π/6	$-\sqrt{3}/2$
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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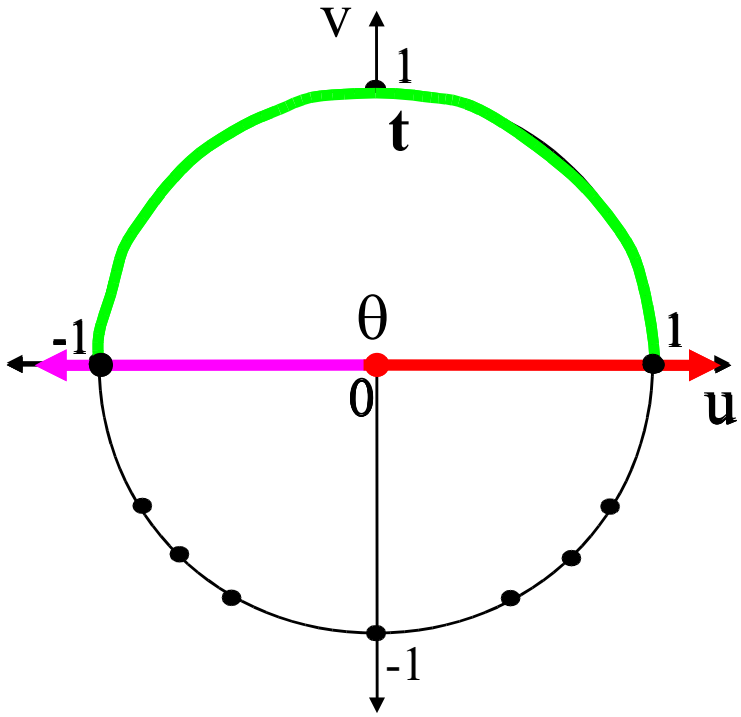

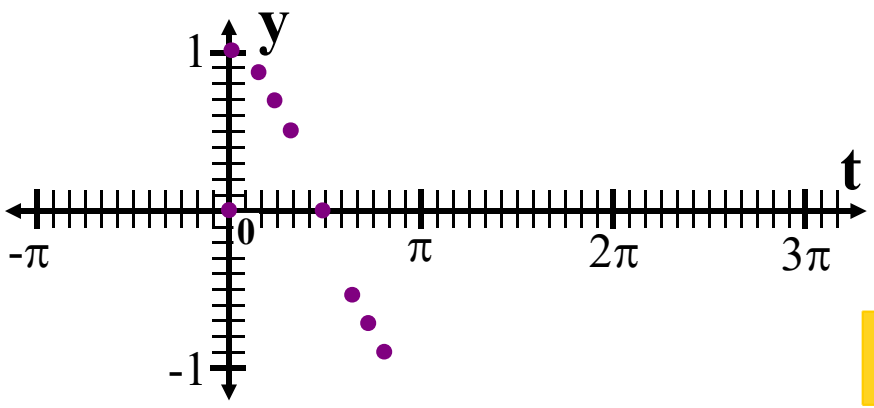

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135°	3π/4	$-\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$
180°	π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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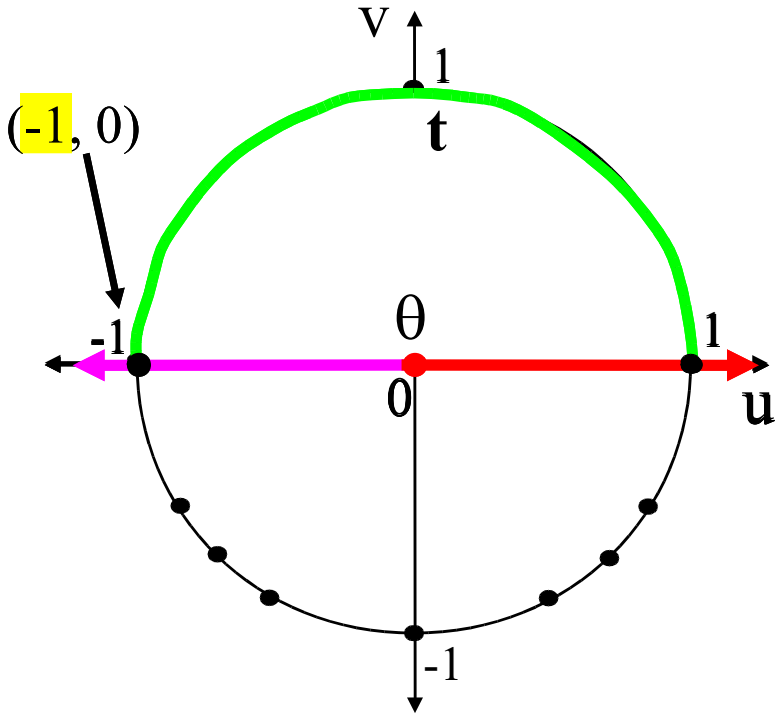

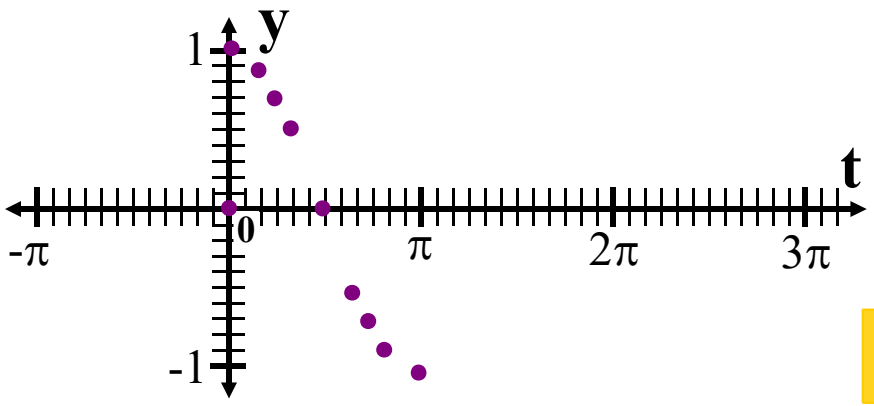

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y = Sin t and y = Cos t

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90°	π/2	0
120°	2π/3	-1/2
135°	3π/4	$-\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$
180°	π	-1

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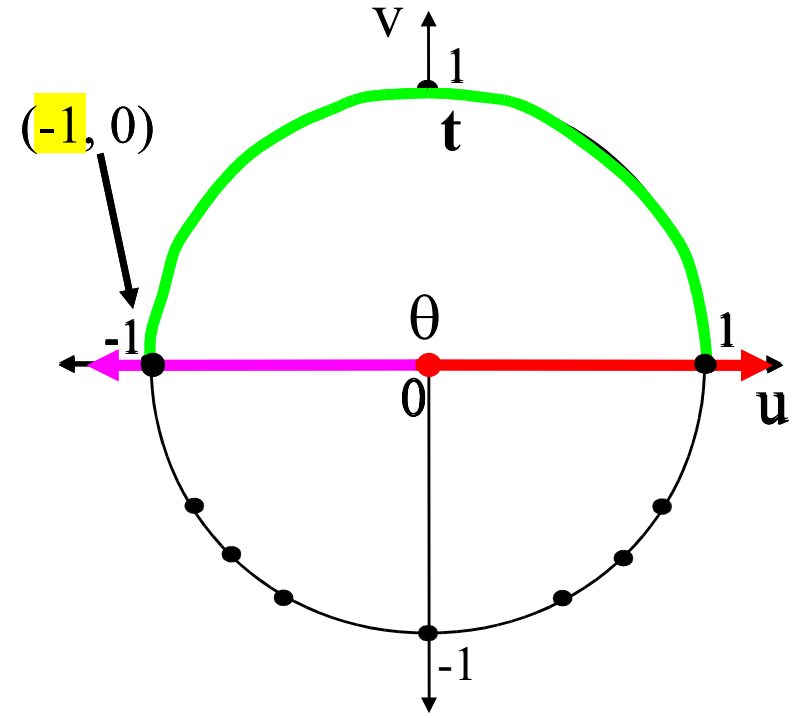
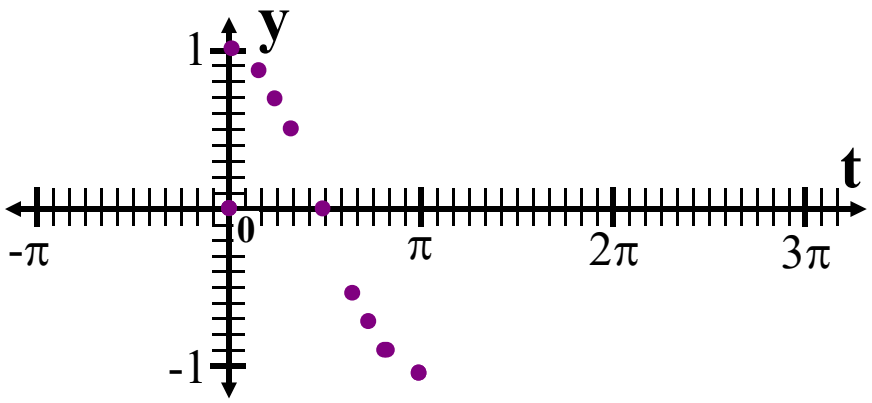
Part 5 : The Circular Functions





Sin t = v and Cos t = u

The Circular Functions

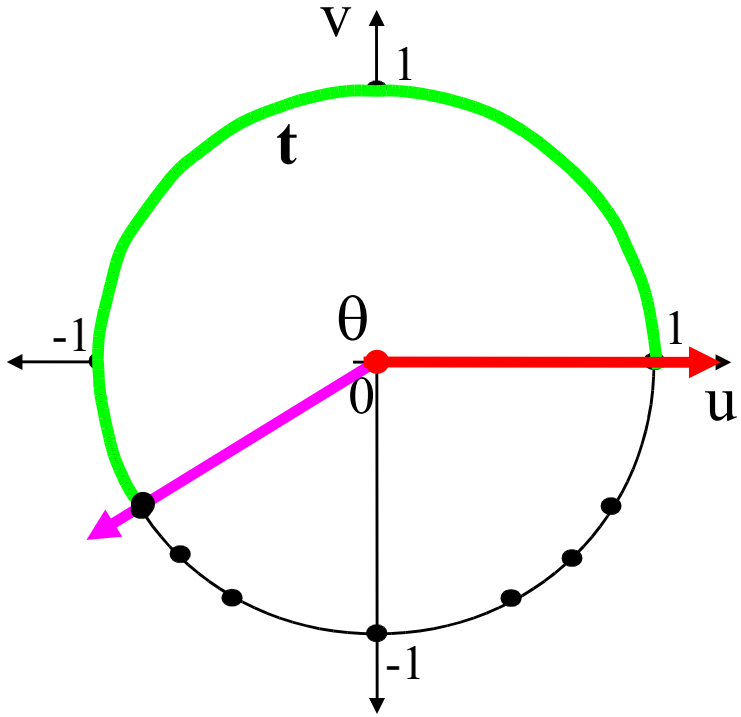
y = Sin t and y = Cos t

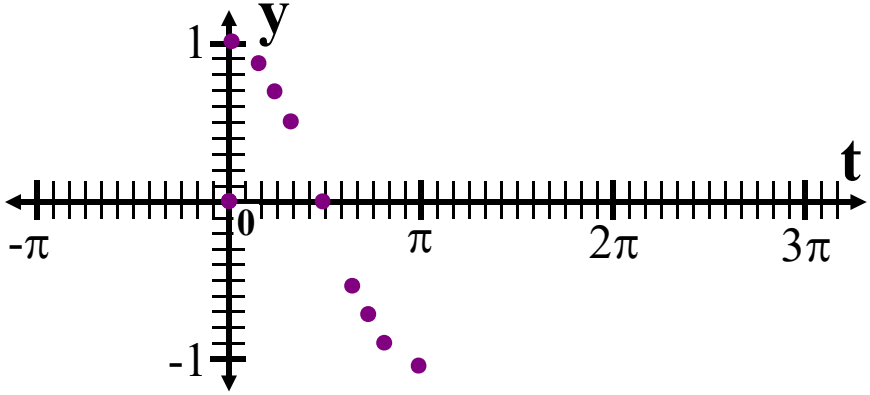
θ	t	Cos t
0°	0	1
30°	π/6	√3/2
45°	π/4	√2/2
60°	π/3	1/2
90°	π/2	0
120°	2π/3	-1/2
135°	3π/4	-√2/2
150°	5π/6	-√3/2
180°	π	-1

θ	t	Cos t
180°	π	-1
210°	7π/6	
225°	5π/4	
240°	4π/3	
270°	3π/2	
300°	5π/3	
315°	7π/4	
330°	$\frac{11\pi}{6}$	
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions





Sin t = v and Cos t = u

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
0°	0	1
30°	π/6	$\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$
60°	π/3	1/2
90°	π/2	0
120°	2π/3	-1/2
135°	3π/4	$-\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$
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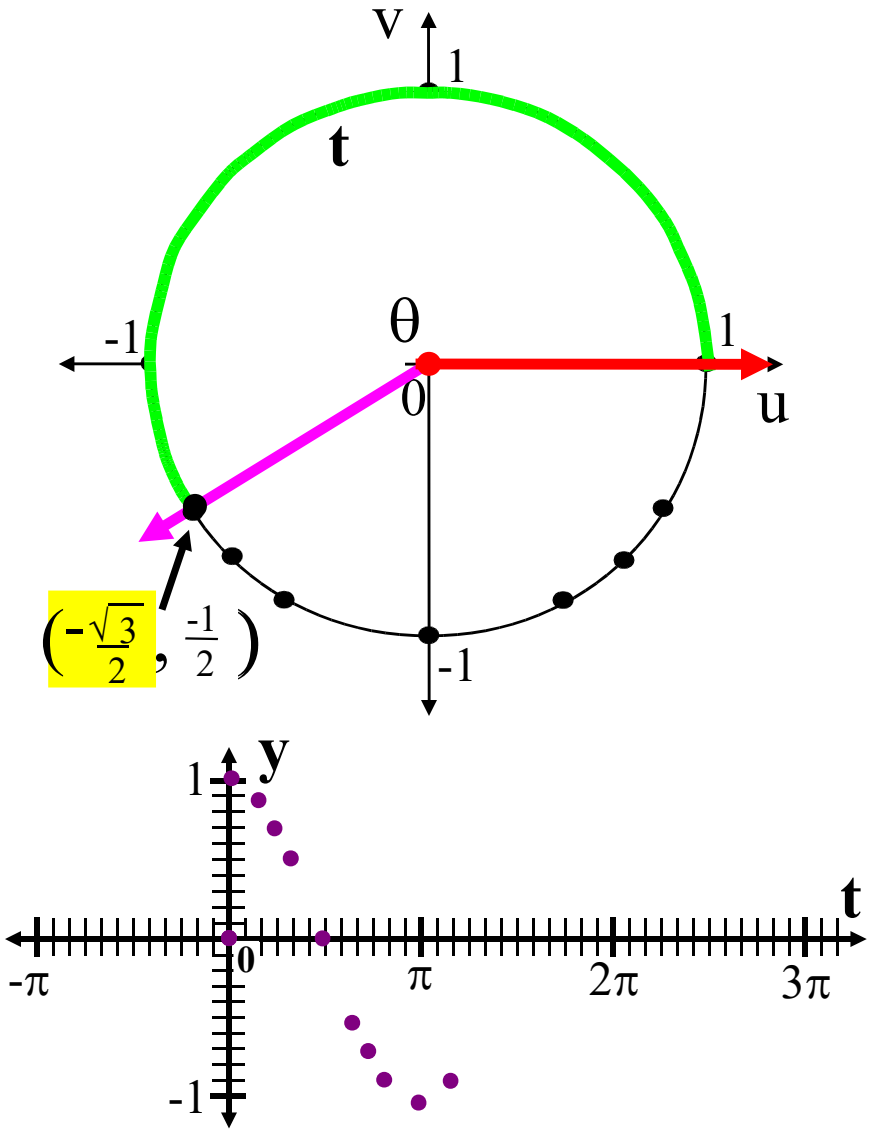
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions



Sin t = v and Cos t = u

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
0°	0	1
30°	π/6	$\sqrt{3}/2$
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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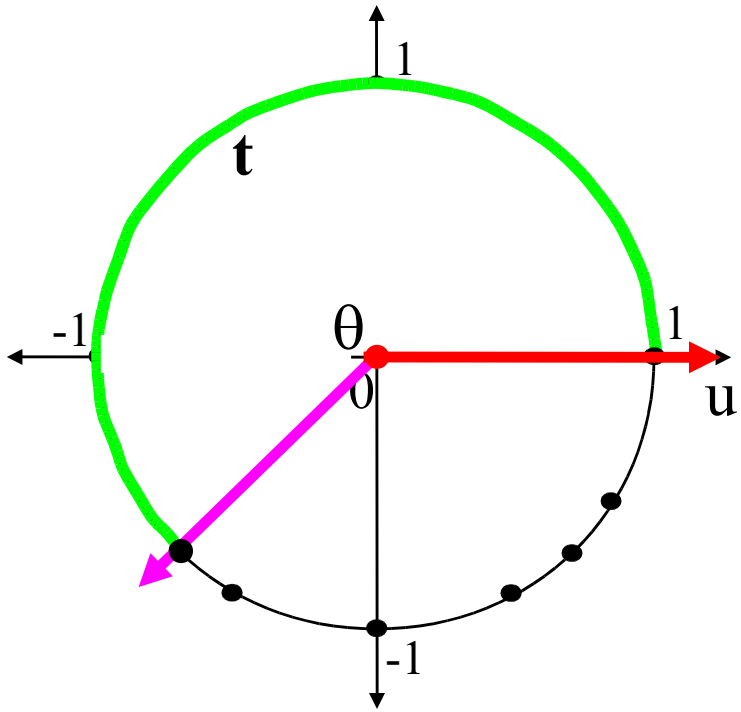

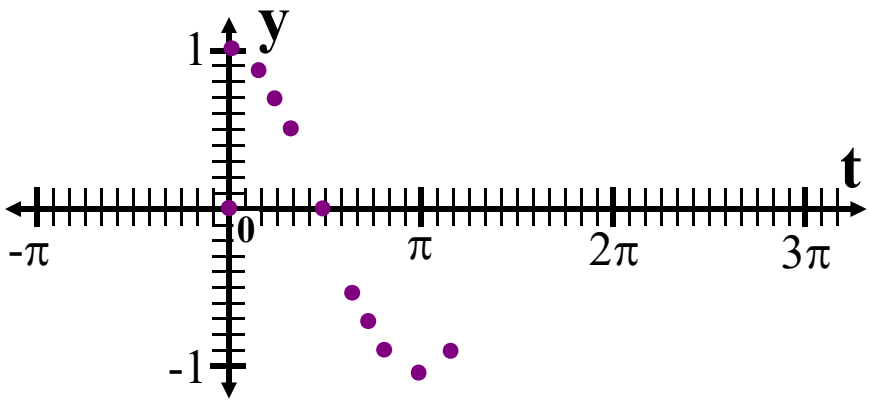

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	
60°	π/3	1/2	240°	4π/3	
90°	π/2	0	270°	3π/2	
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	
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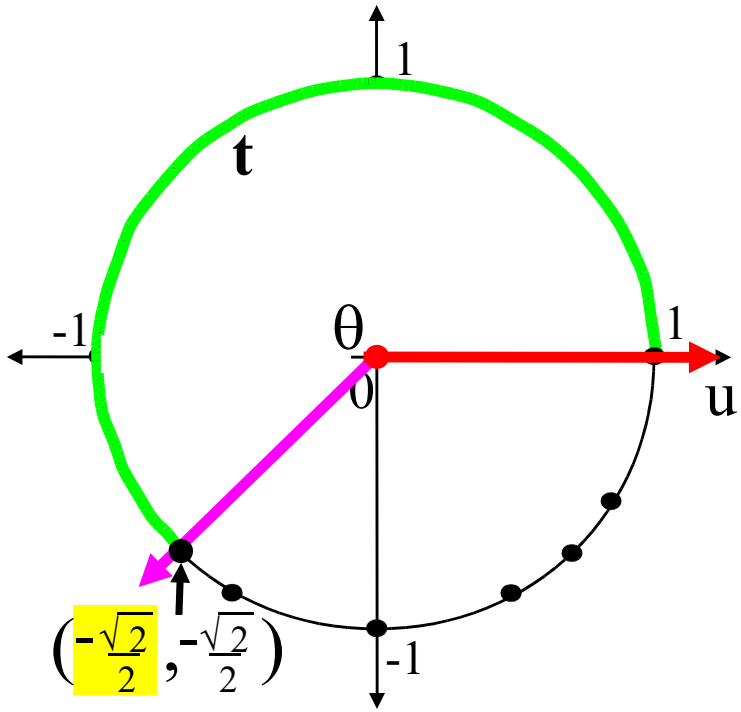
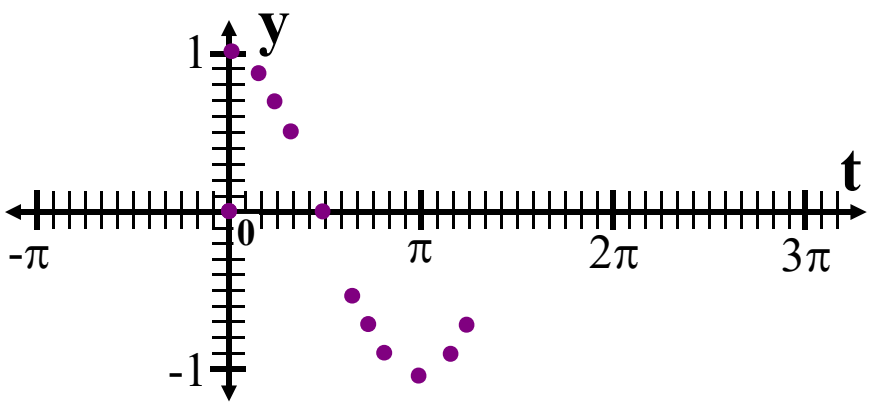
Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

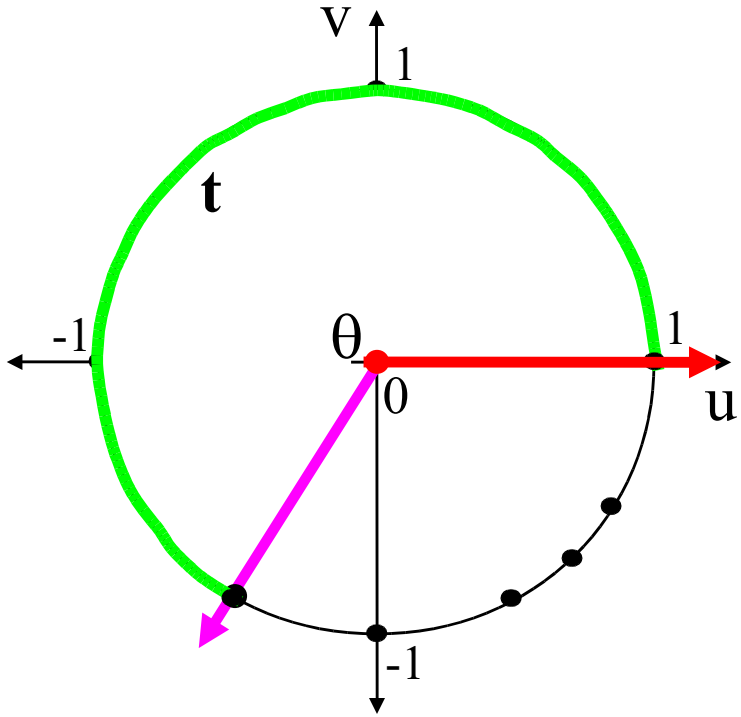
y = Sin t and y = Cos t

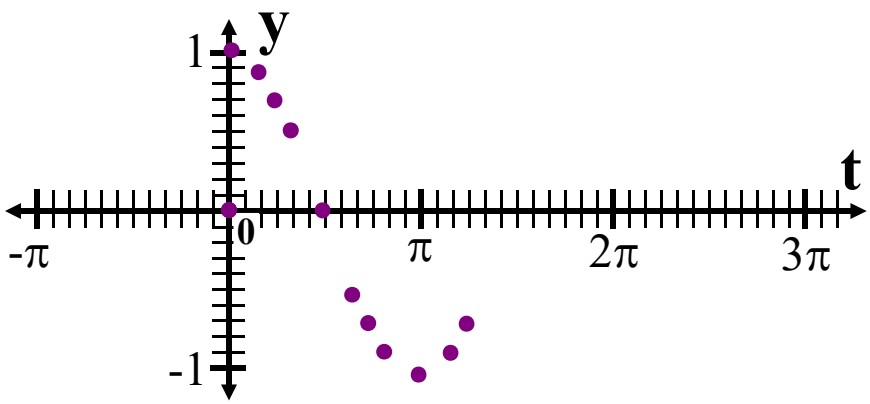
θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	√3/2	210°	7π/6	-√3/2
45°	π/4	√2/2	225°	5π/4	-√2/2
60°	π/3	1/2	240°	4π/3	
90°	π/2	0	270°	3π/2	
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	-√2/2	315°	7π/4	
150°	5π/6	-√3/2	330°	11π/6	
180°	π	-1	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

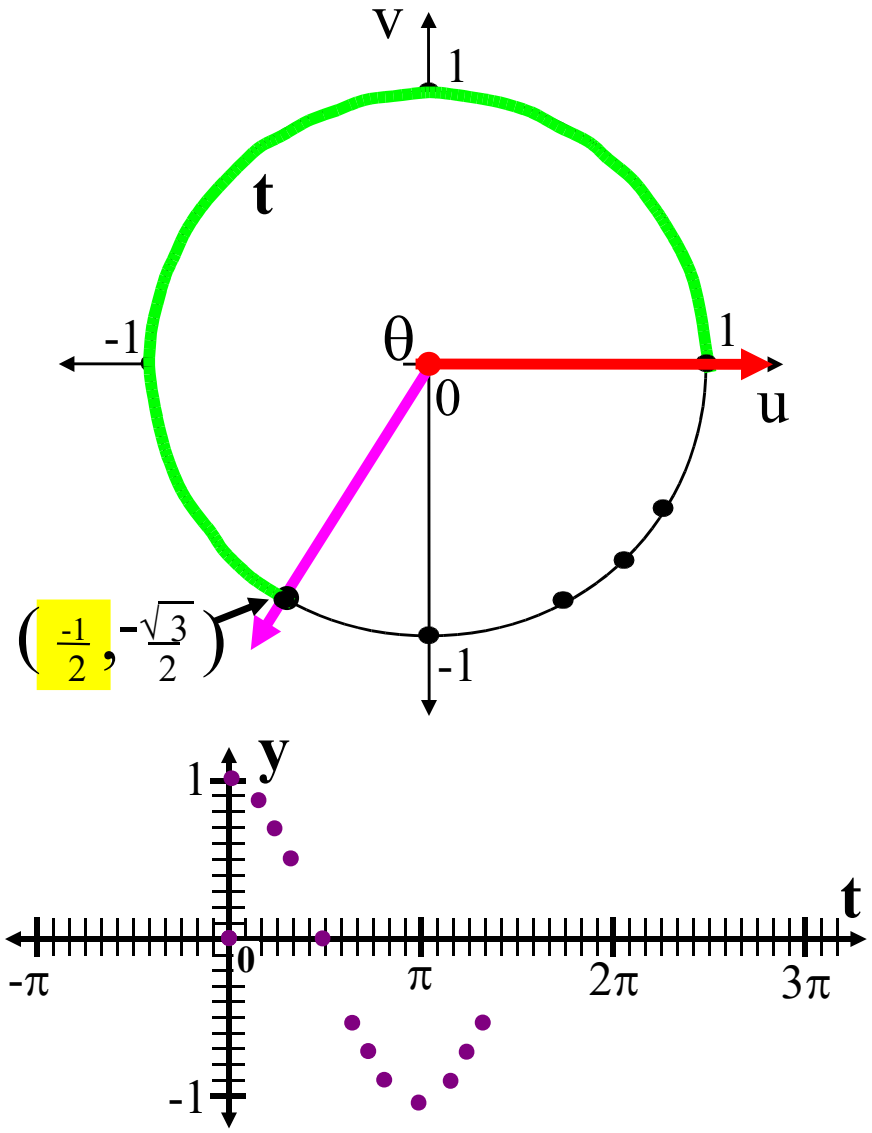
y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	
90°	π/2	0	270°	3π/2	
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	
180°	π	-1	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u



The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
0°	0	1
30°	π/6	$\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$
60°	π/3	1/2
90°	π/2	0
120°	2π/3	-1/2
135°	3π/4	$-\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$
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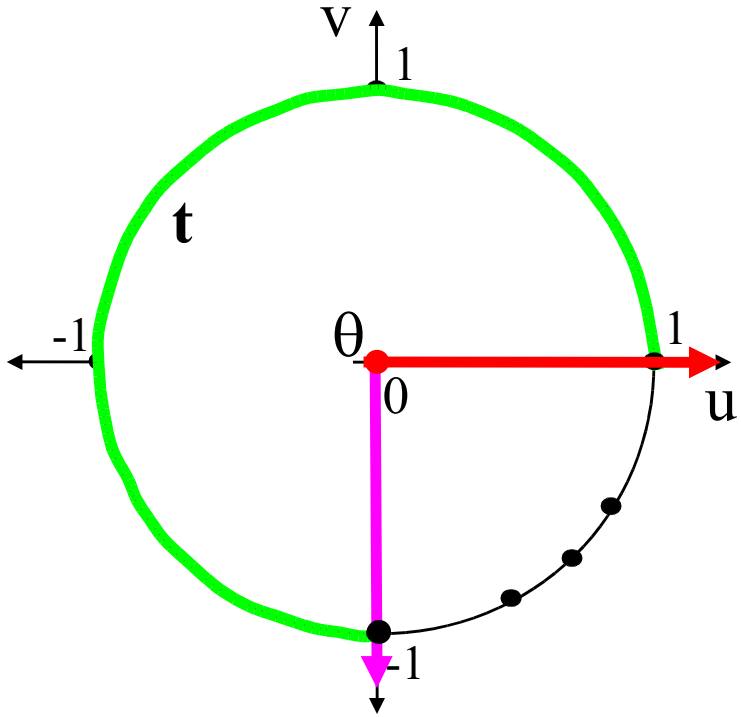
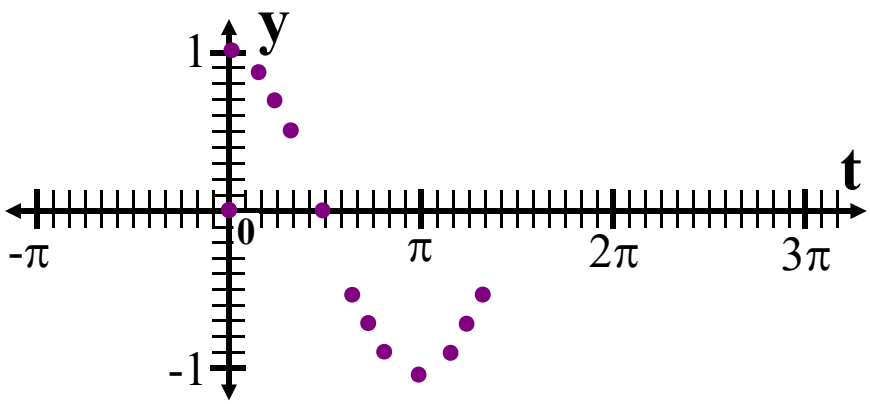
θ	t	Cos t
180°	π	-1
210°	7π/6	$-\sqrt{3}/2$
225°	5π/4	$-\sqrt{2}/2$
240°	4π/3	-1/2
270°	3π/2	
300°	5π/3	
315°	7π/4	
330°	$\frac{11\pi}{6}$	
360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
90°	π/2	0	270°	3π/2	
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	
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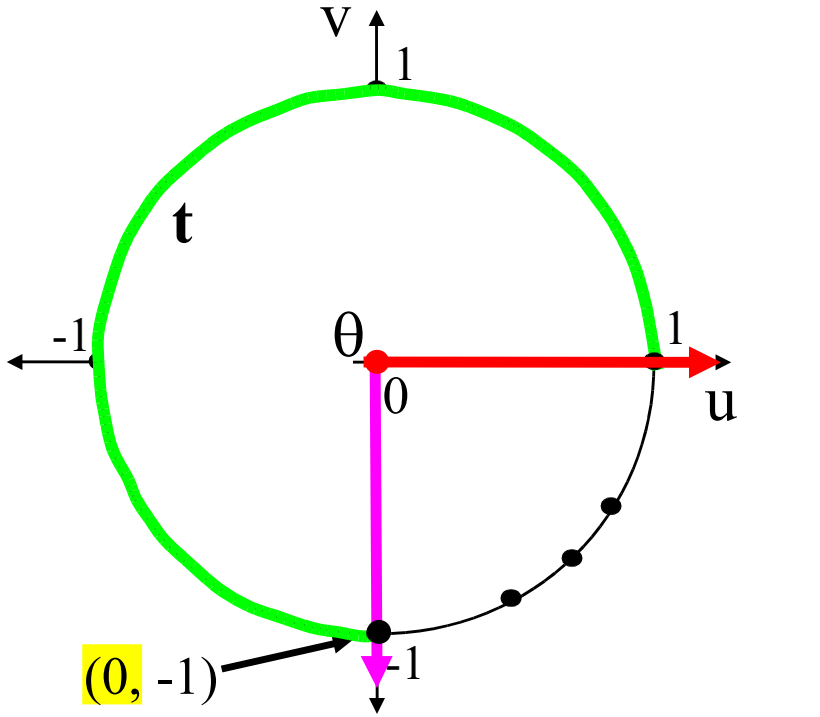
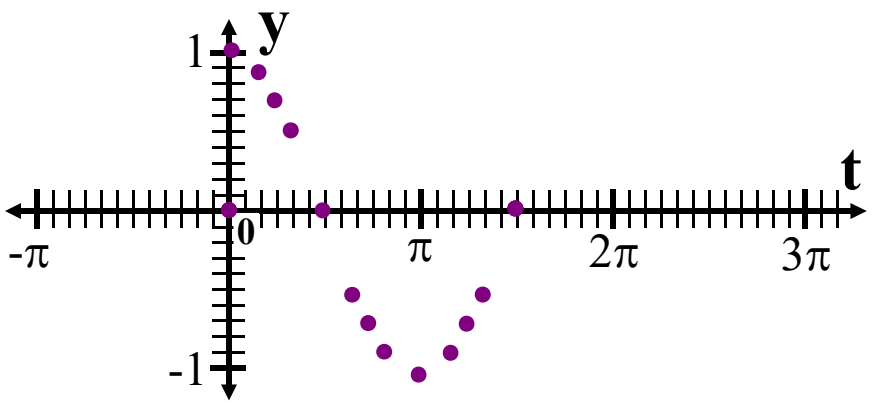
Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





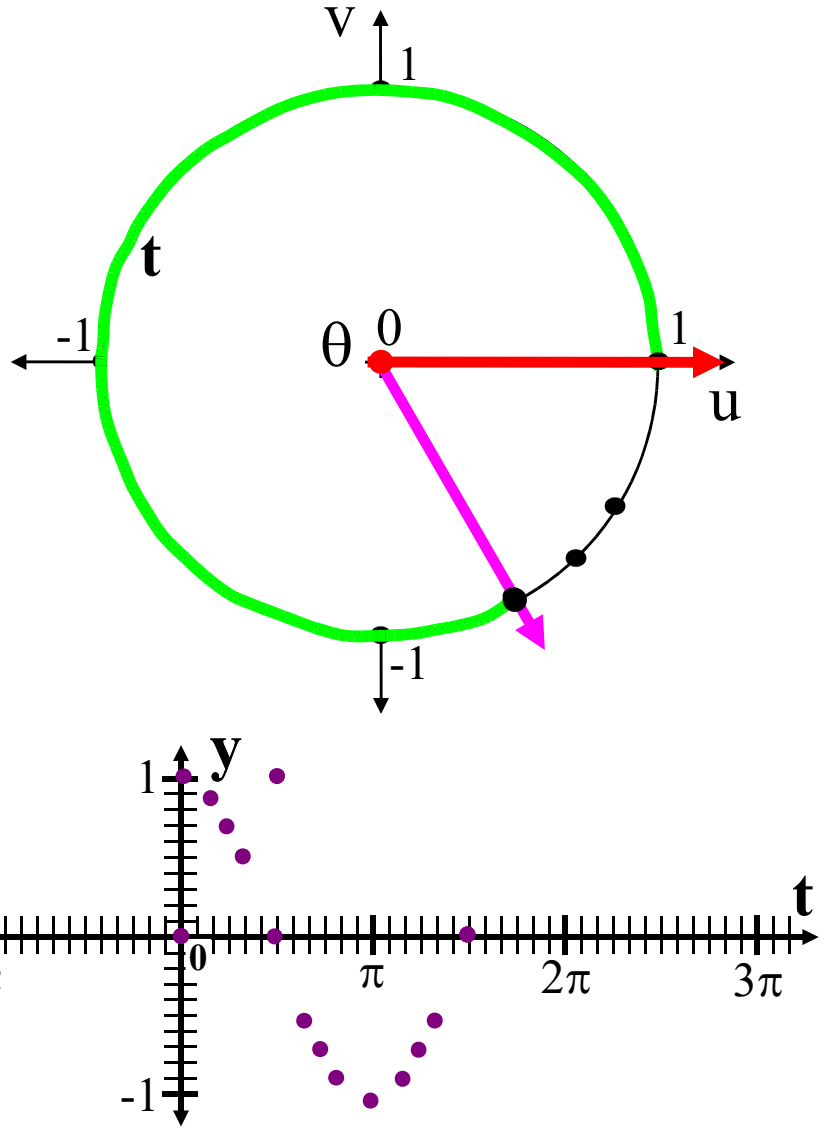
The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
90°	π/2	0	270°	3π/2	0
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	
180°	π	-1	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions



Sin t = v and Cos t = u

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
90°	π/2	0	270°	3π/2	0
120°	2π/3	-1/2	300°	5π/3	
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	
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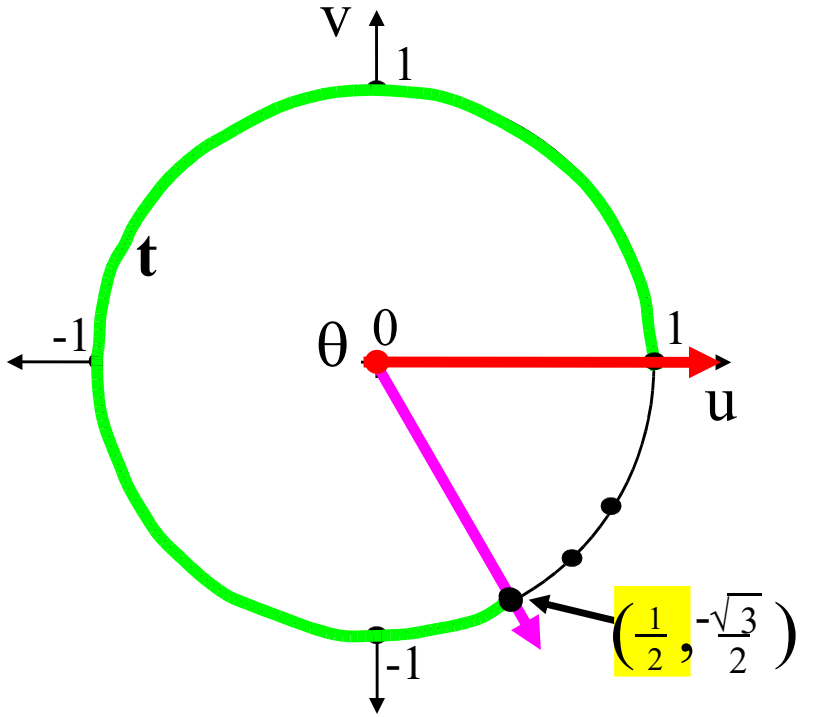
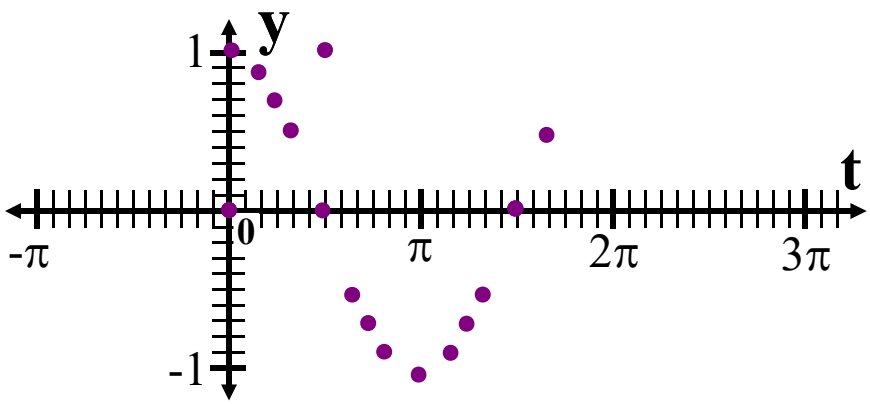
Part 5 : The Circular Functions

Sin t = v and Cos t = u





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y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
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120°	2π/3	-1/2	300°	5π/3	1/2
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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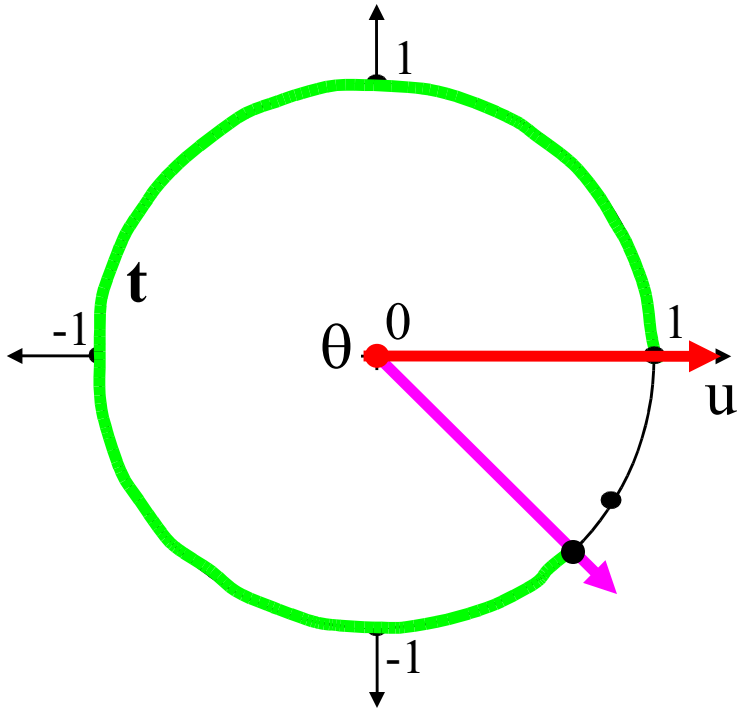

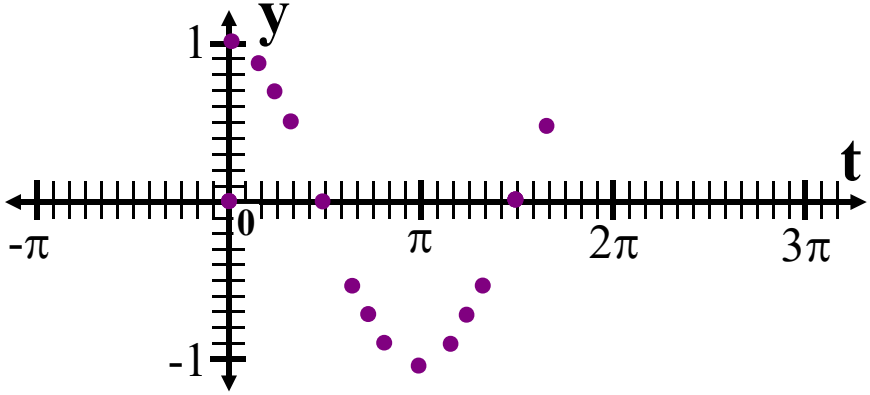

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θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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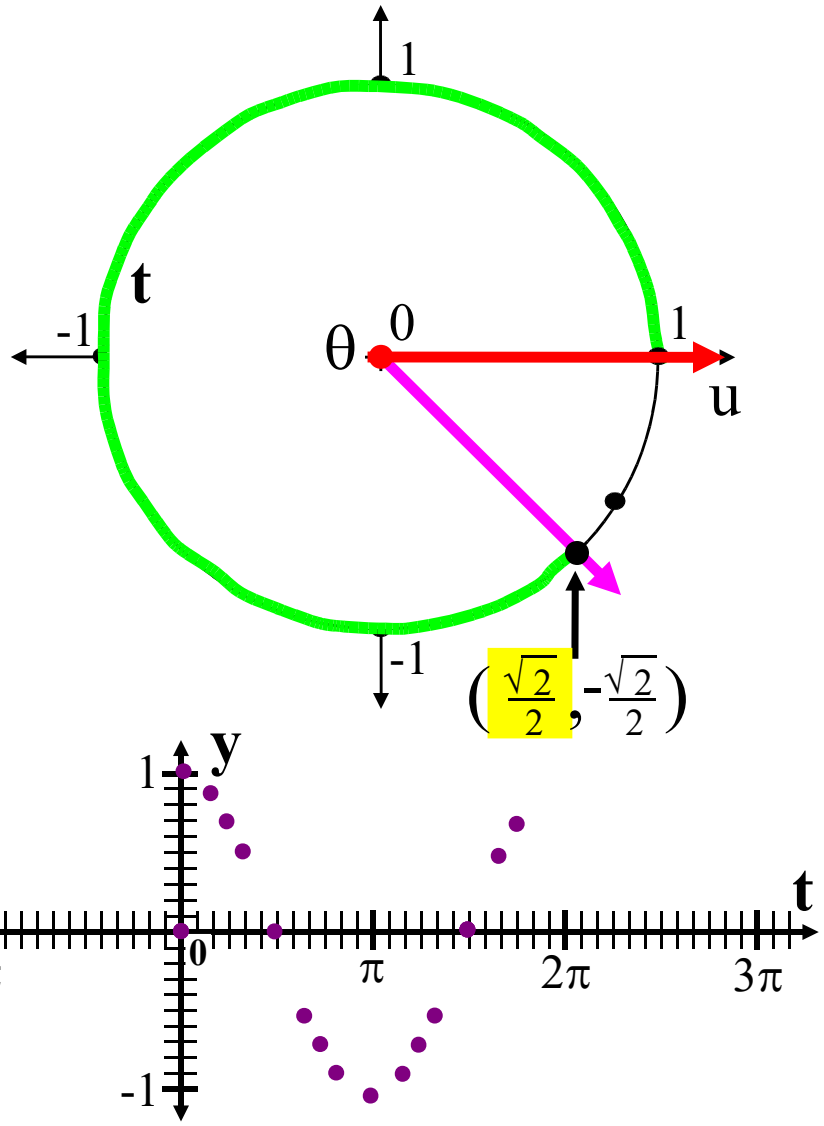

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0°	0	1	180°	π	-1
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90°	π/2	0	270°	3π/2	0
120°	2π/3	-1/2	300°	5π/3	1/2
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	$\sqrt{2}/2$
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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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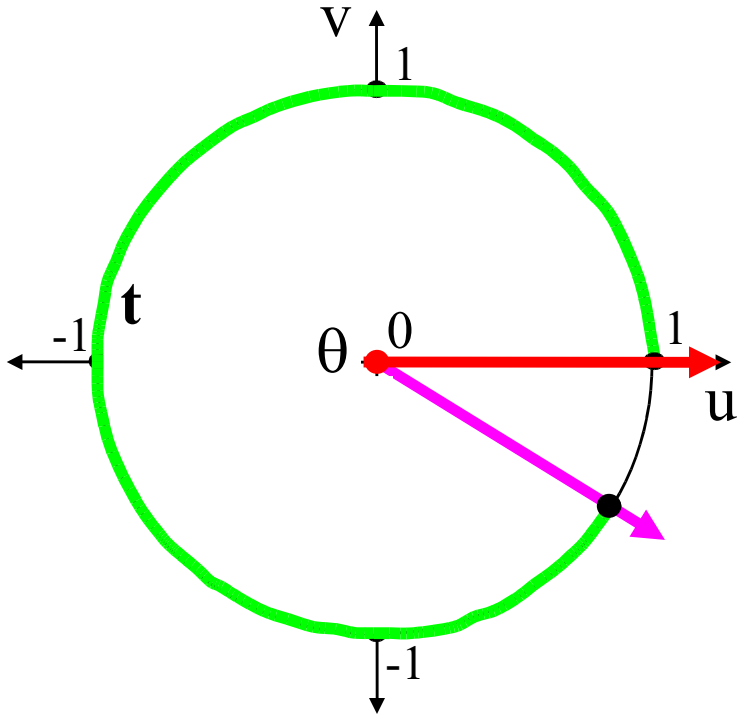

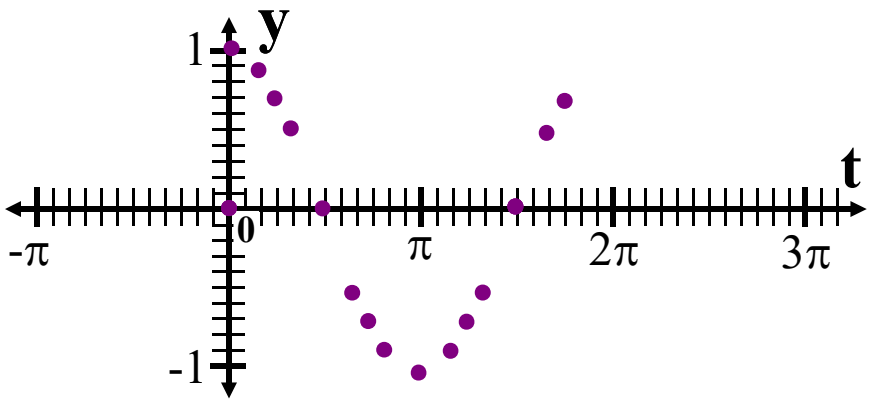

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θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
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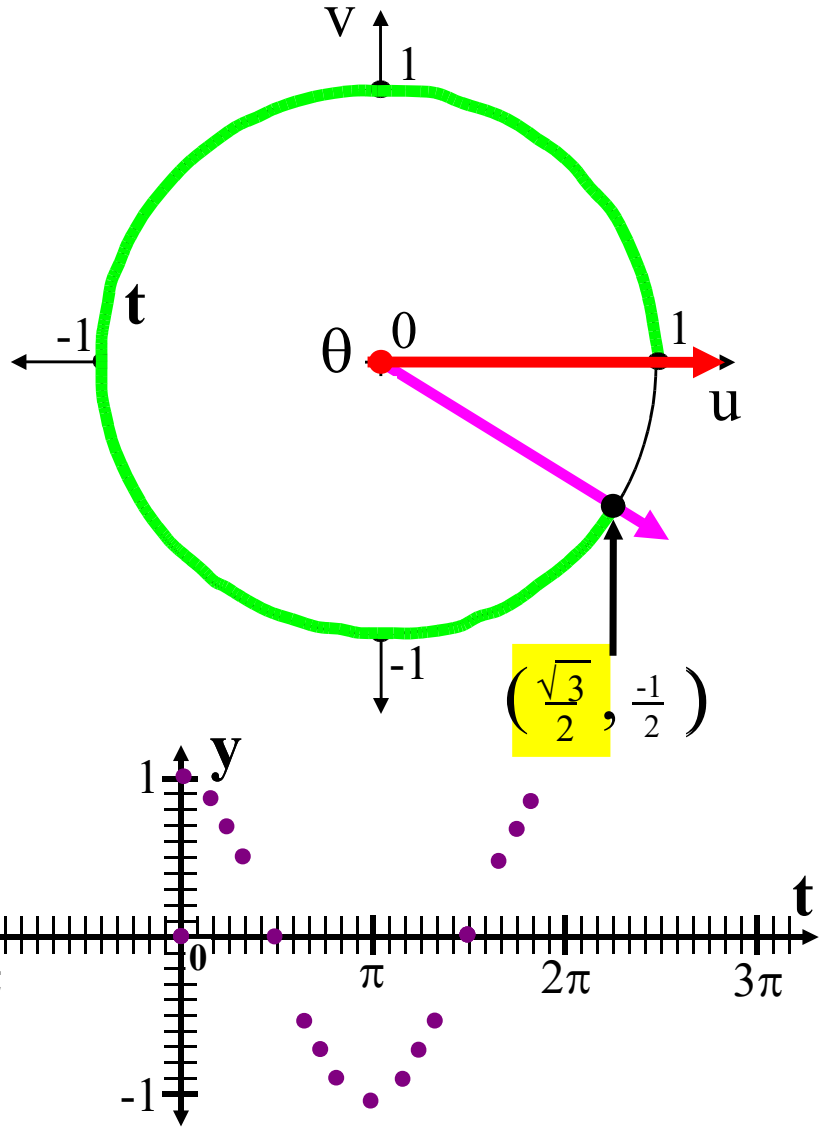
Part 5 : The Circular Functions

Sin t = v and Cos t = u



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y = Sin t and y = Cos t

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0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
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120°	2π/3	-1/2	300°	5π/3	1/2
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	$\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	$\sqrt{3}/2$
180°	π	-1	360°	2π	

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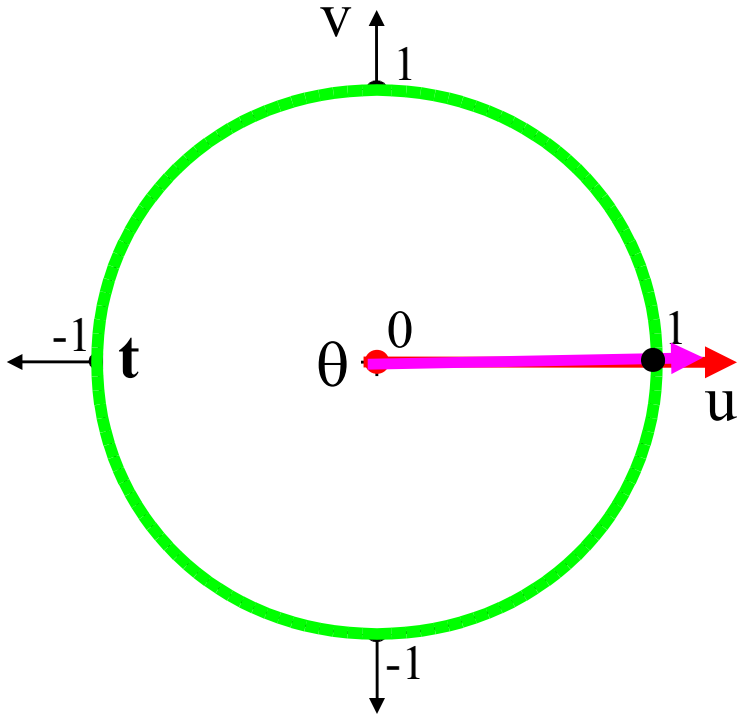
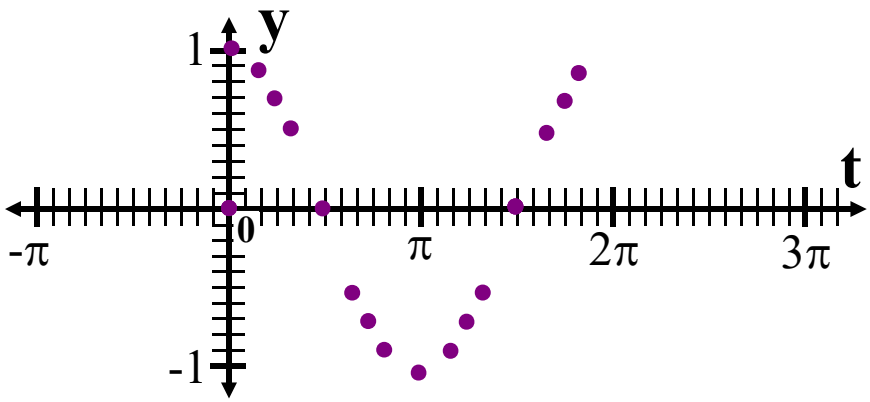
Part 5 : The Circular Functions





Sin t = v and Cos t = u

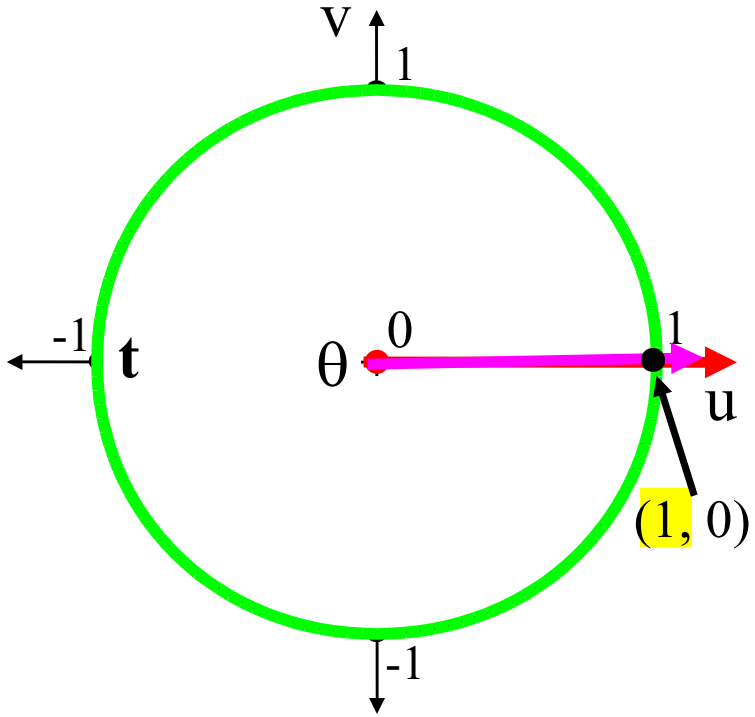
The Circular Functions

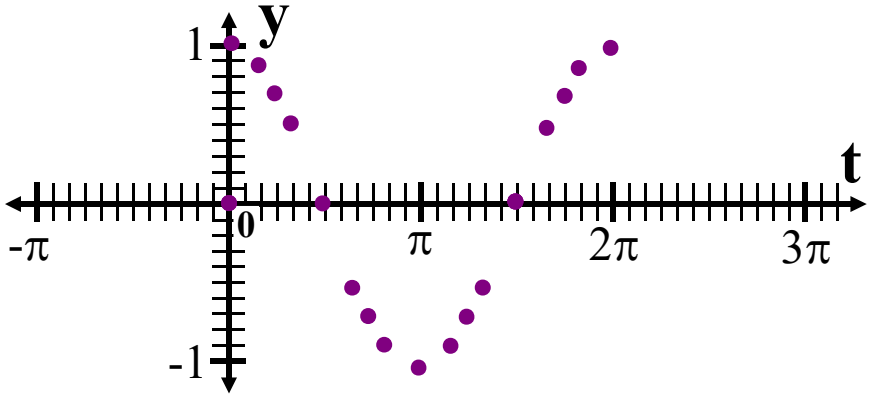
y = Sin t and y = Cos t

θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
90°	π/2	0	270°	3π/2	0
120°	2π/3	-1/2	300°	5π/3	1/2
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	$\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	$\sqrt{3}/2$
180°	π	-1	360°	2π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions





Sin t = v and Cos t = u

The Circular Functions

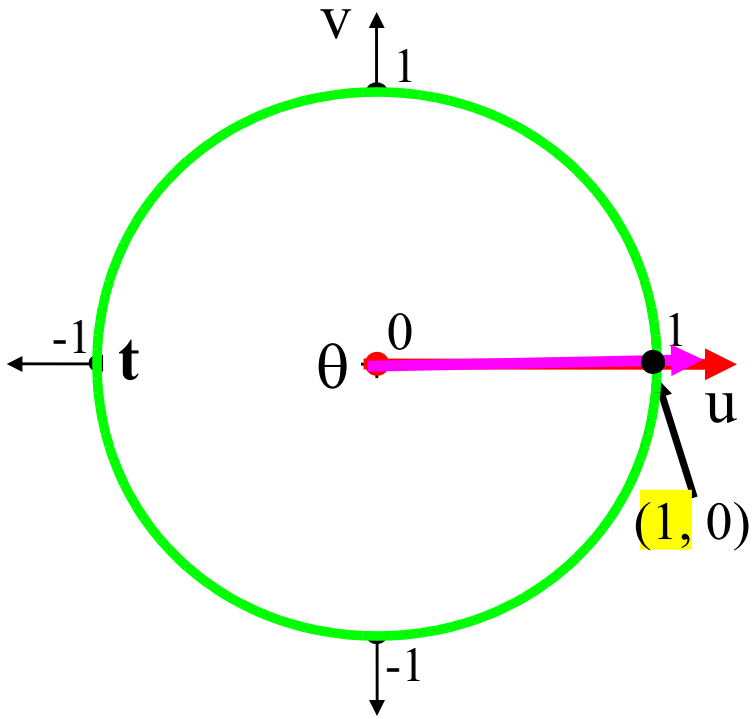
y = Sin t and y = Cos t

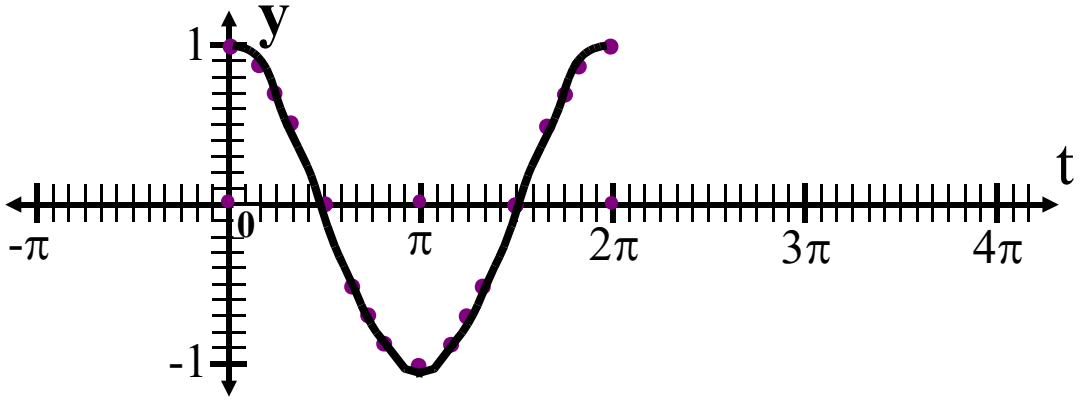
θ	t	Cos t	θ	t	Cos t
0°	0	1	180°	π	-1
30°	π/6	$\sqrt{3}/2$	210°	7π/6	$-\sqrt{3}/2$
45°	π/4	$\sqrt{2}/2$	225°	5π/4	$-\sqrt{2}/2$
60°	π/3	1/2	240°	4π/3	-1/2
90°	π/2	0	270°	3π/2	0
120°	2π/3	-1/2	300°	5π/3	1/2
135°	3π/4	$-\sqrt{2}/2$	315°	7π/4	$\sqrt{2}/2$
150°	5π/6	$-\sqrt{3}/2$	330°	$\frac{11\pi}{6}$	$\sqrt{3}/2$
180°	π	-1	360°	2π	1

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
360°	2π	1
390°	$\frac{13\pi}{6}$	
405°	$\frac{9\pi}{4}$	
420°	$\frac{7\pi}{3}$	
450°	$\frac{5\pi}{2}$	
480°	$\frac{8\pi}{3}$	
495°	$\frac{11\pi}{4}$	
510°	$\frac{17\pi}{6}$	
540°	3π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

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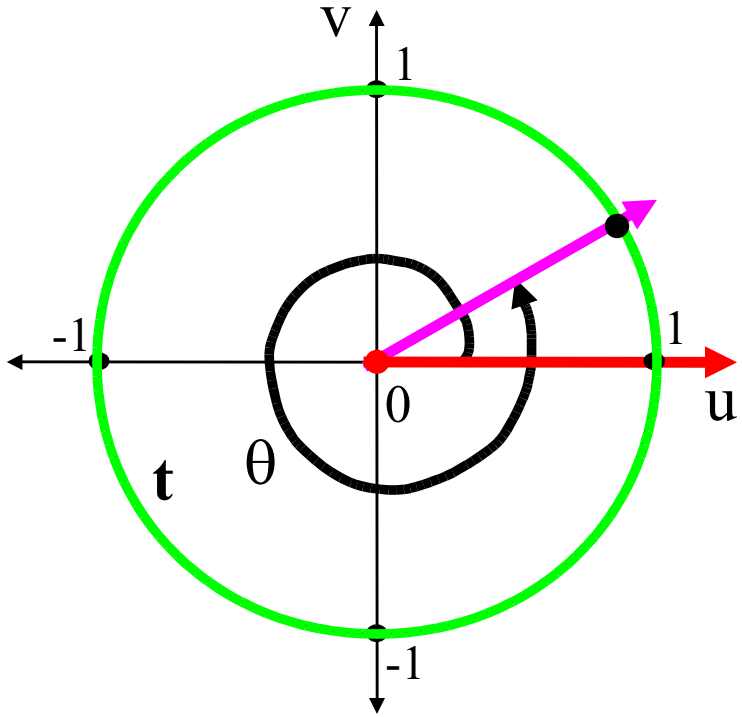

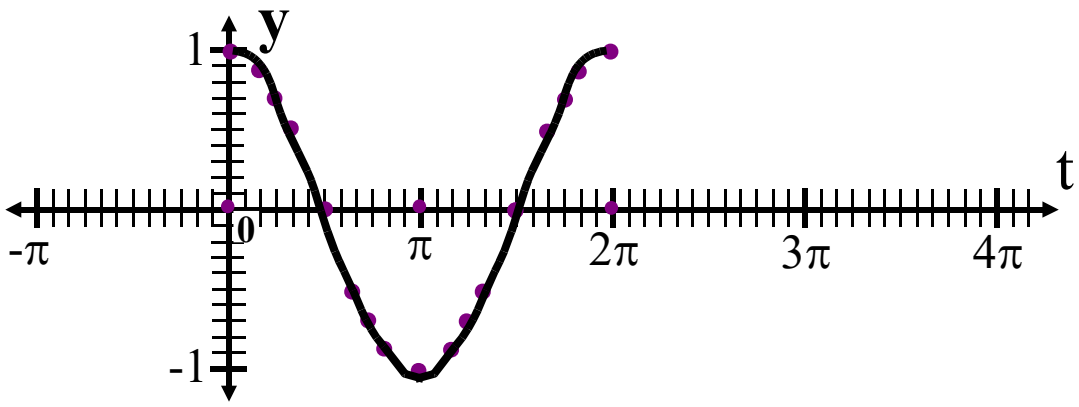

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Teach Yourself Trigonometry

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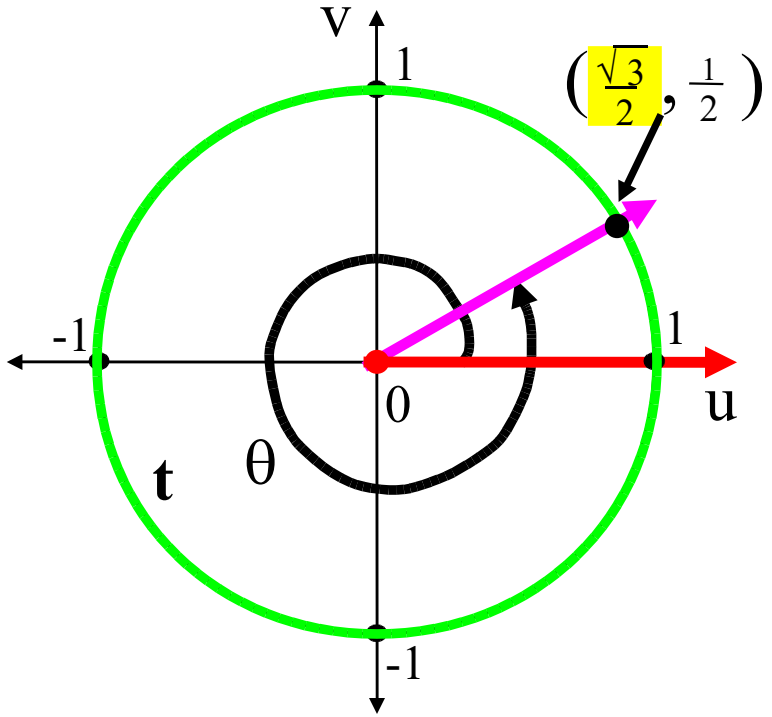

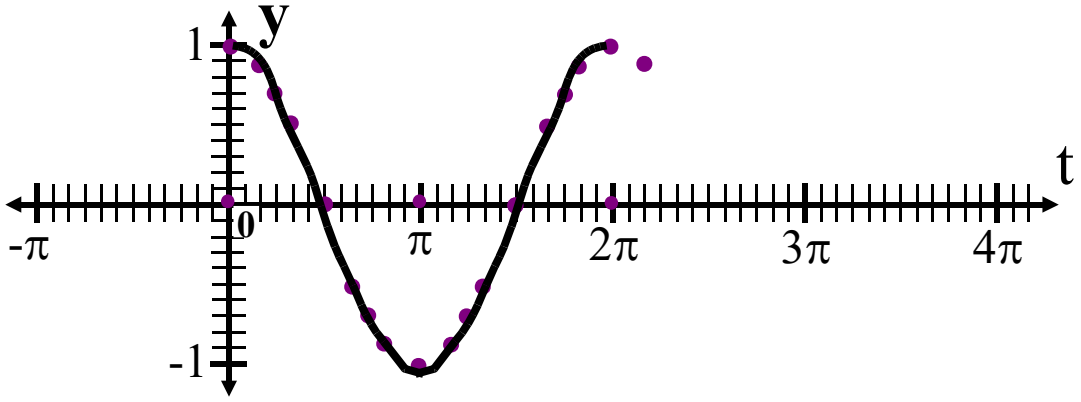

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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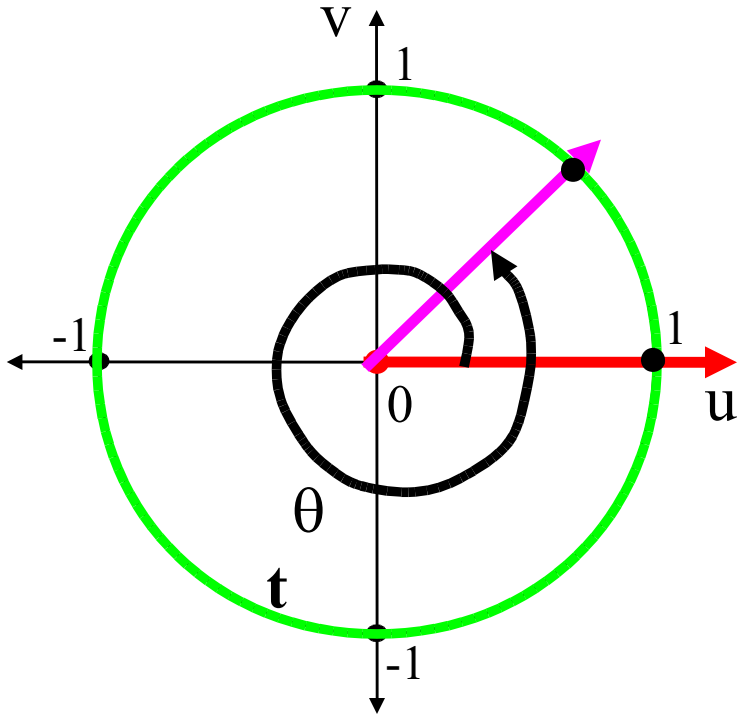

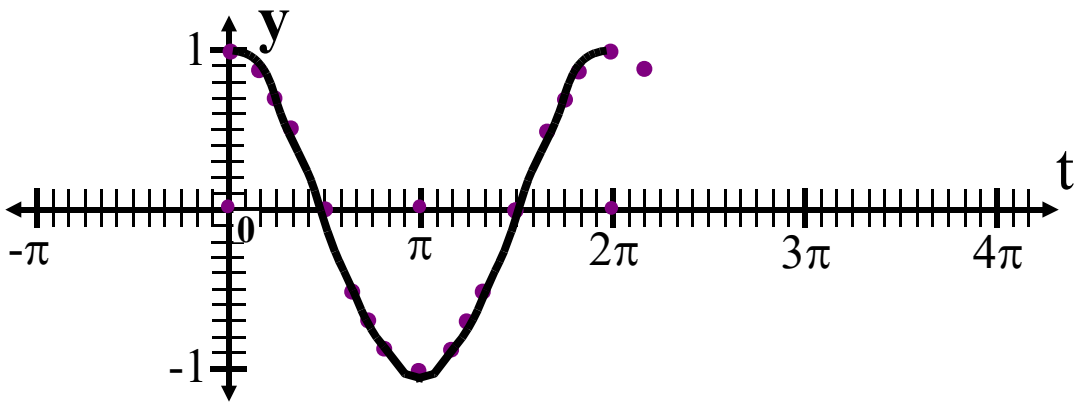

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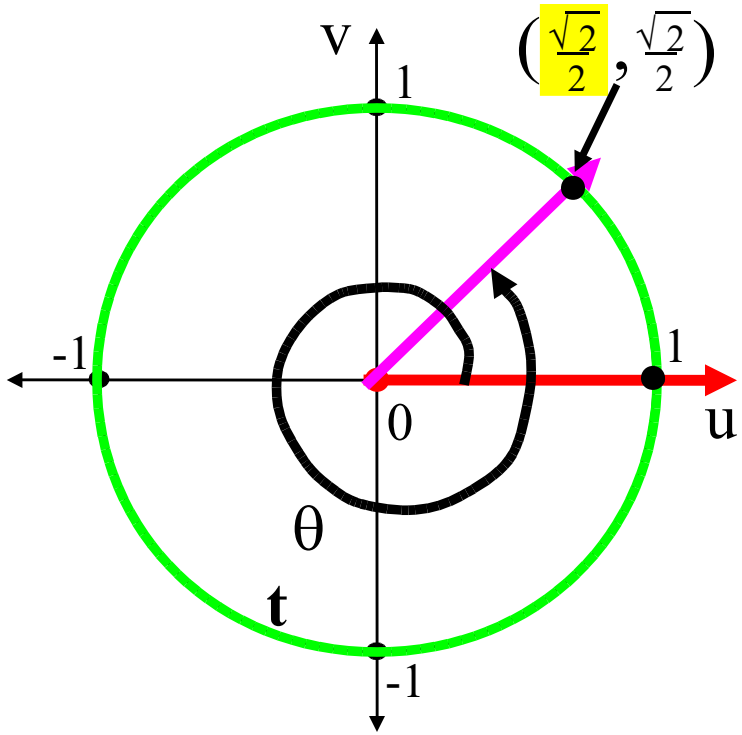
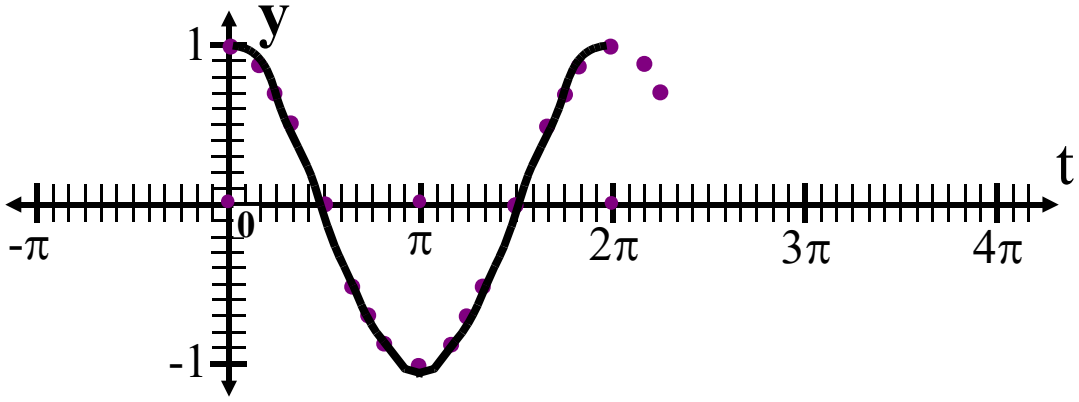
Part 5 : The Circular Functions





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Part 5 : The Circular Functions

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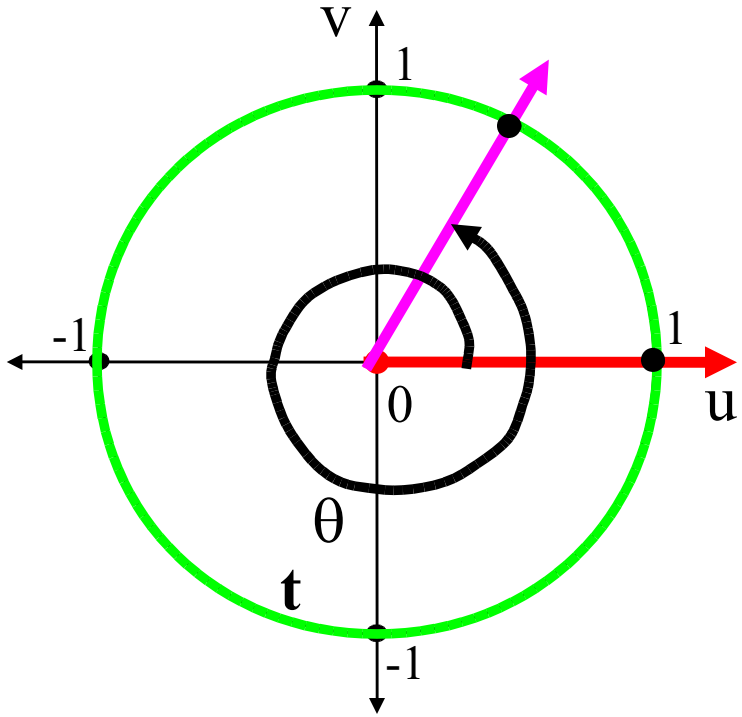

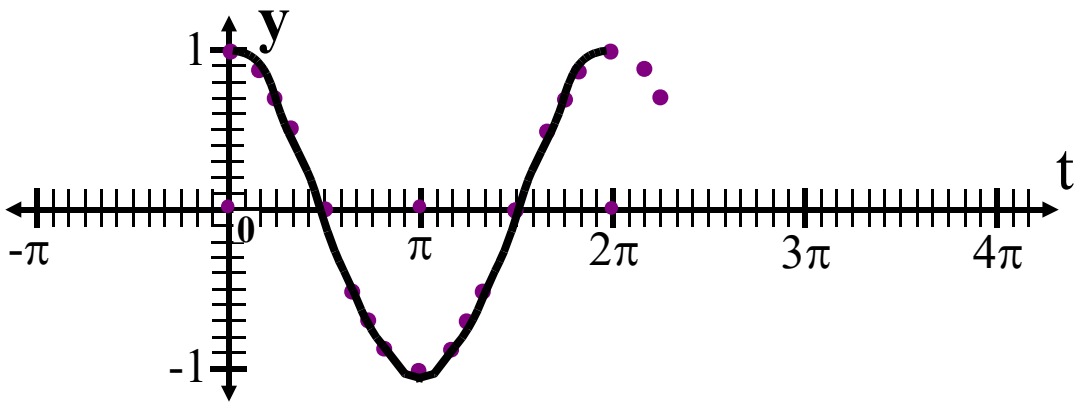

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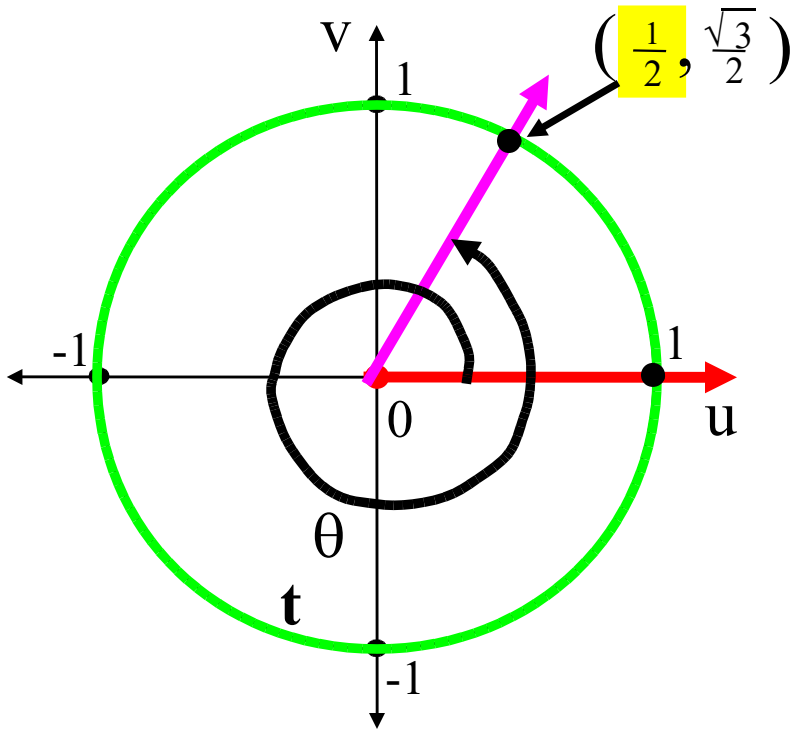
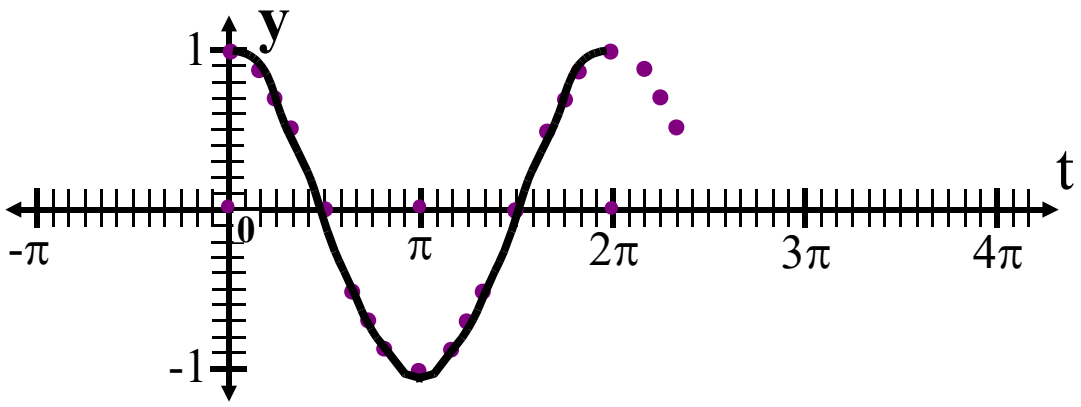
Part 5 : The Circular Functions





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Part 5 : The Circular Functions

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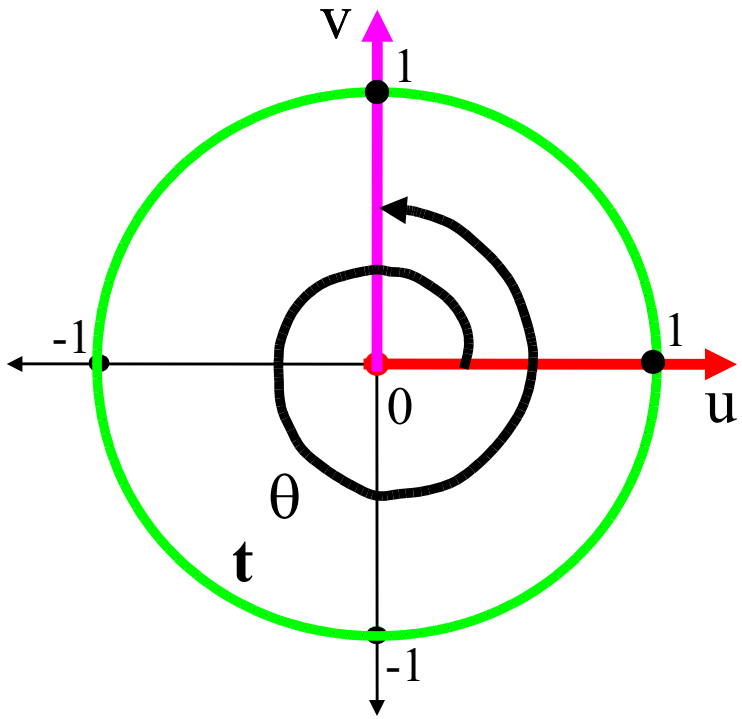

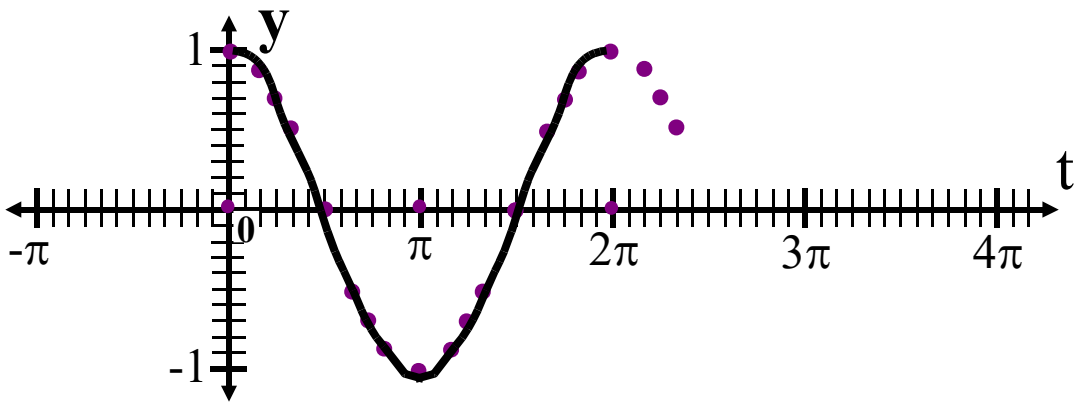

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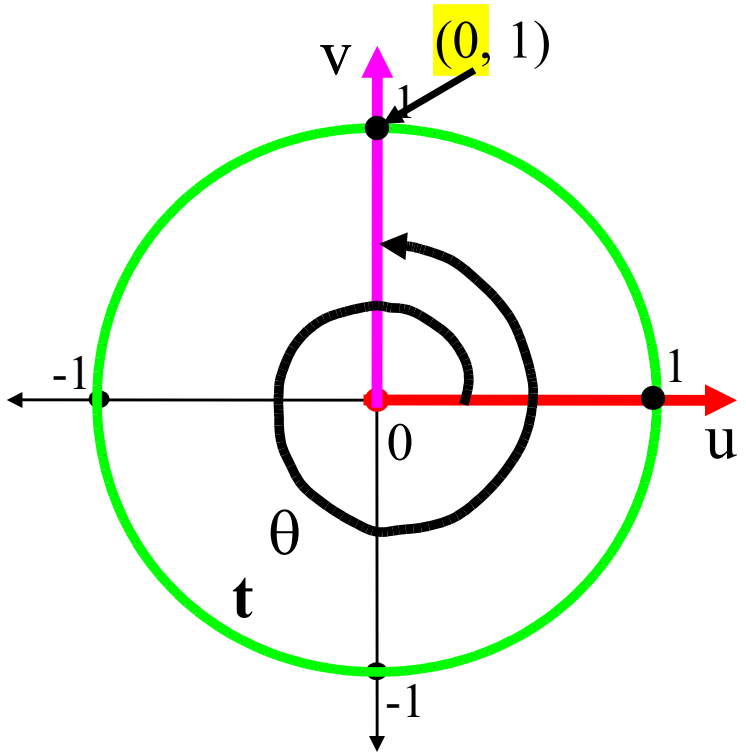
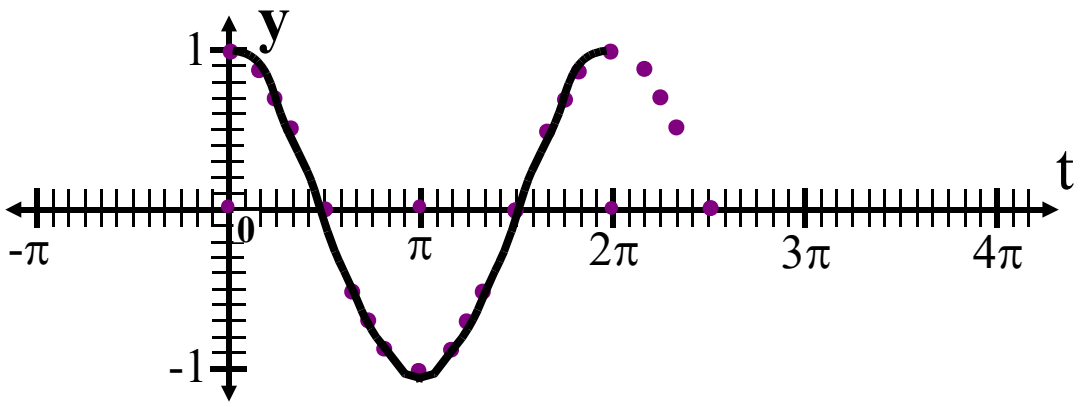
Part 5 : The Circular Functions





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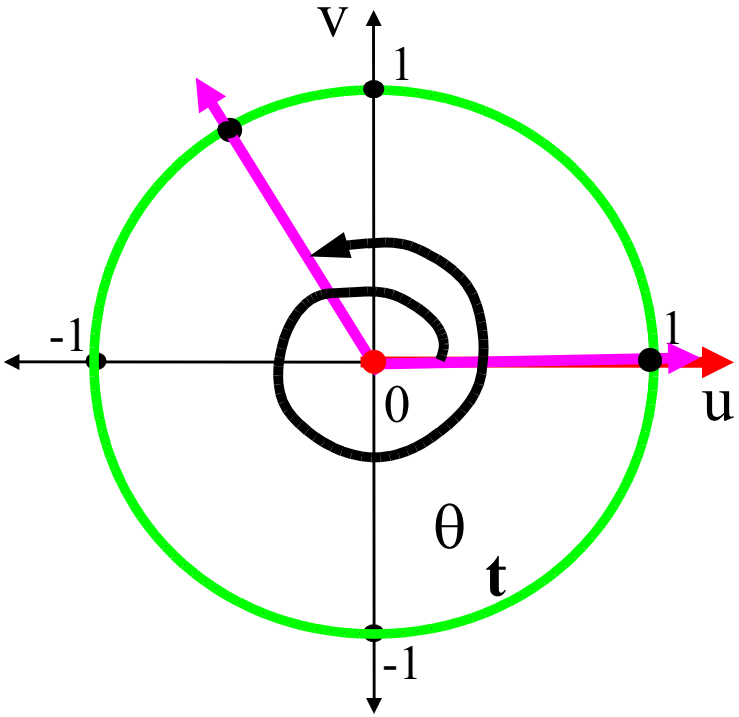

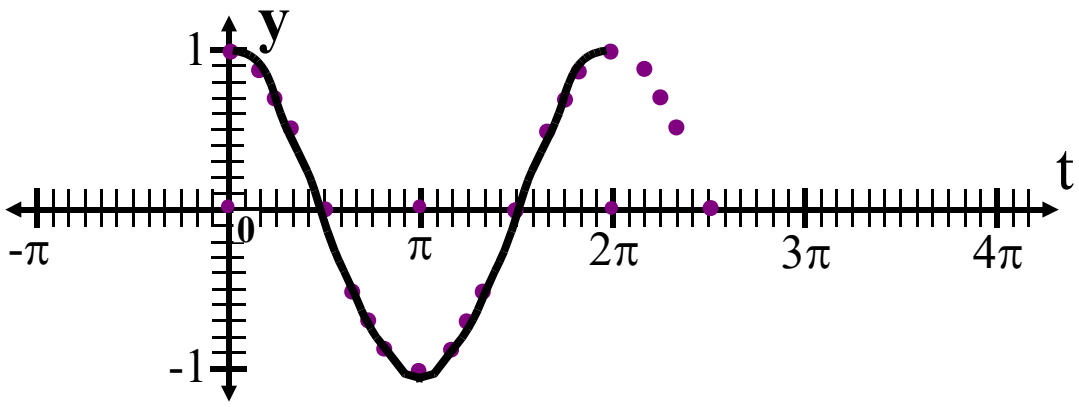

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Part 5 : The Circular Functions

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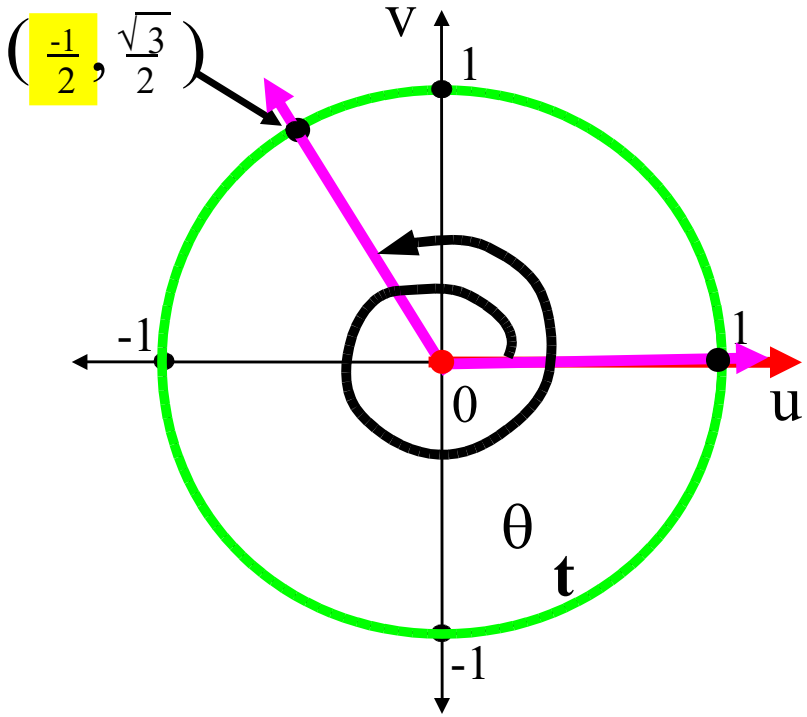

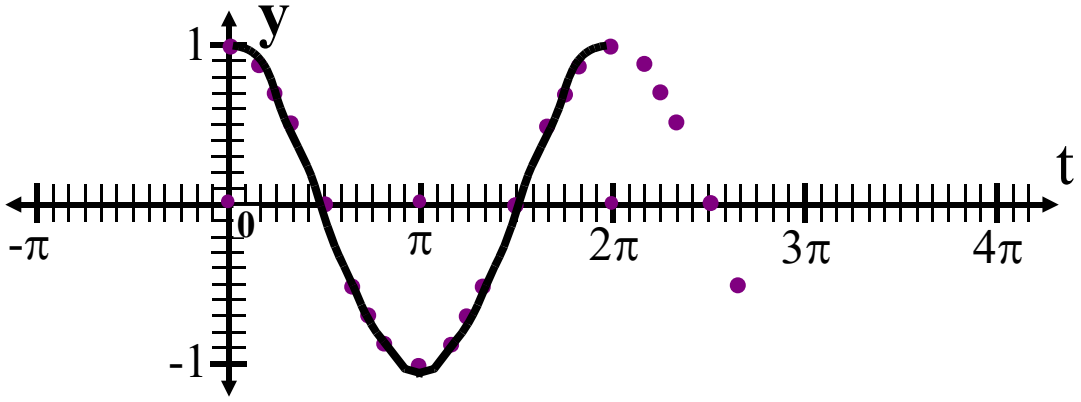

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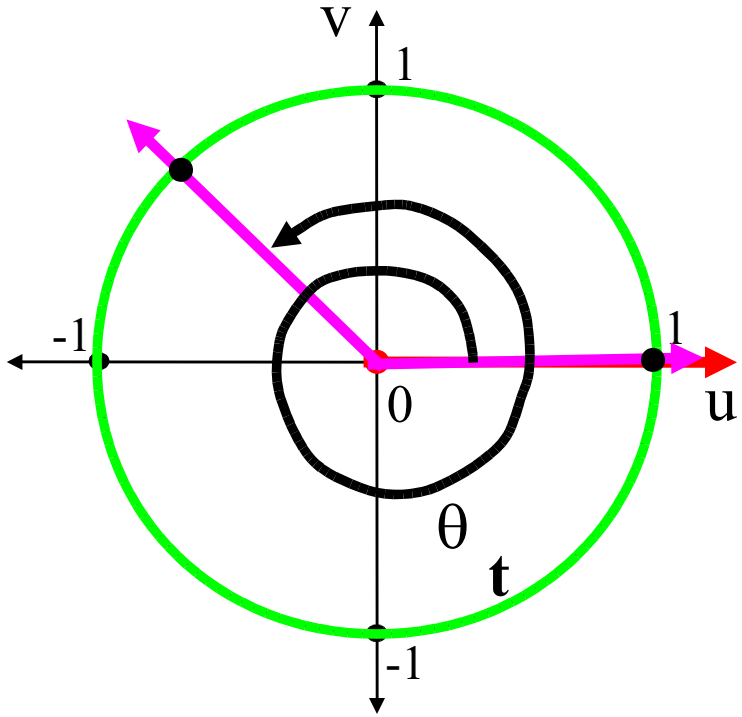

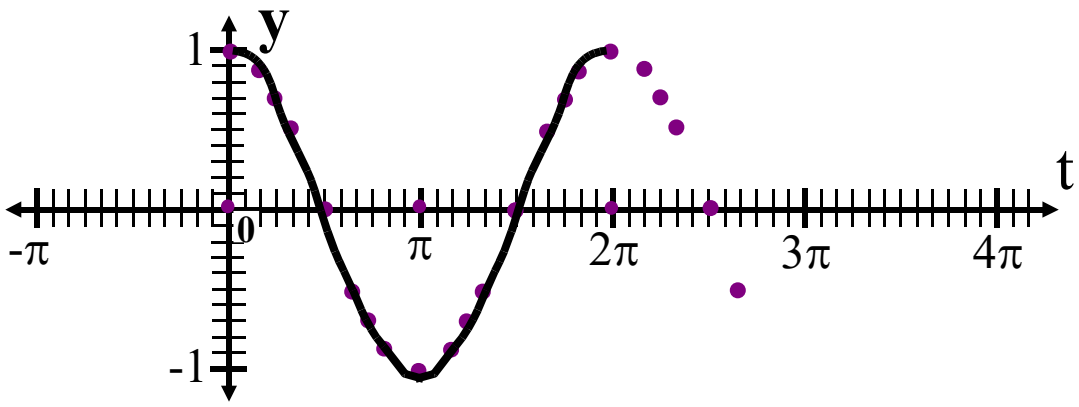

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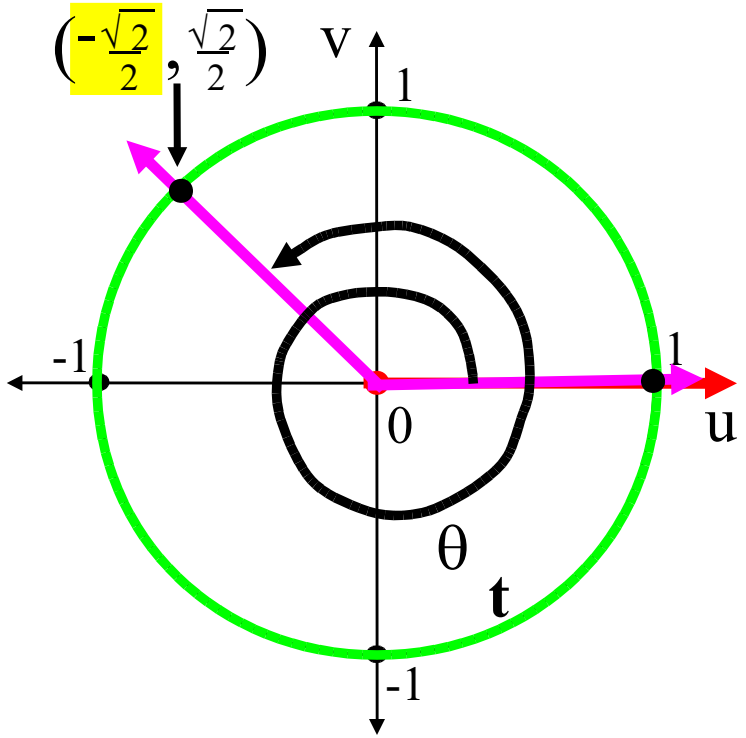
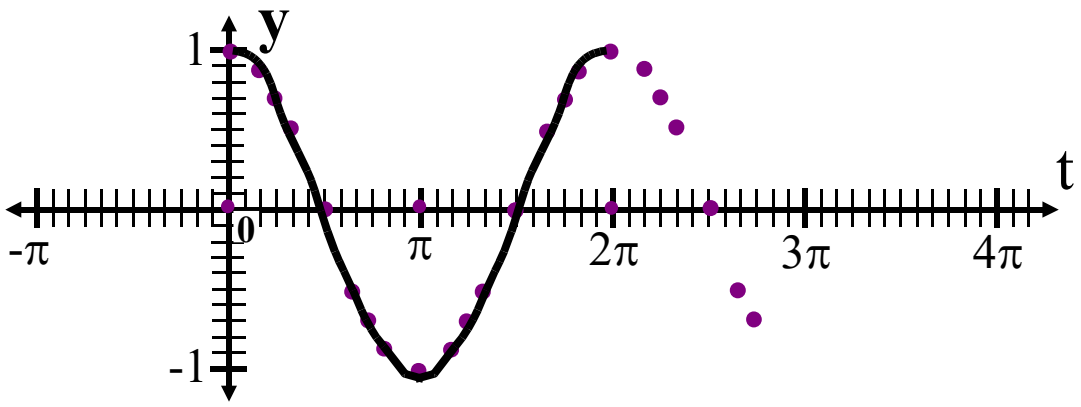
Part 5 : The Circular Functions





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Part 5 : The Circular Functions

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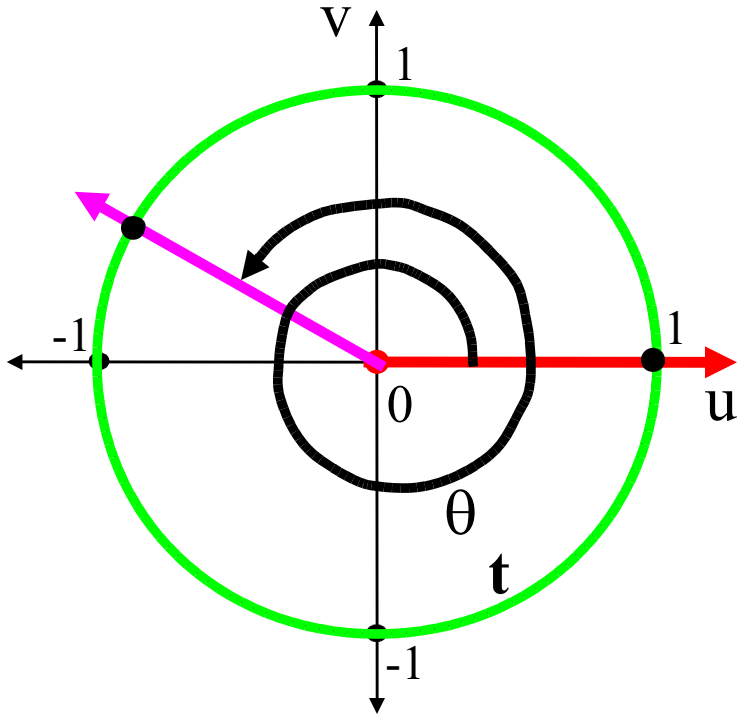

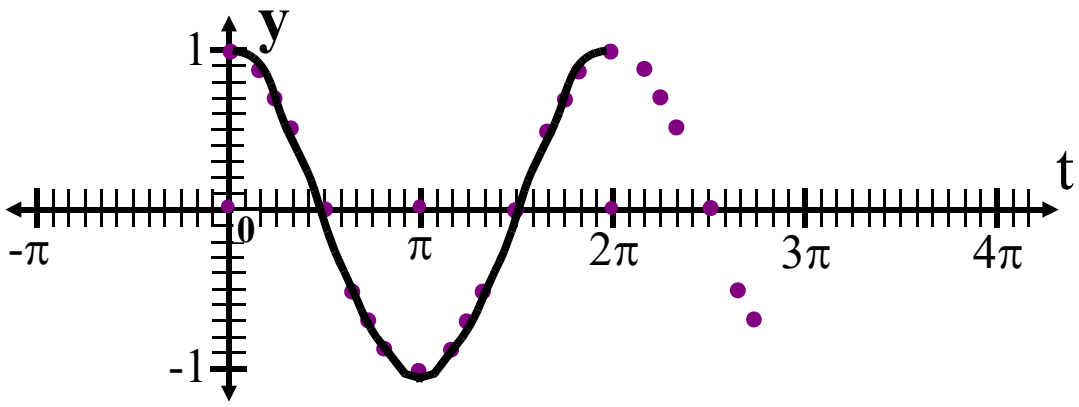

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Part 5 : The Circular Functions

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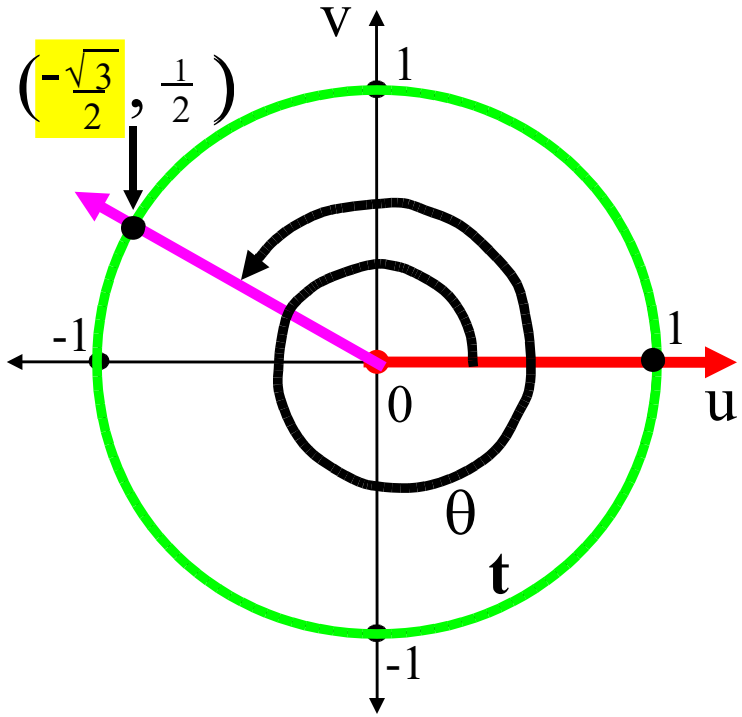

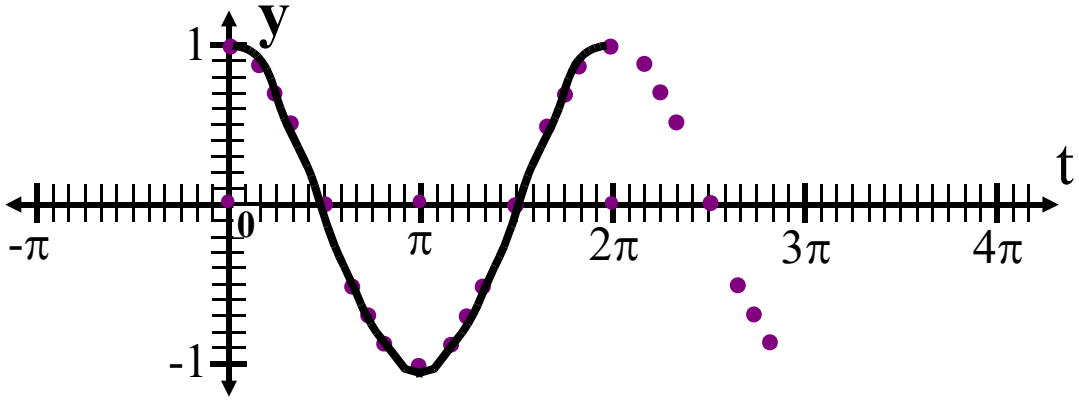

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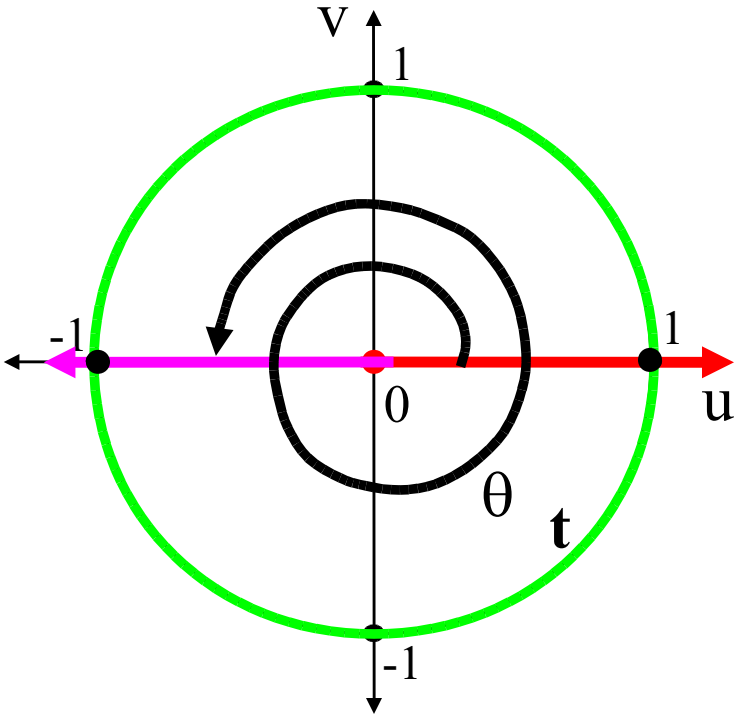

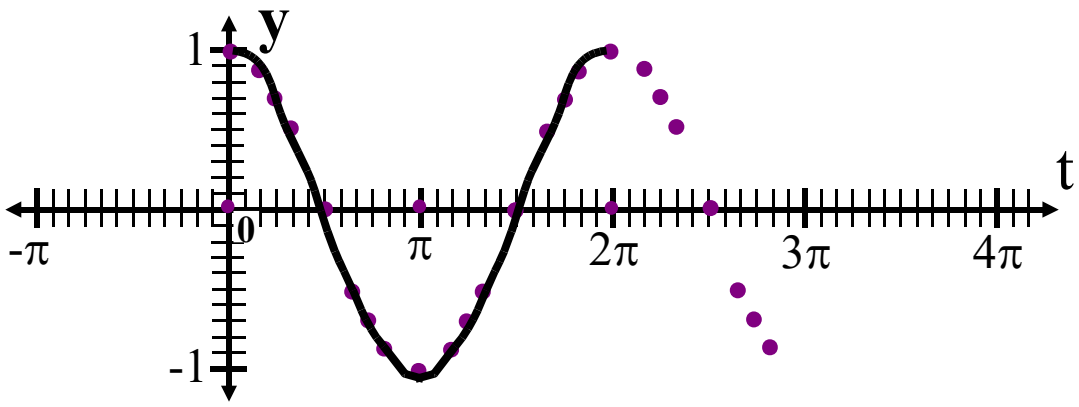

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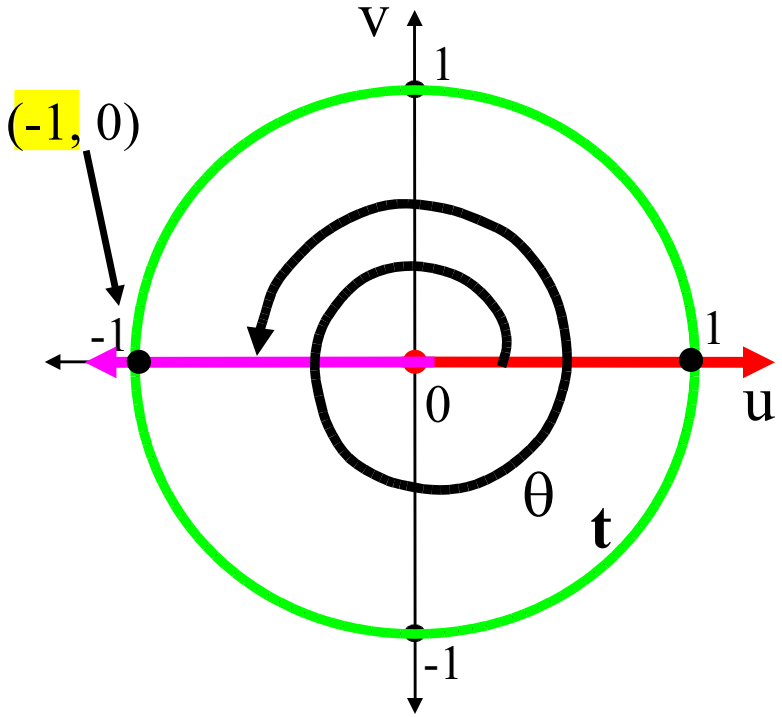

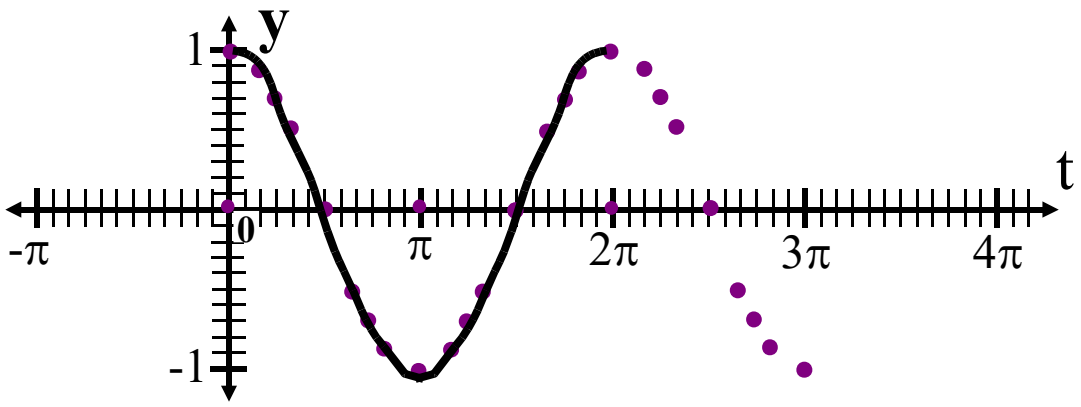

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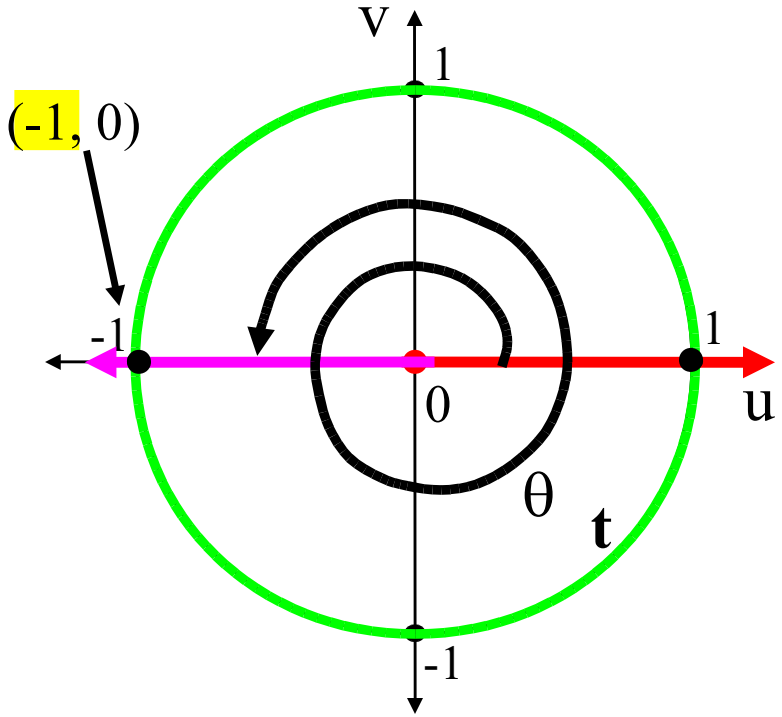

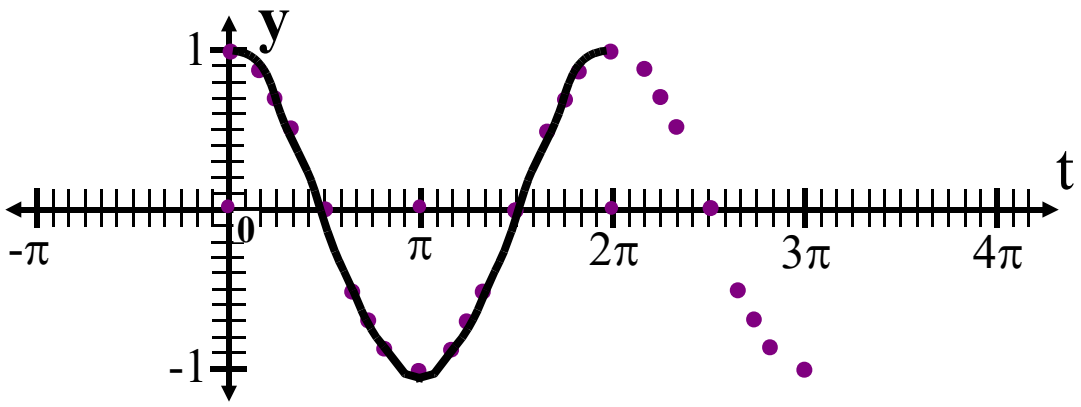

The Circular Functions

y = Sin t and y = Cos t

θ	t	Cos t
540°	3π	-1
570°	$\frac{19\pi}{6}$	
585°	$\frac{13\pi}{4}$	
600°	$\frac{10\pi}{3}$	
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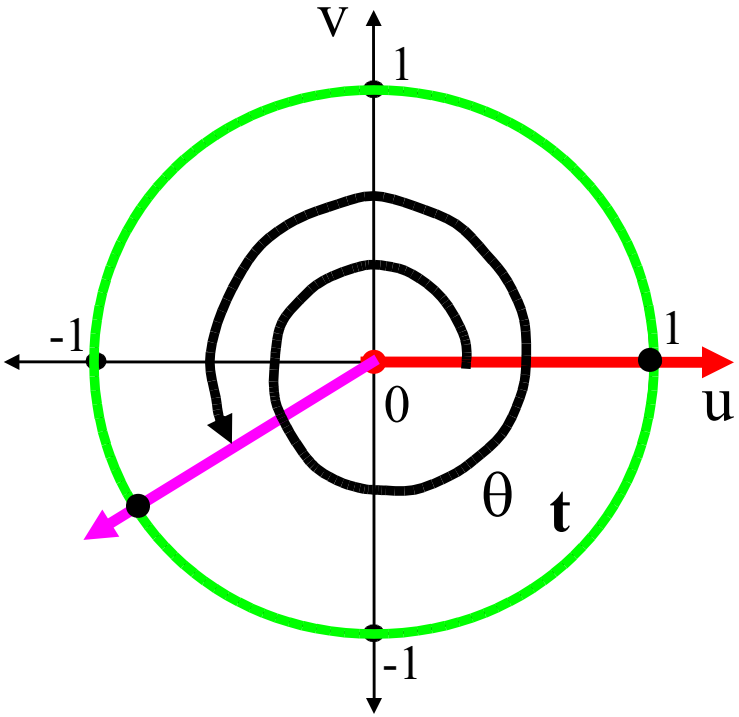
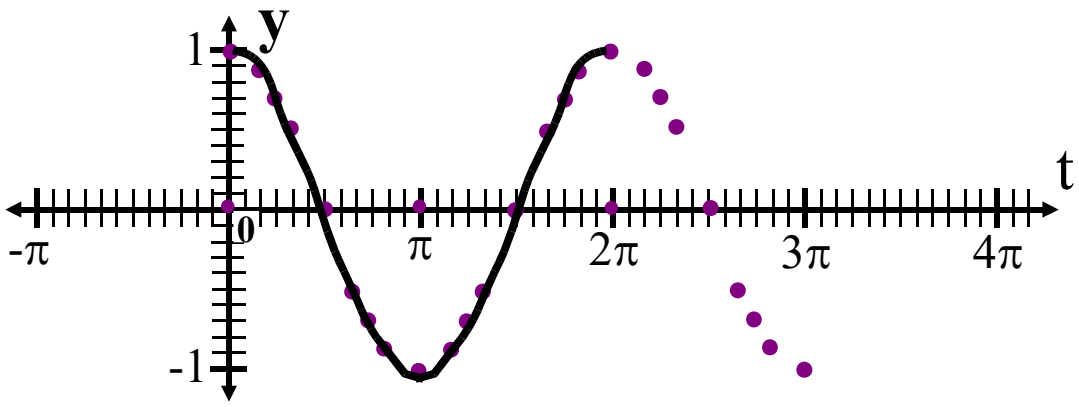
660°	$\frac{11\pi}{3}$	
675°	$\frac{15\pi}{4}$	
690°	$\frac{23\pi}{6}$	
720°	4π	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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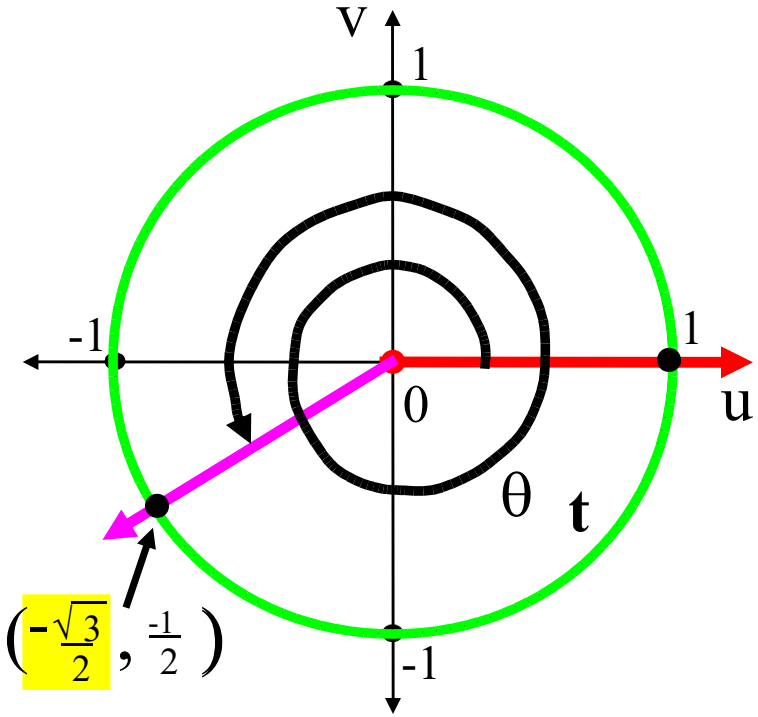

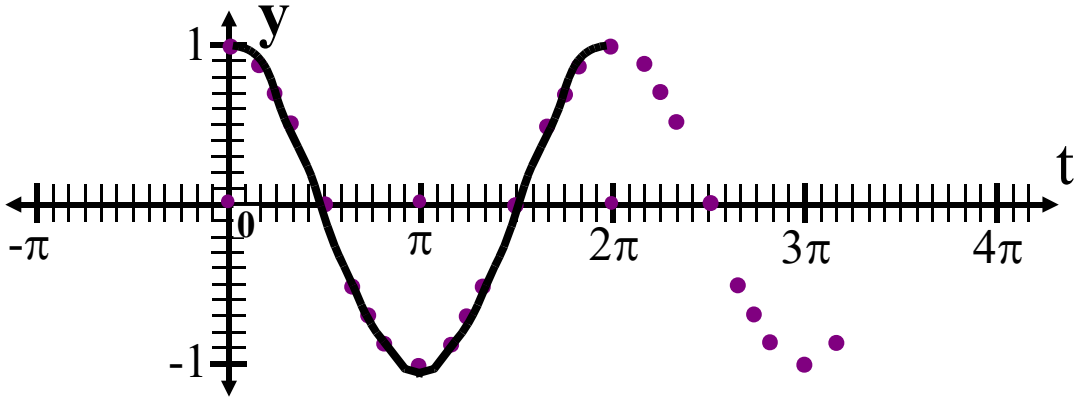

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720°	4π	

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Part 5 : The Circular Functions

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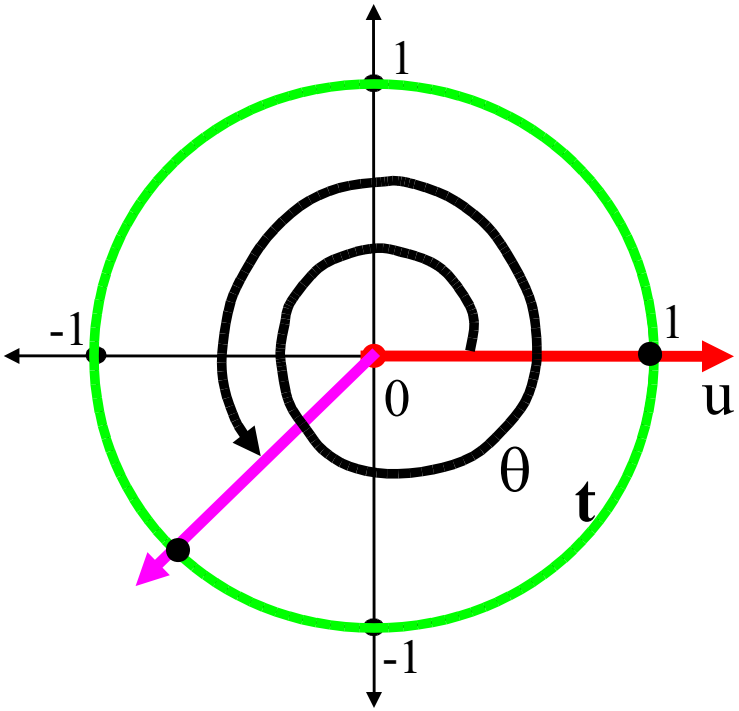

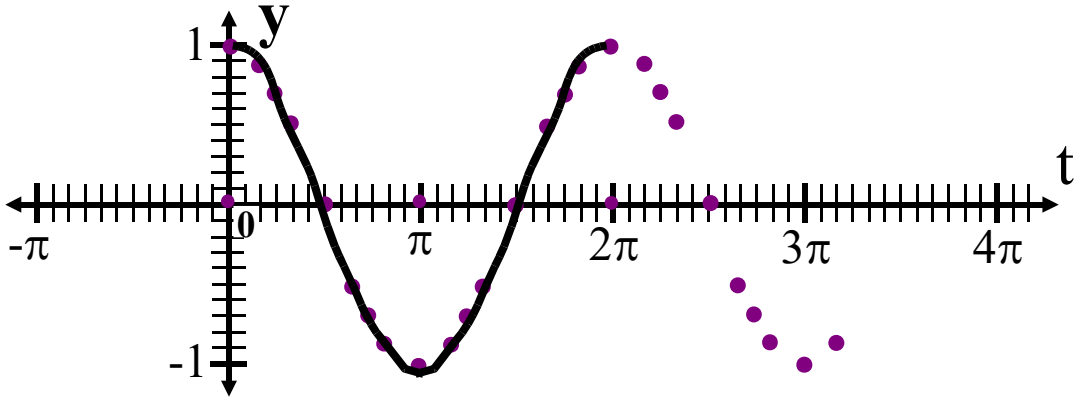

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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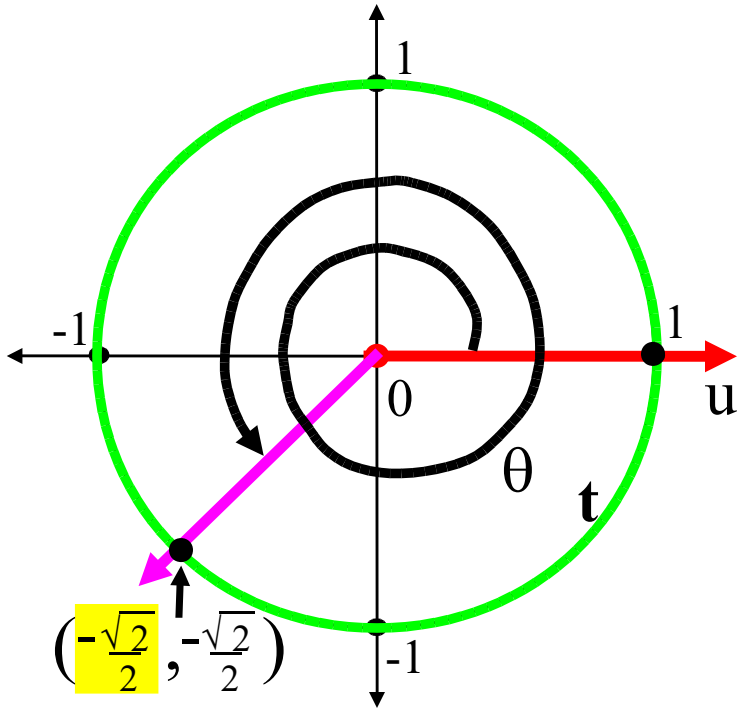

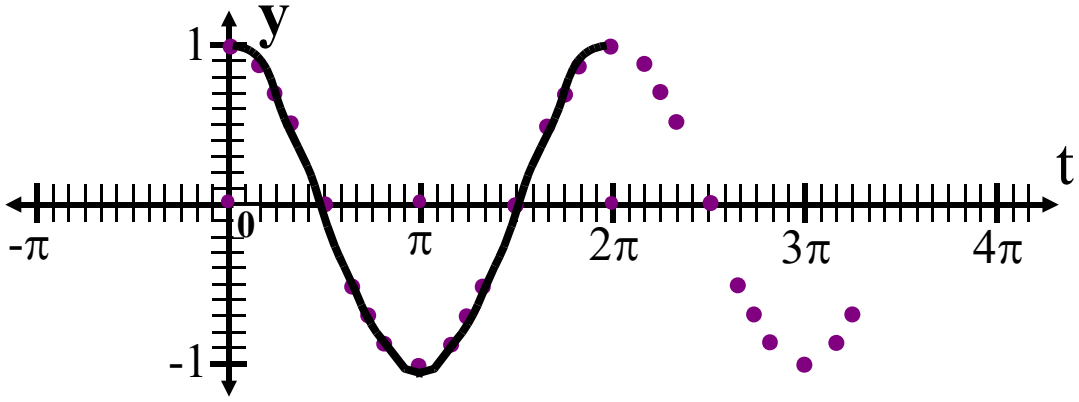

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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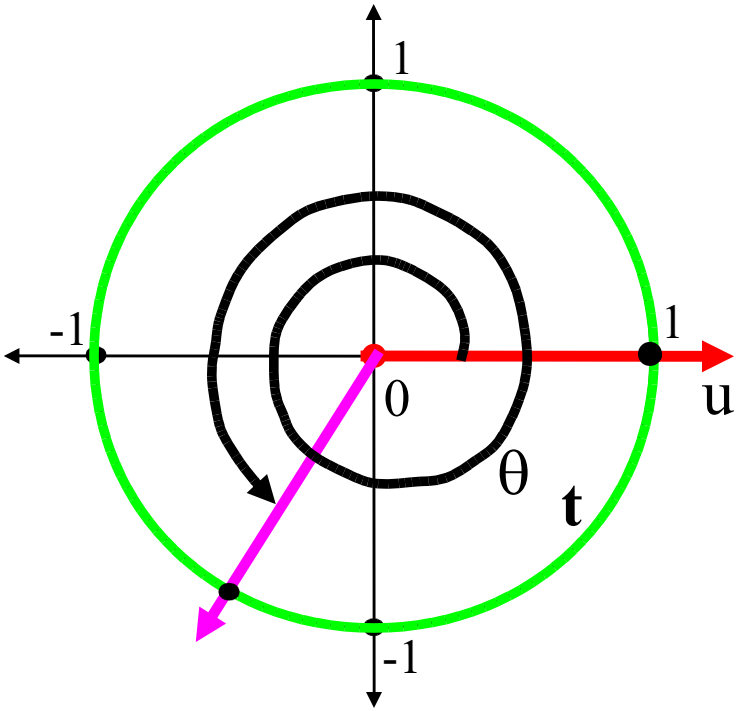

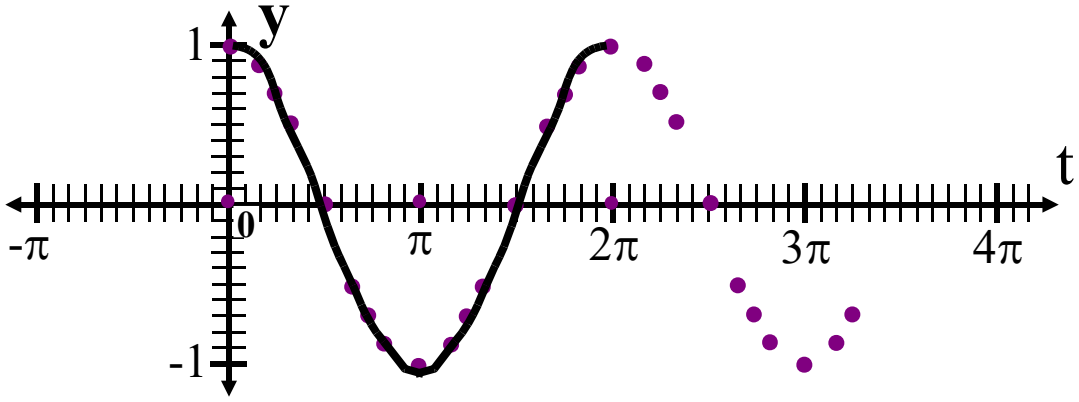

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Part 5 : The Circular Functions

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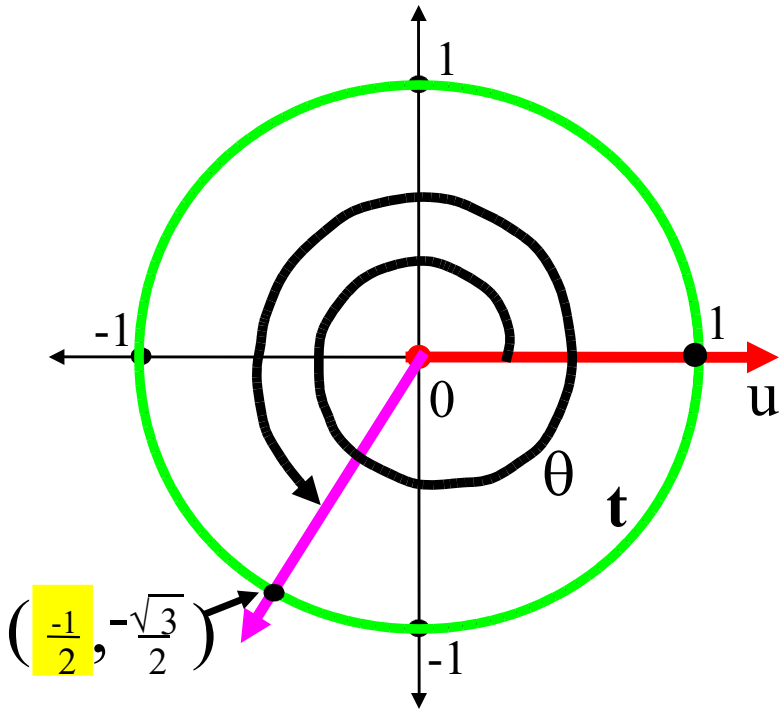

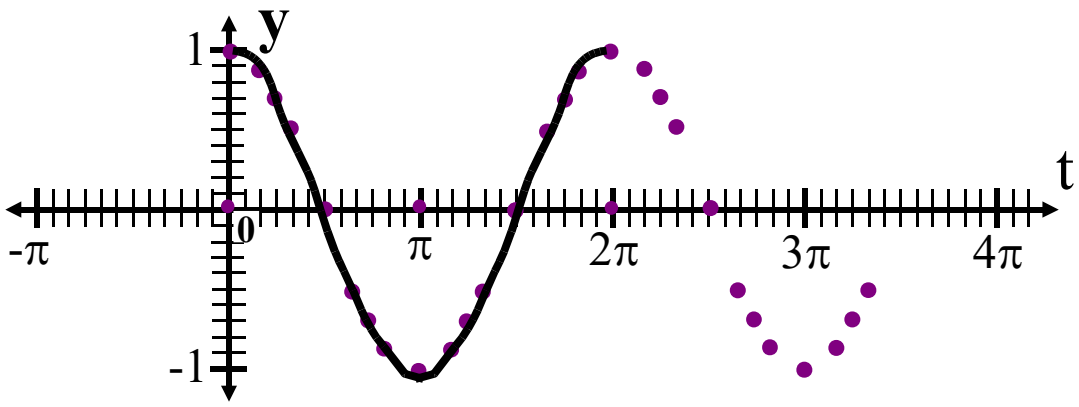

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Part 5 : The Circular Functions

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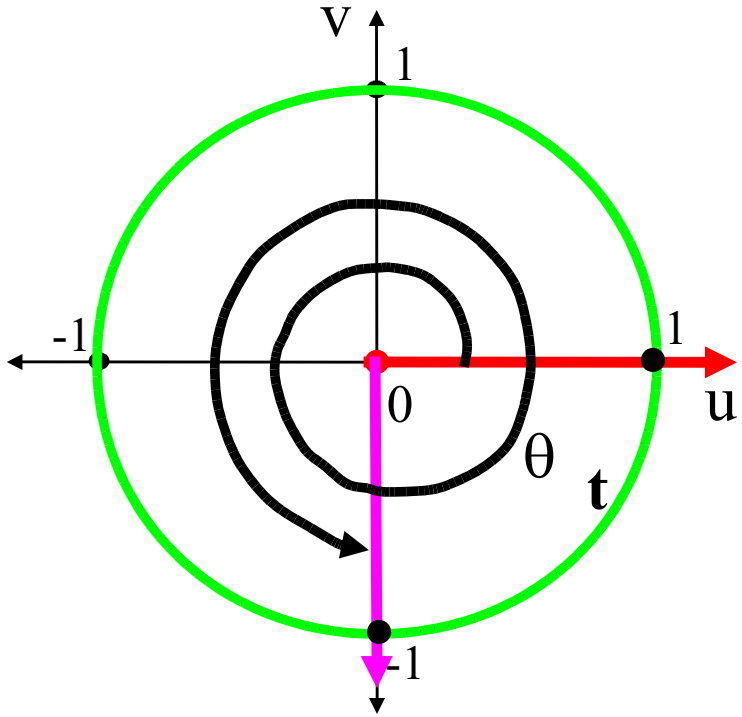

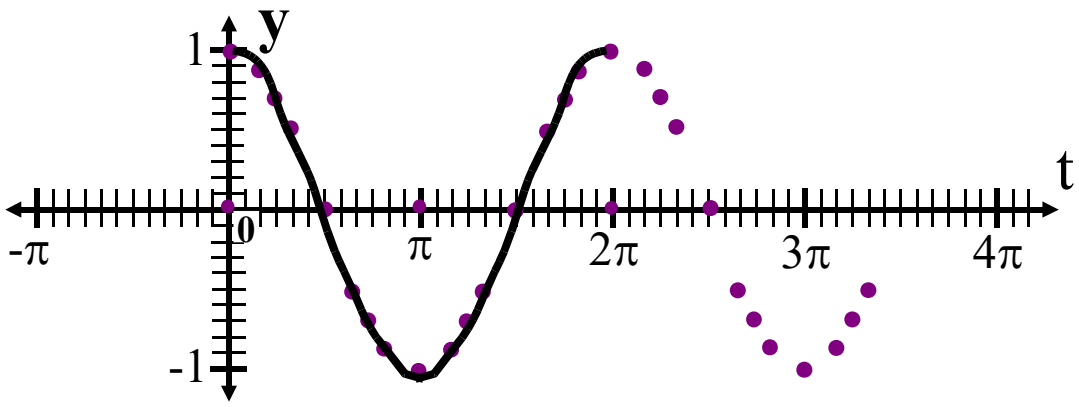

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Part 5 : The Circular Functions

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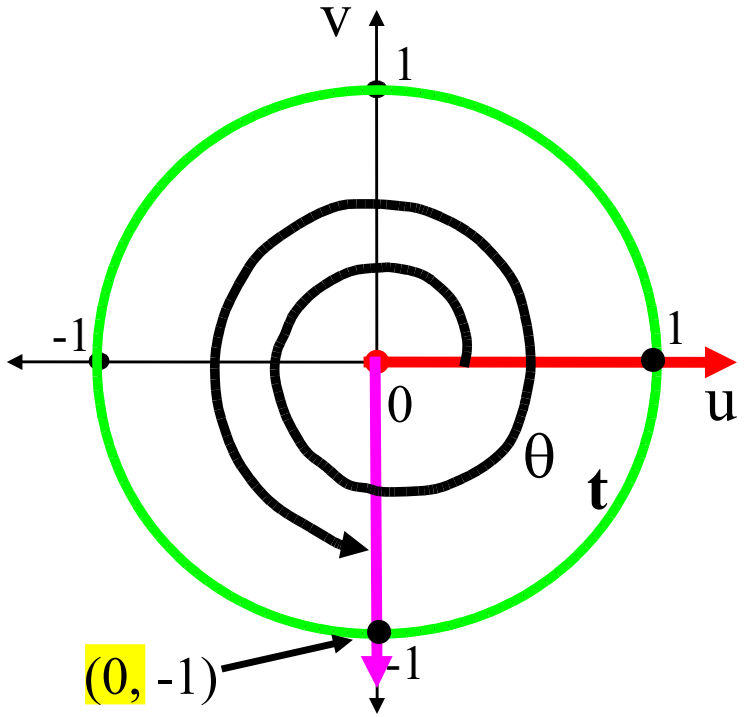

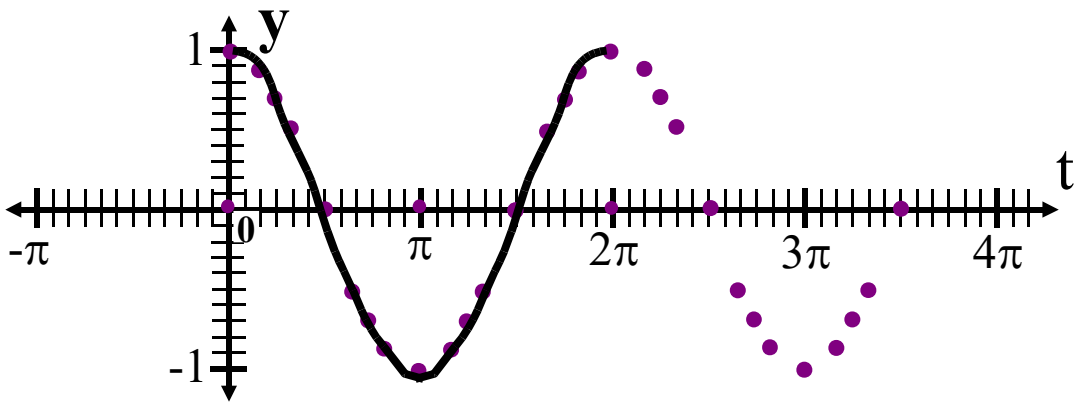

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Part 5 : The Circular Functions

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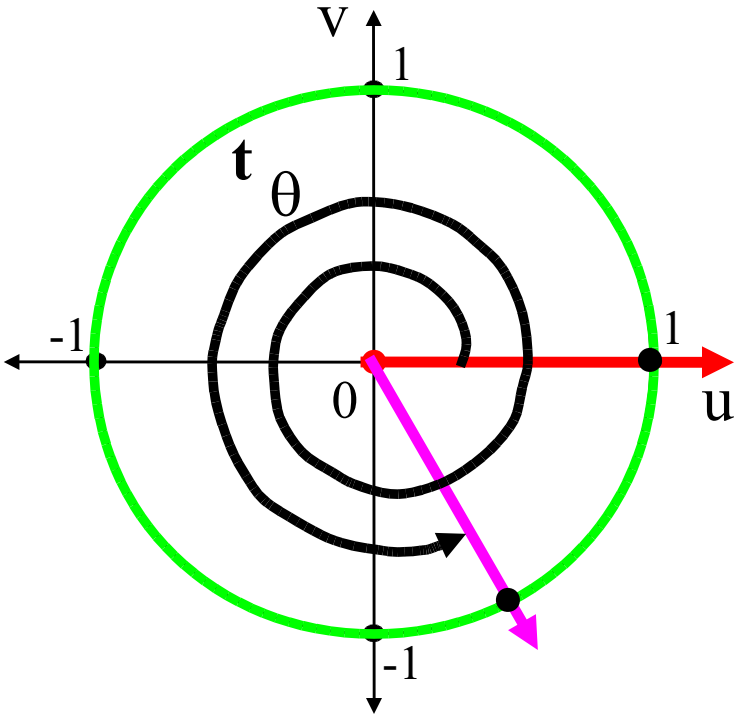

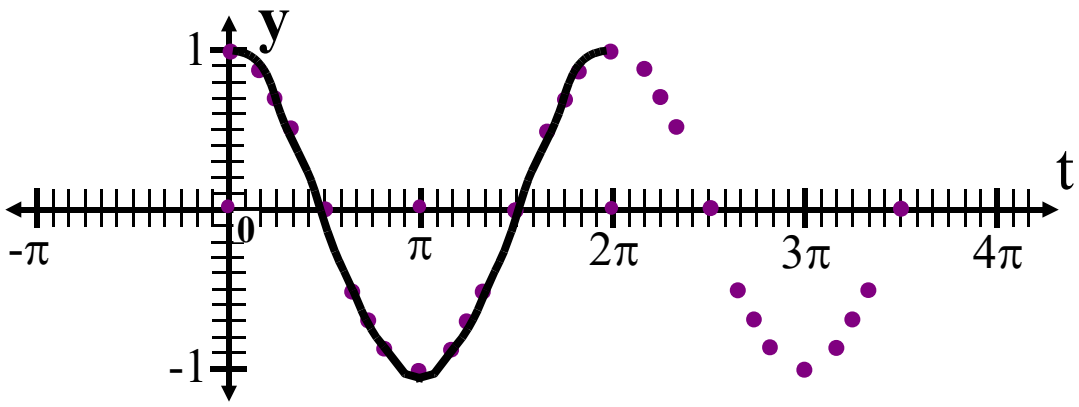

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Part 5 : The Circular Functions

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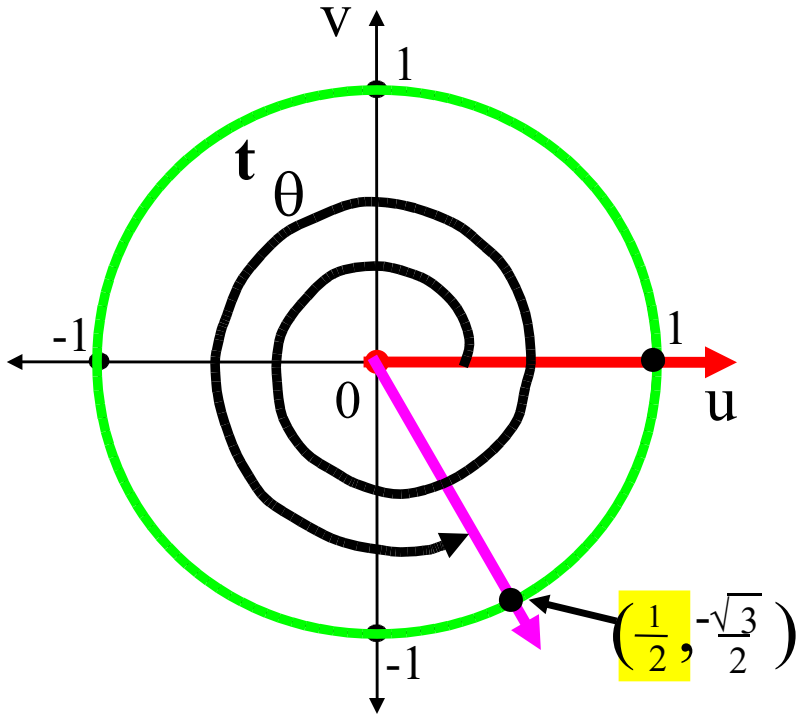

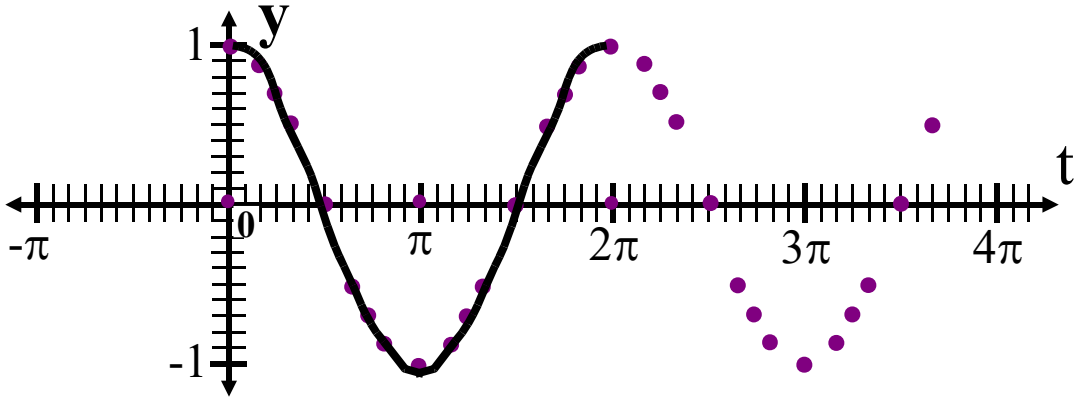

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Part 5 : The Circular Functions

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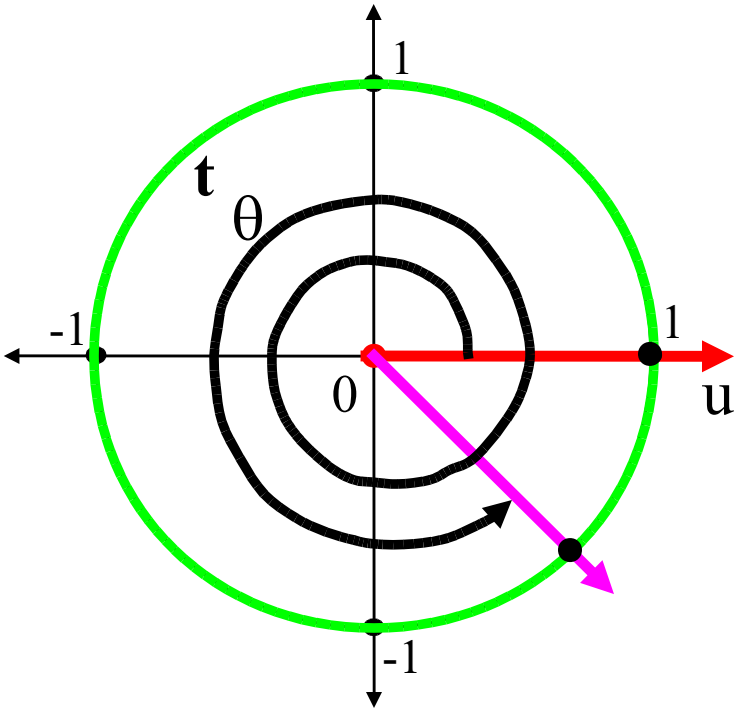

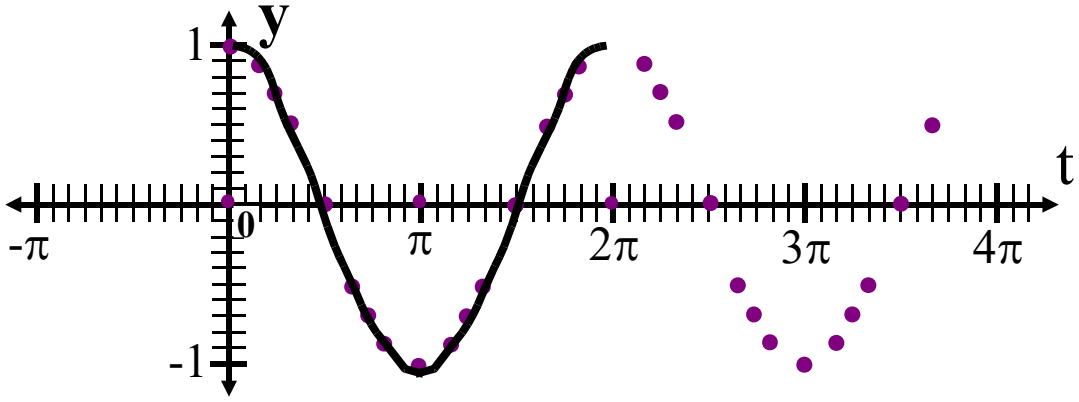

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Part 5 : The Circular Functions

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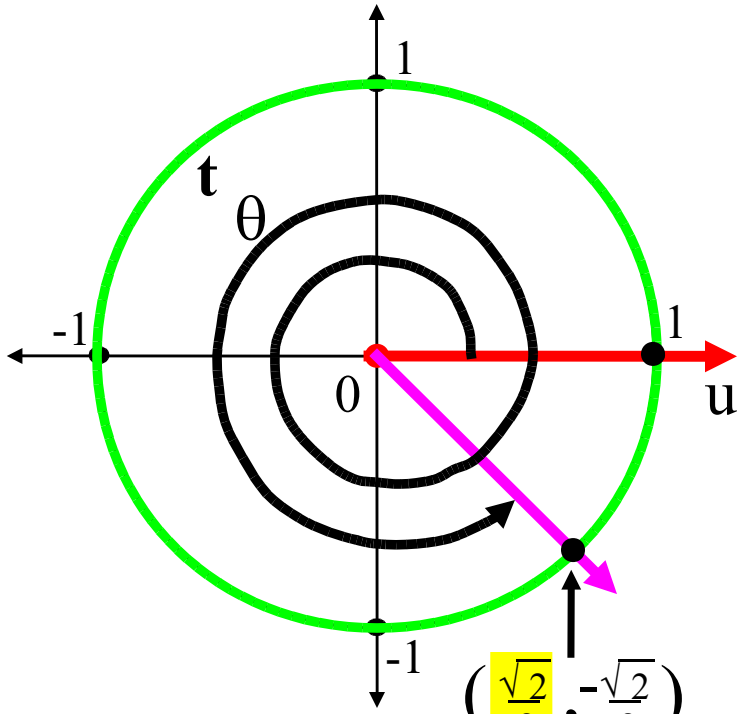

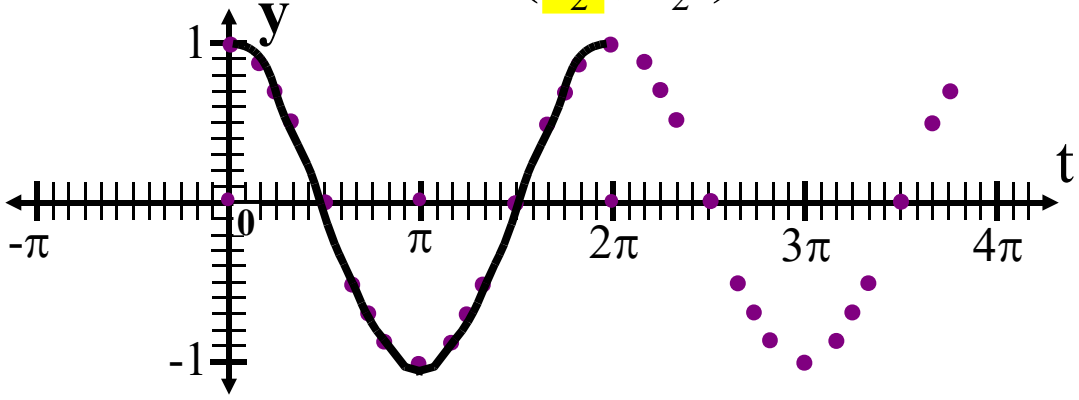

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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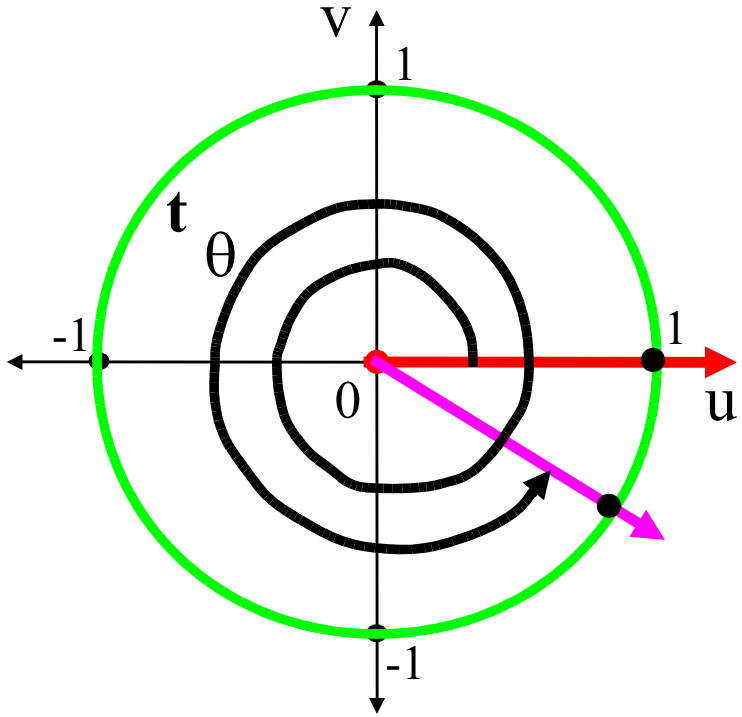

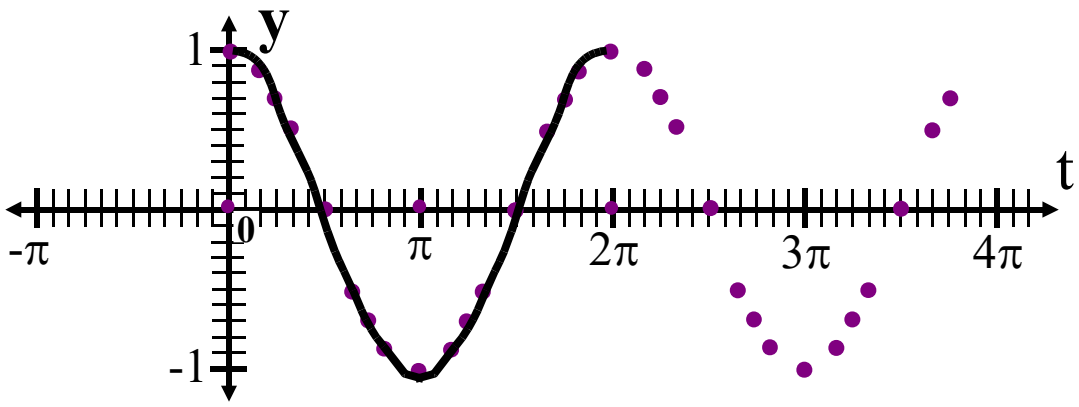

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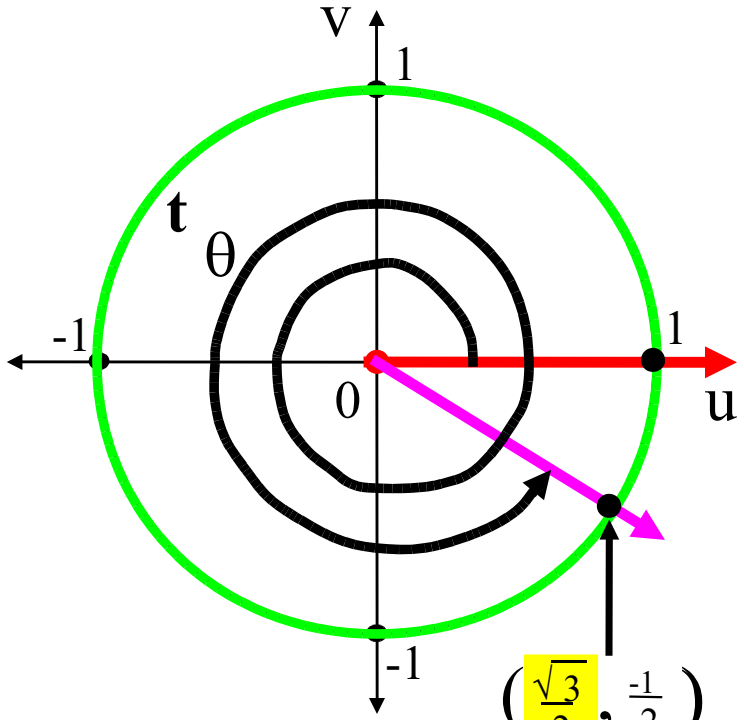

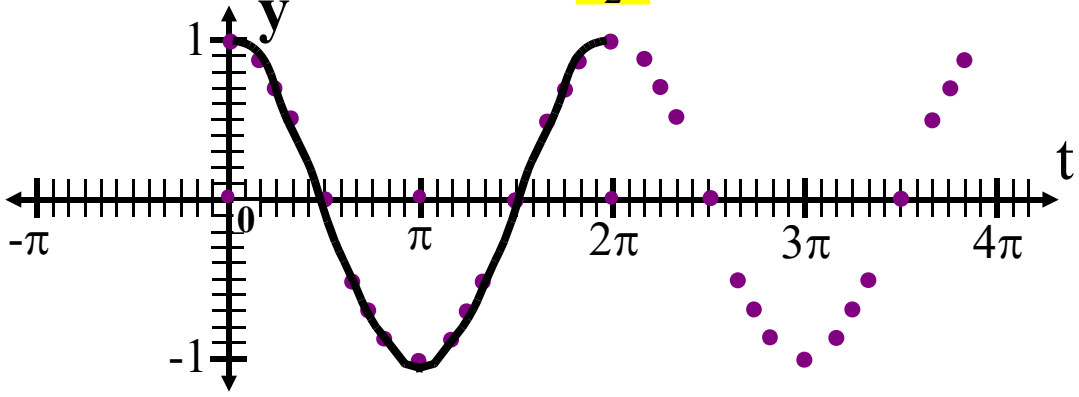

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Part 5 : The Circular Functions

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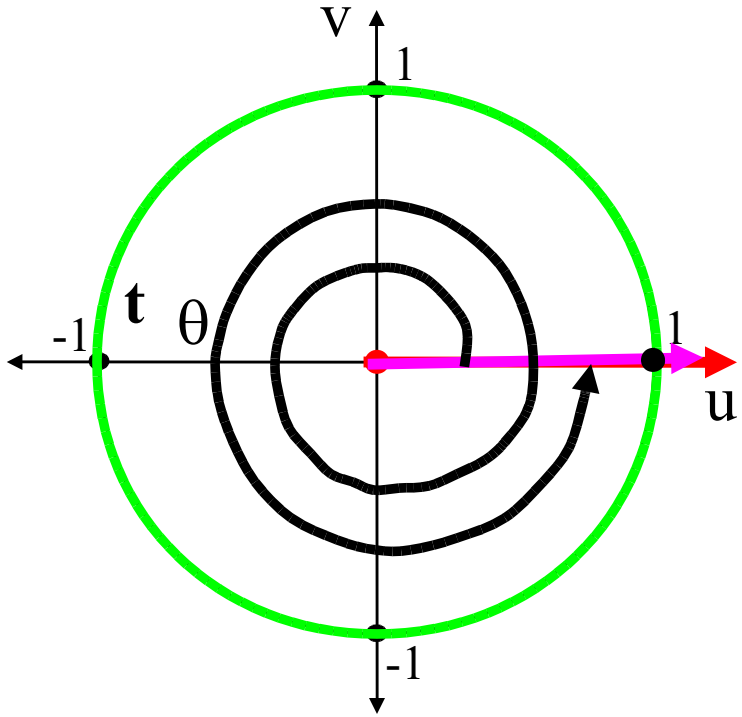

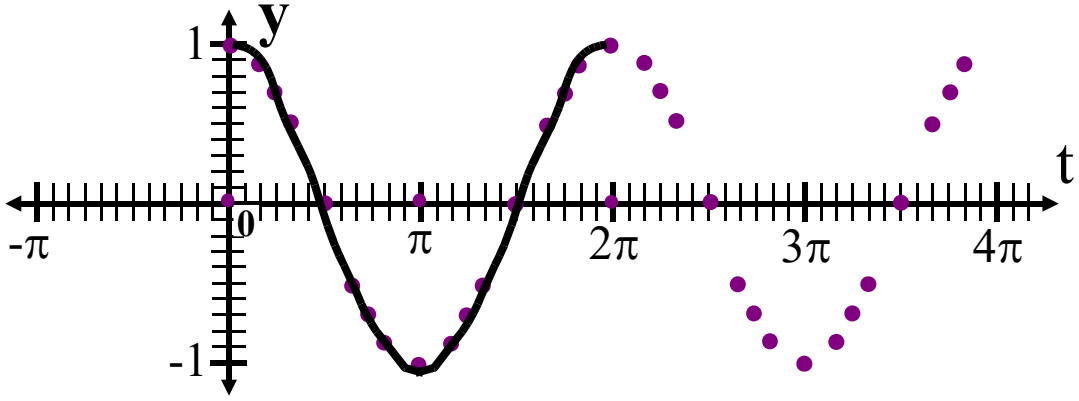

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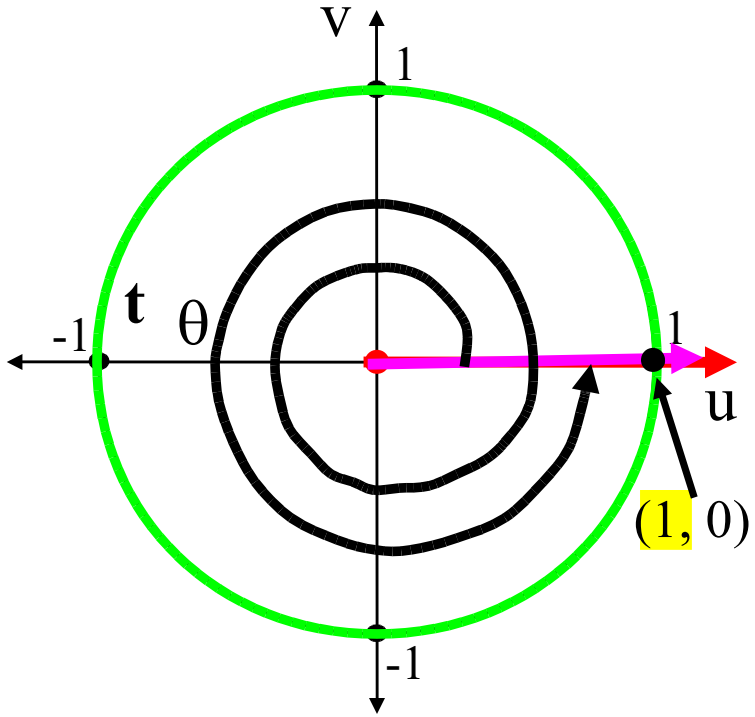

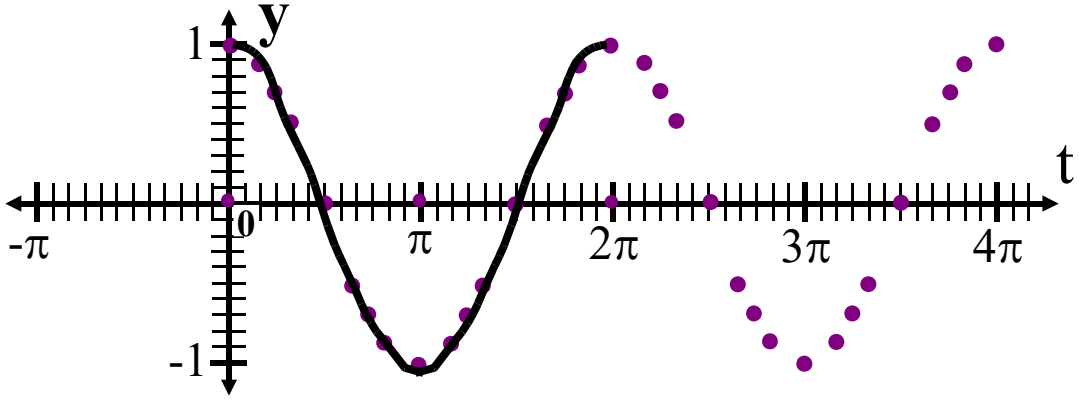

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Part 5 : The Circular Functions

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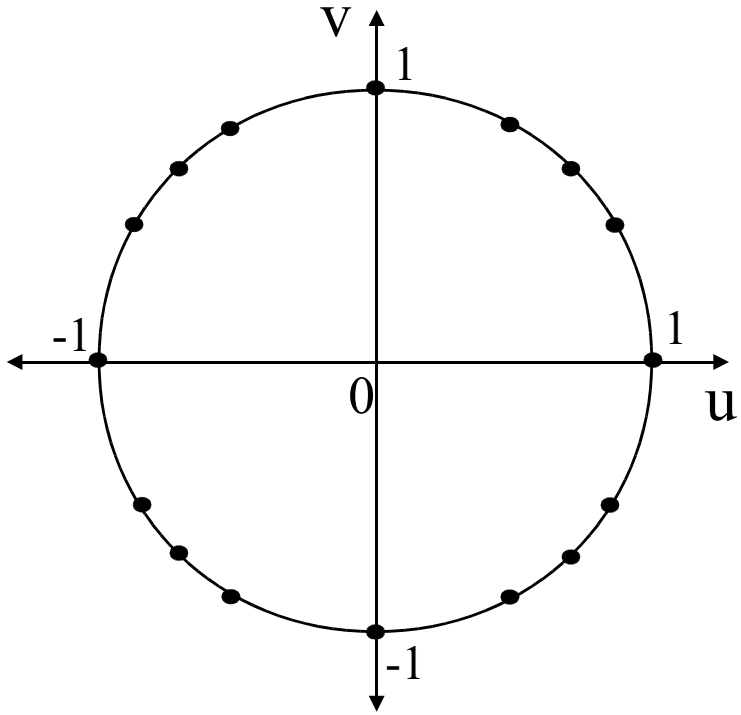

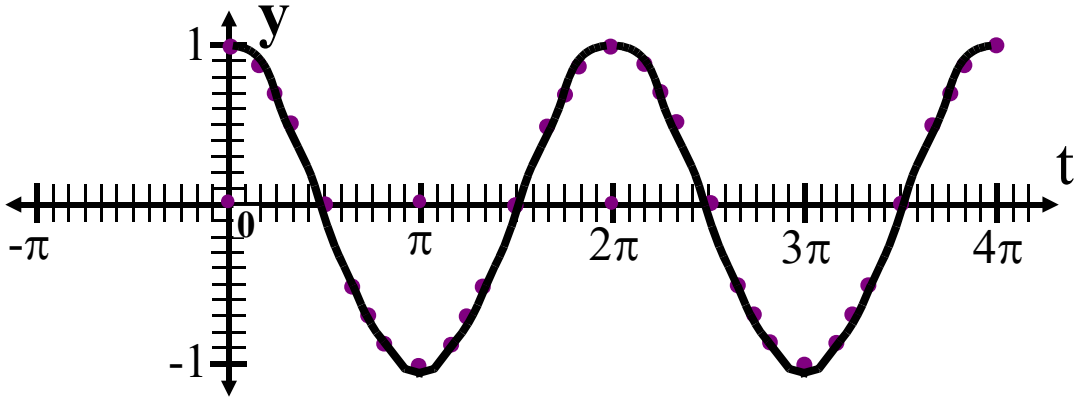

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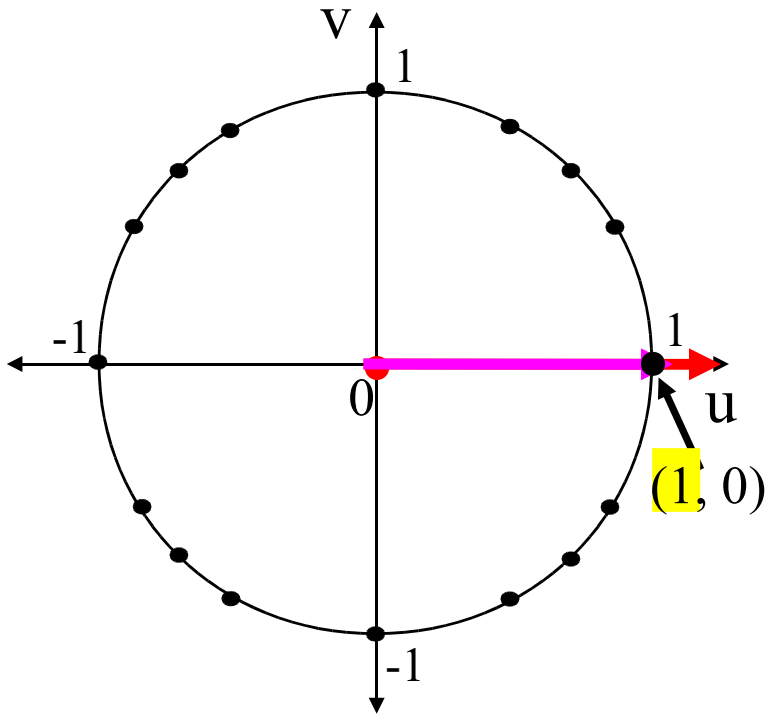
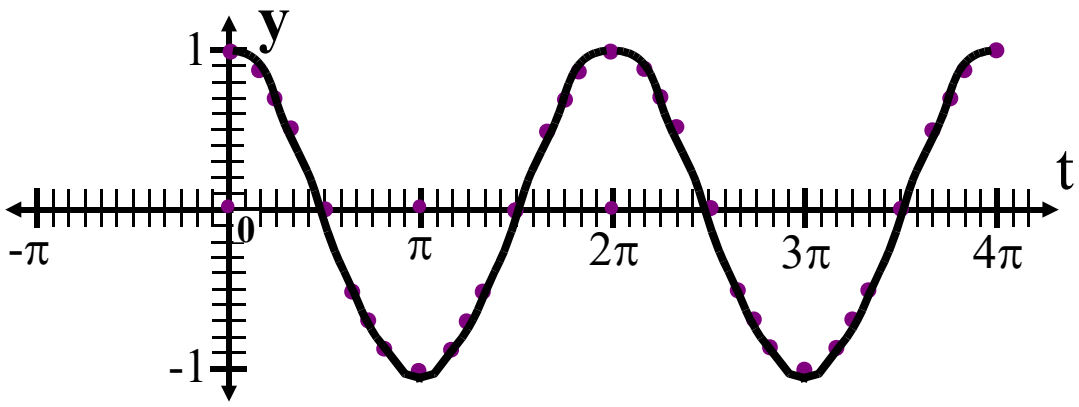
Part 5 : The Circular Functions

Sin t = v and Cos t = u





The Circular Functions

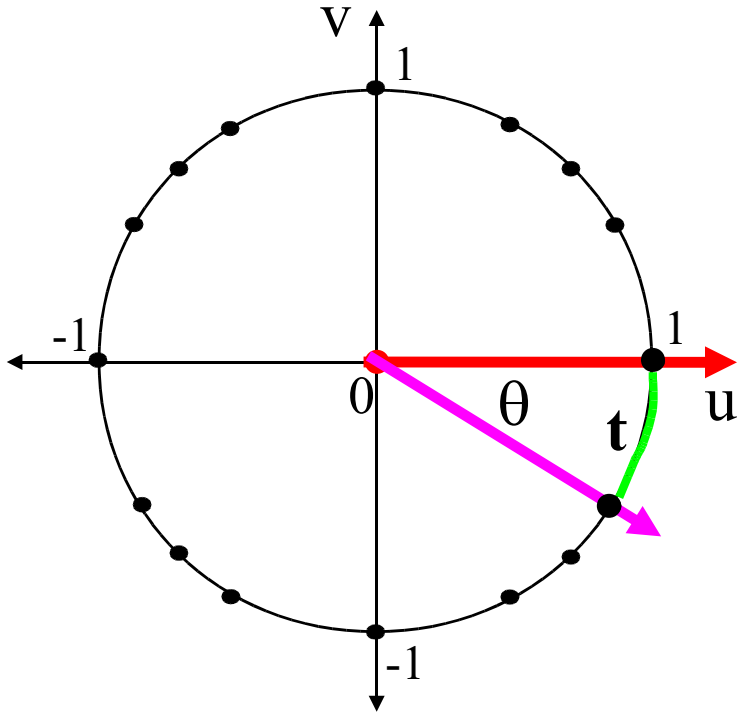
y = Sin t and y = Cos t

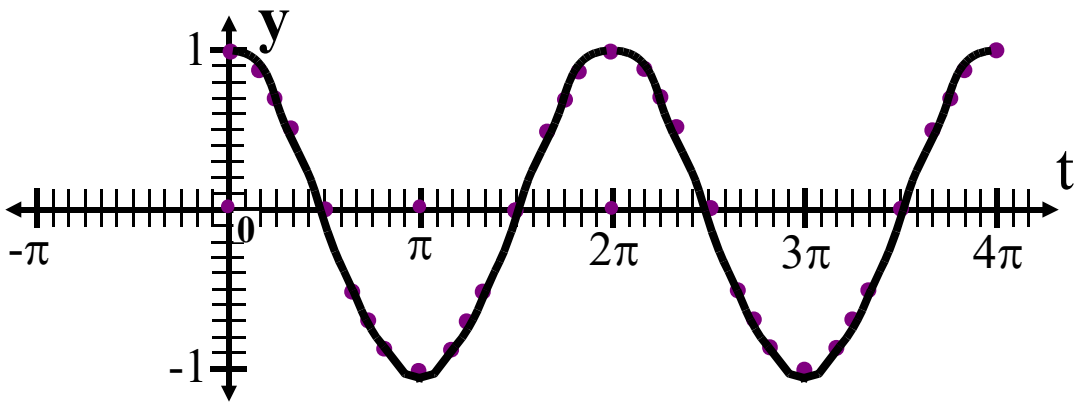
θ	t	Cos t
0°	0	1
-30°	$\frac{-\pi}{6}$	
-45°	$\frac{-\pi}{4}$	
-60°	$\frac{-\pi}{3}$	
-90°	$\frac{-\pi}{2}$	
-120°	$\frac{-2\pi}{3}$	
-135°	$\frac{-3\pi}{4}$	
-150°	$\frac{-5\pi}{6}$	
-180°	$-\pi$	

Teach Yourself Trigonometry

Part 5 : The Circular Functions

Sin t = v and Cos t = u





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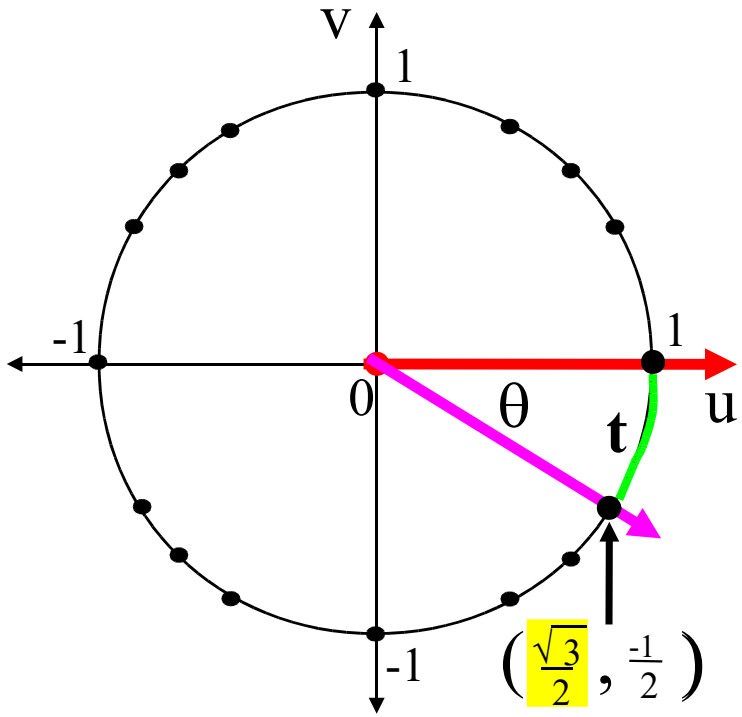

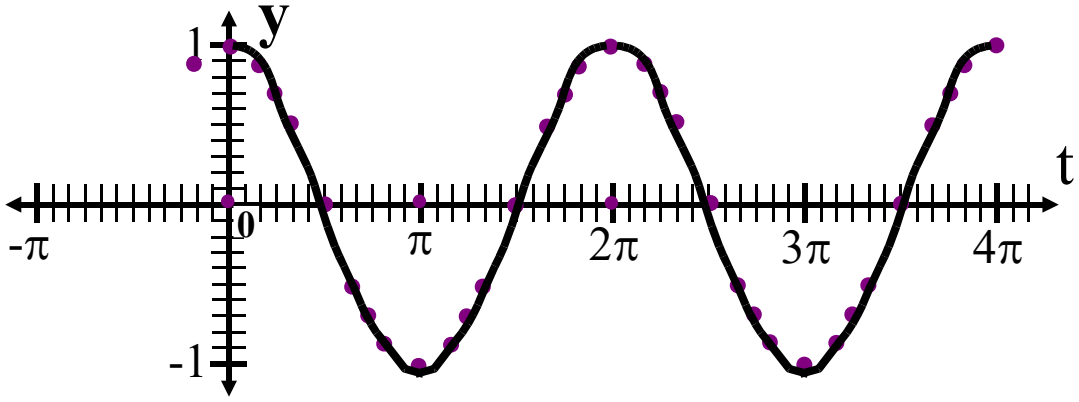

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θ	t	Cos t
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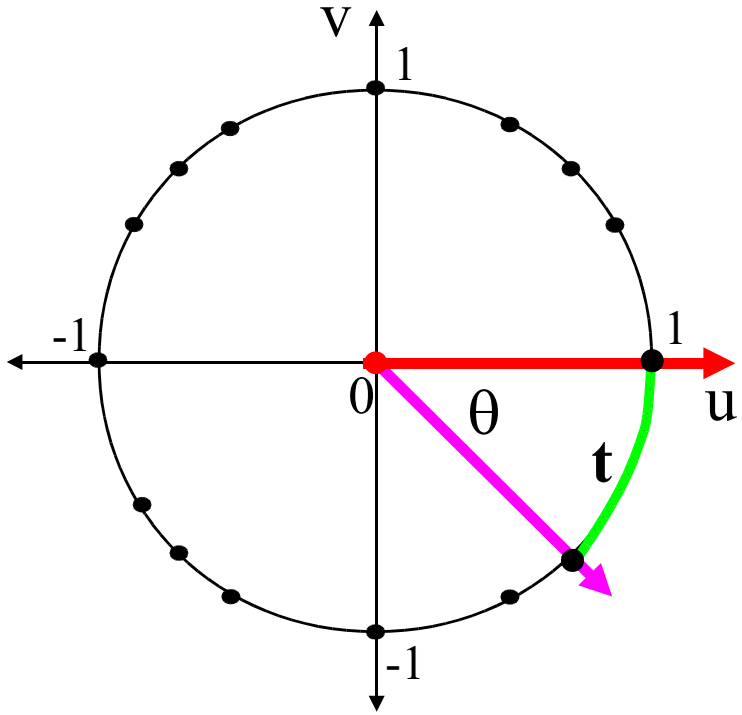

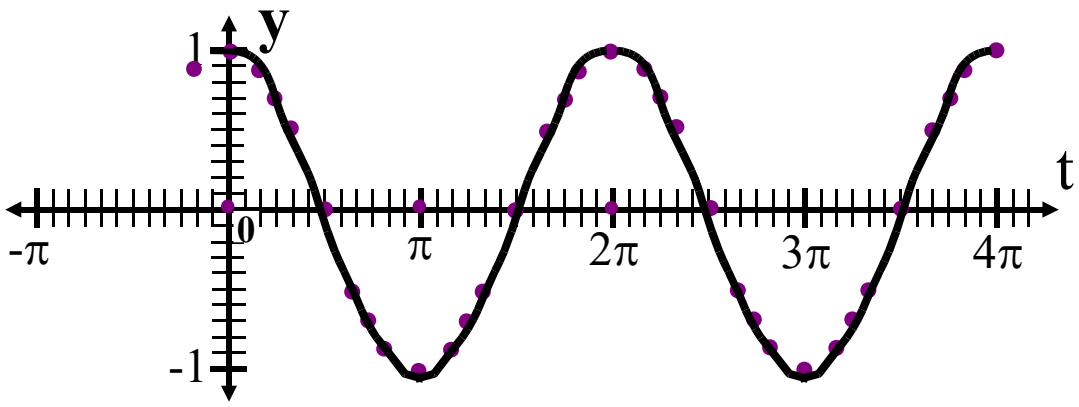

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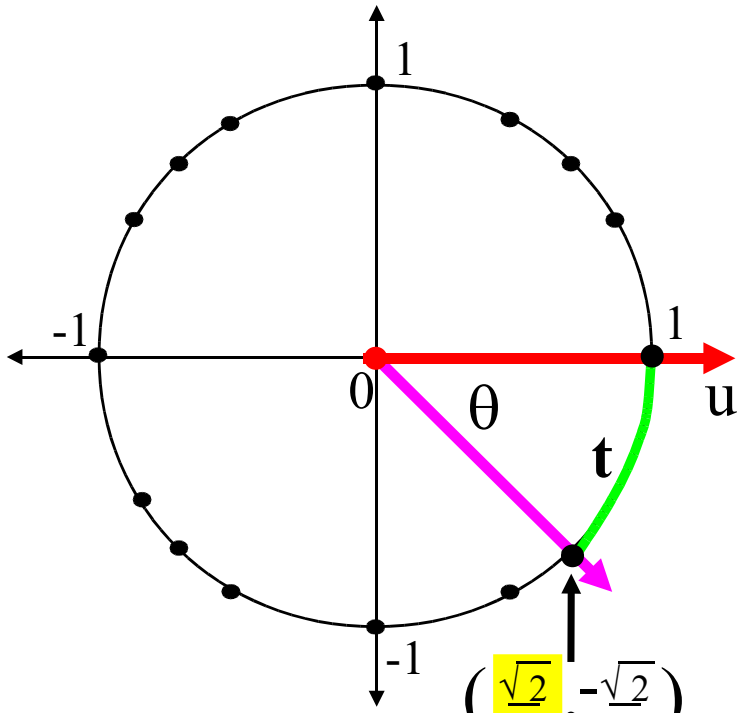

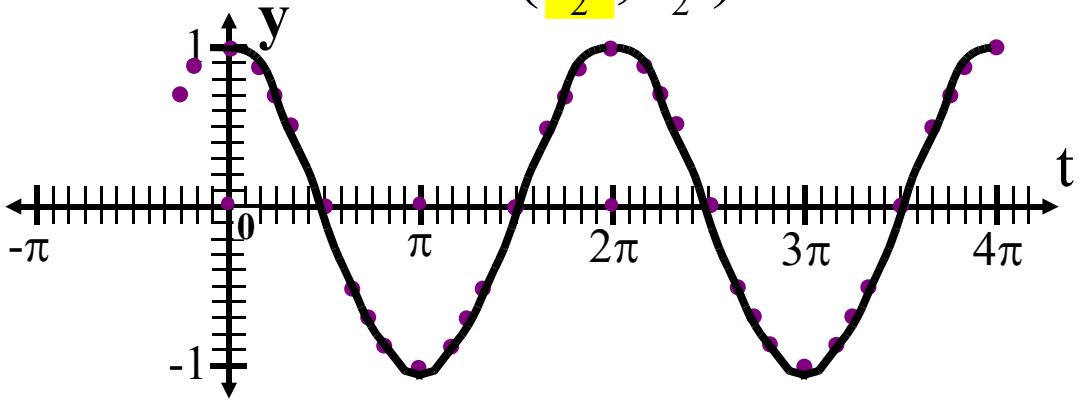

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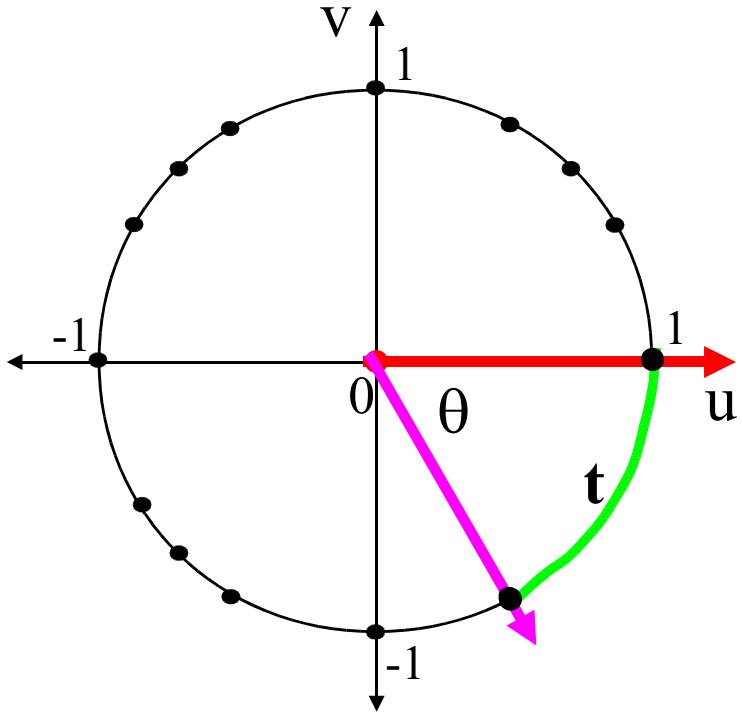

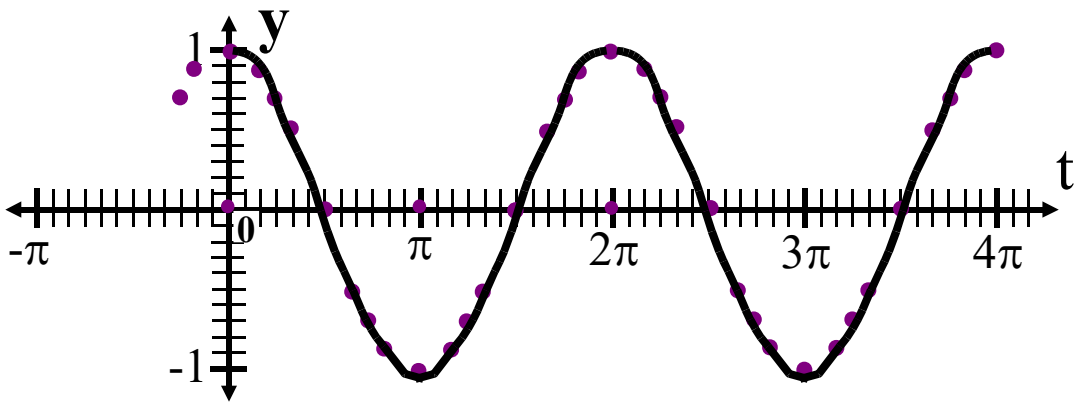

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Teach Yourself Trigonometry

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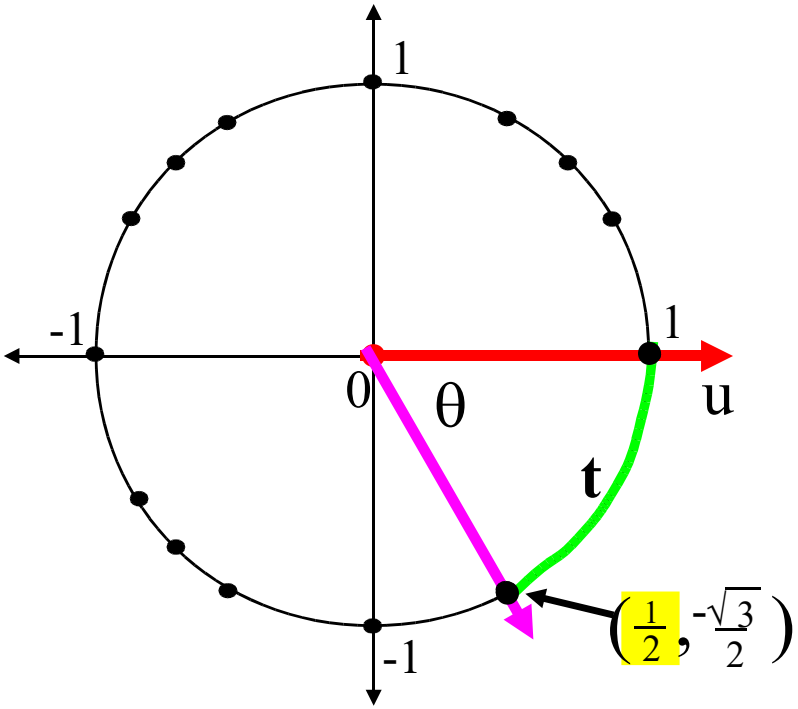

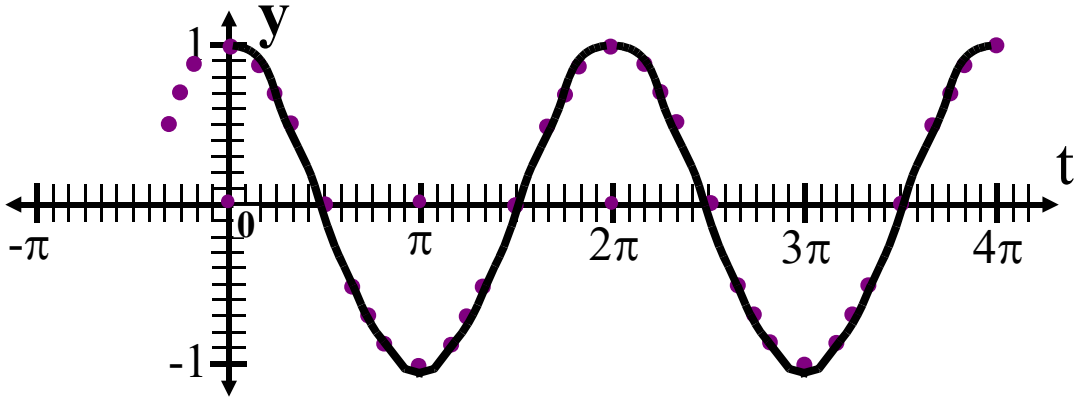

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Teach Yourself Trigonometry

Part 5 : The Circular Functions

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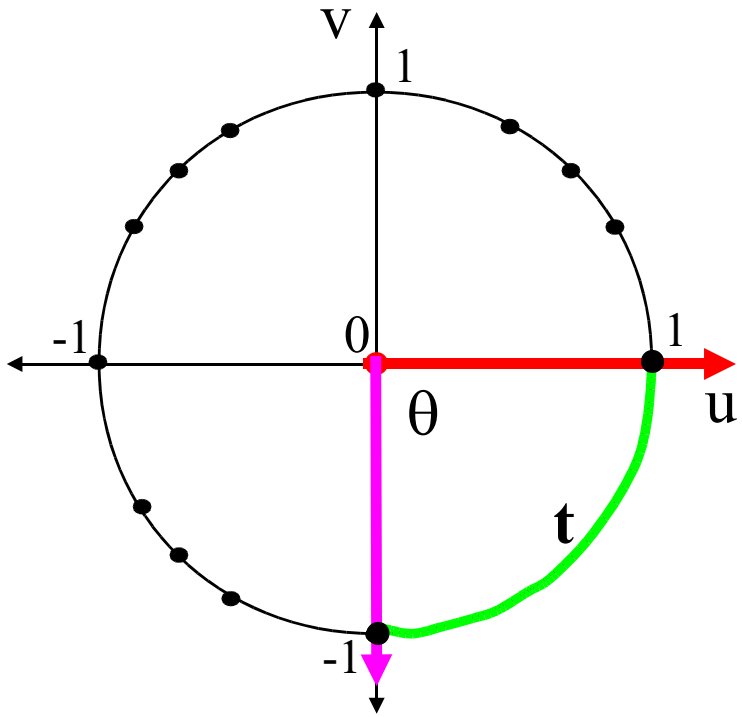

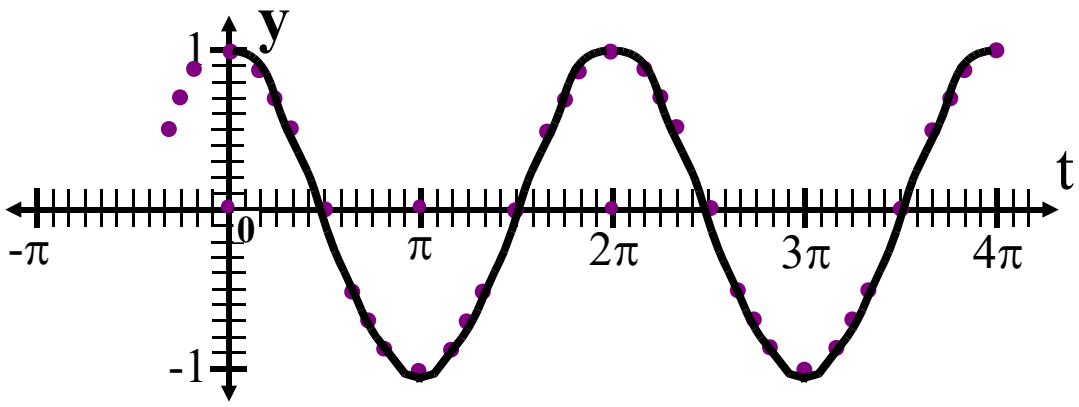

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Part 5 : The Circular Functions

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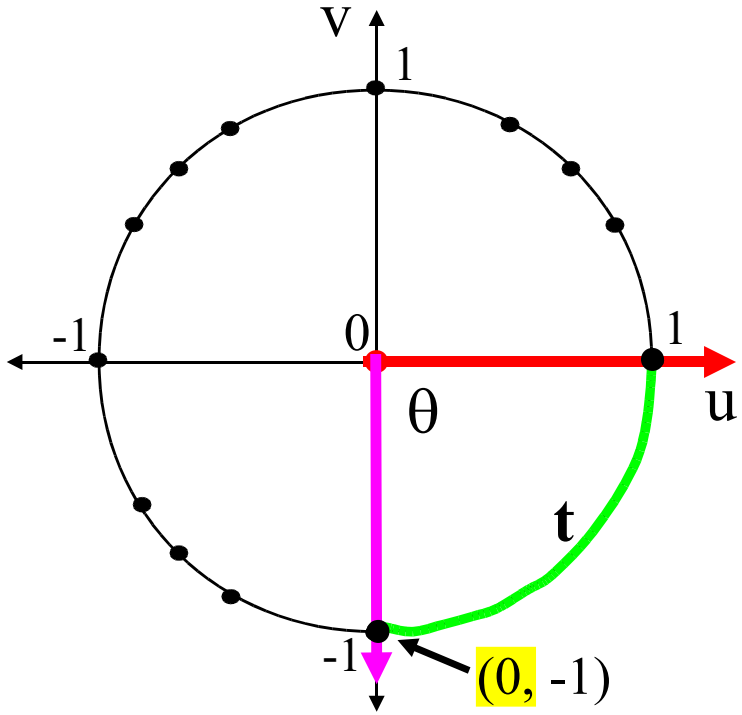

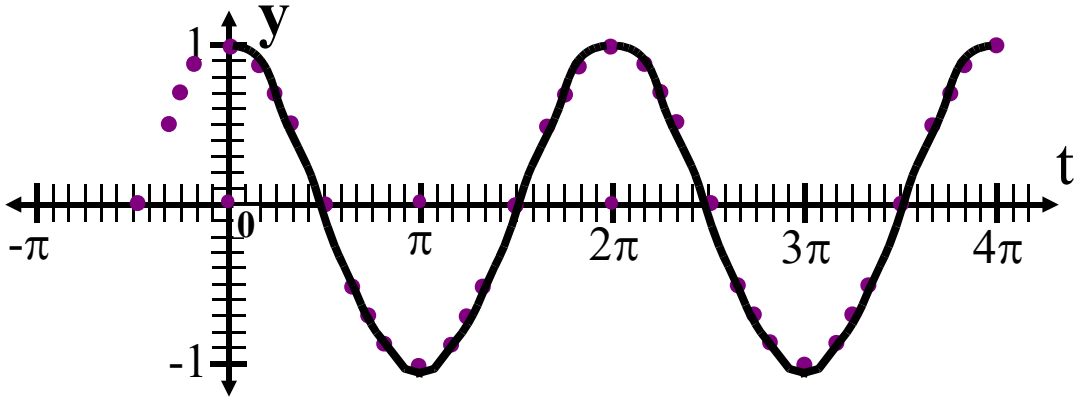

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Teach Yourself Trigonometry

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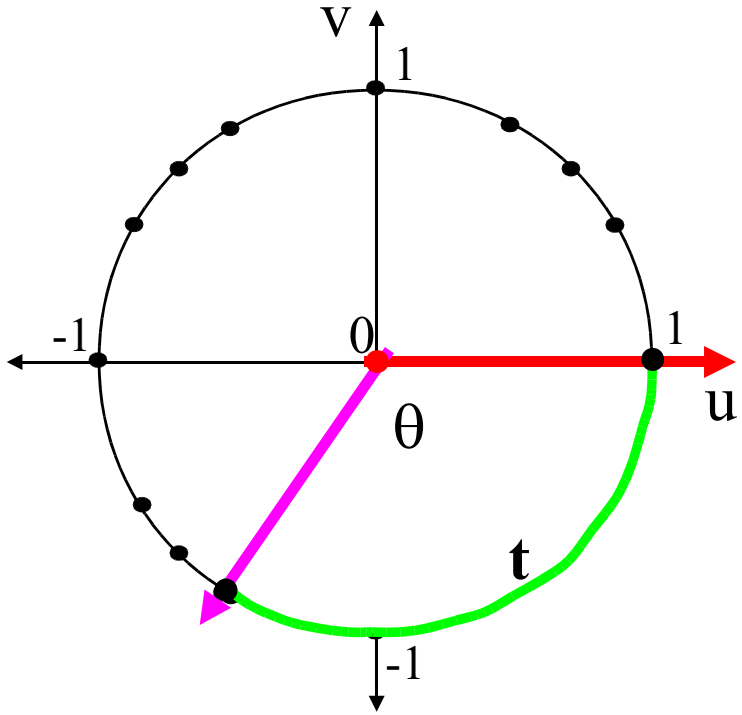

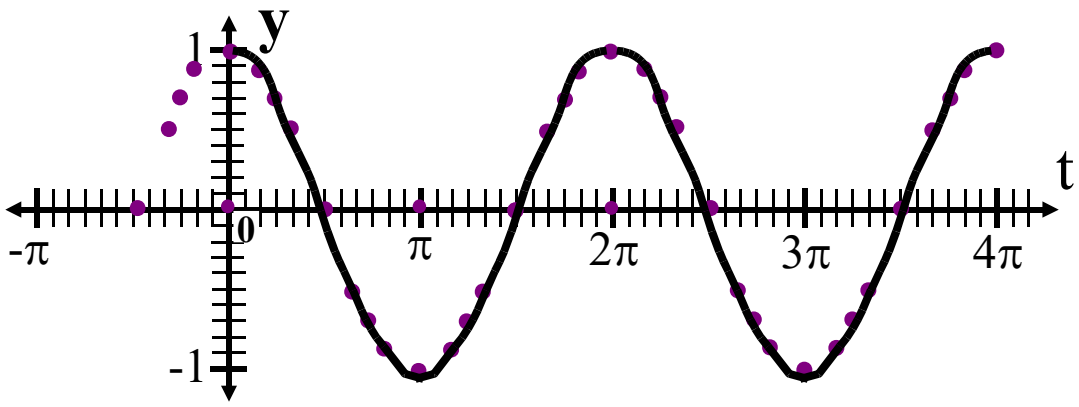

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Part 5 : The Circular Functions

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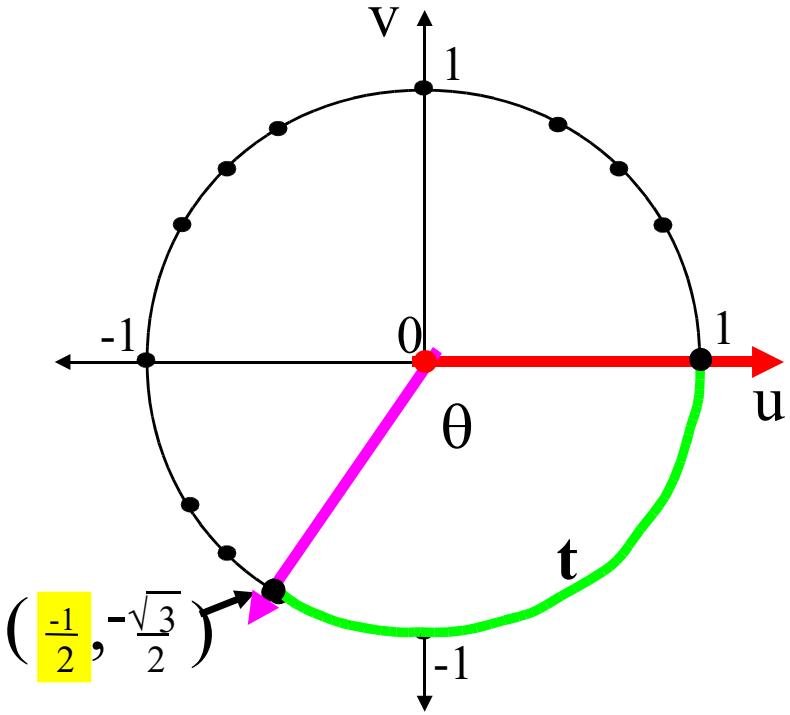

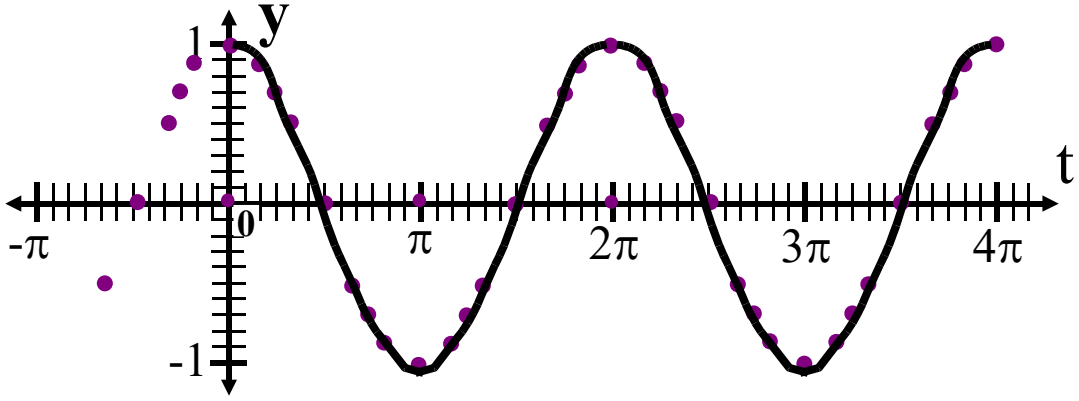

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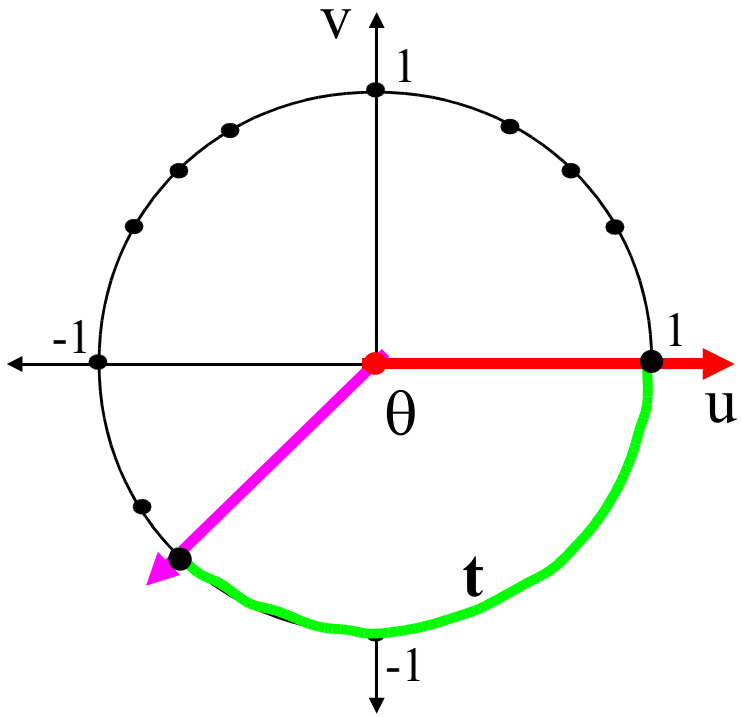

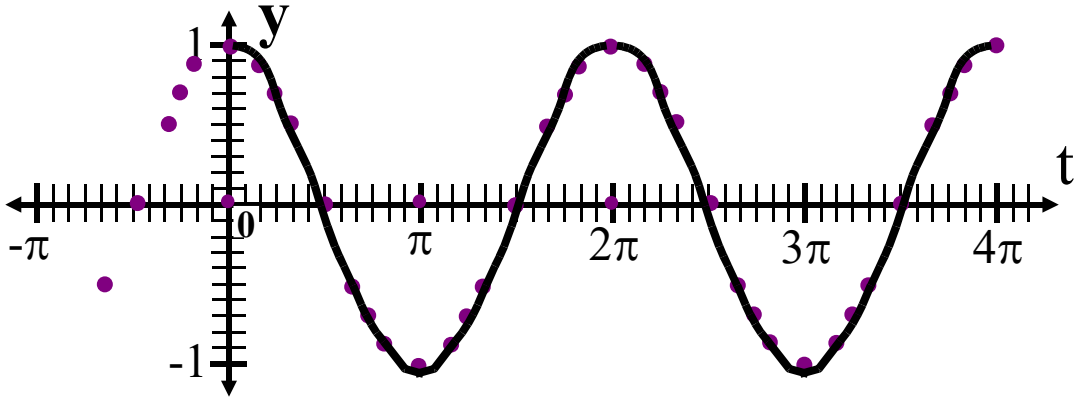

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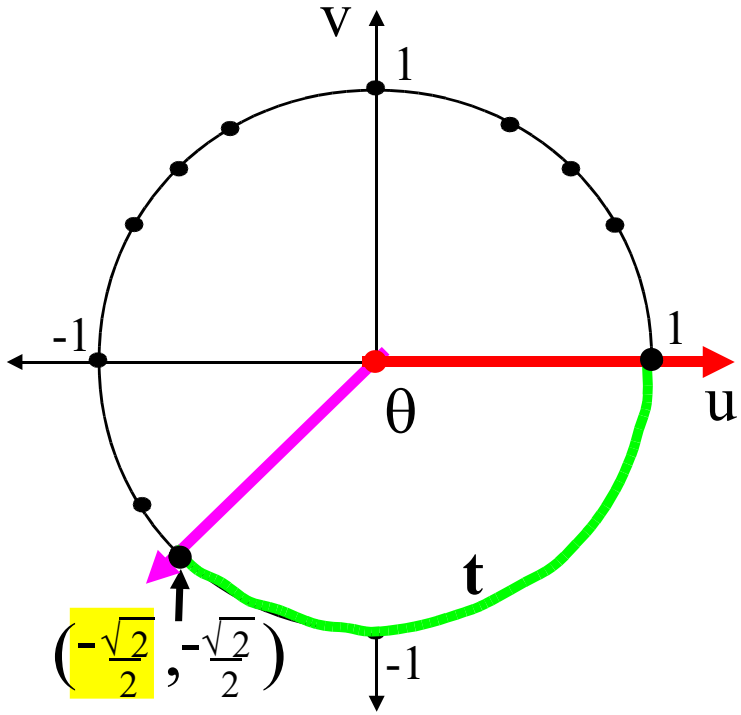

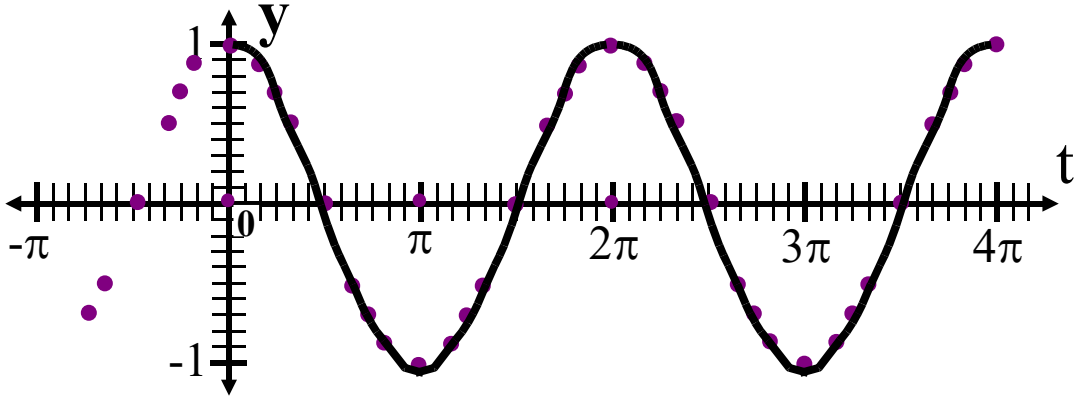

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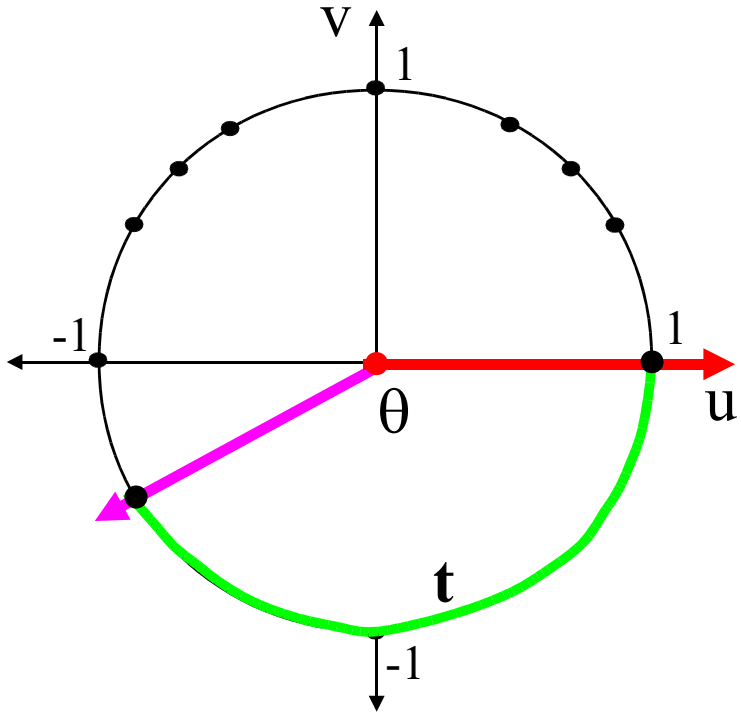

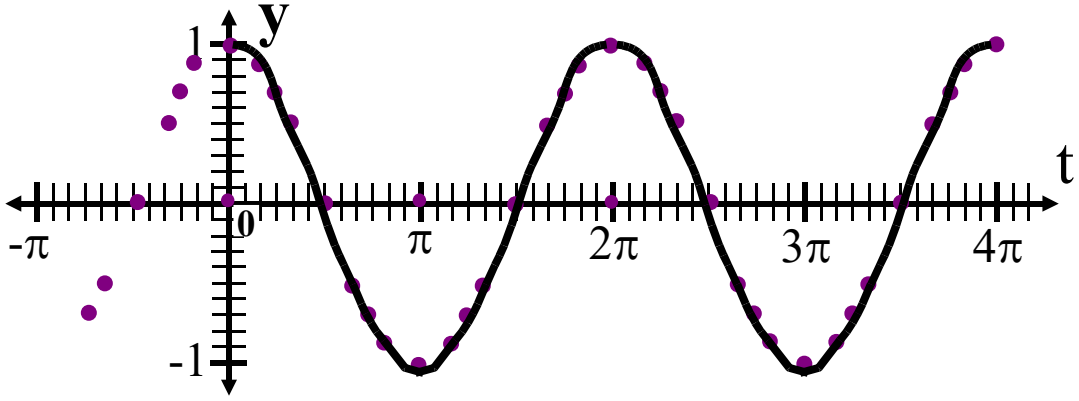

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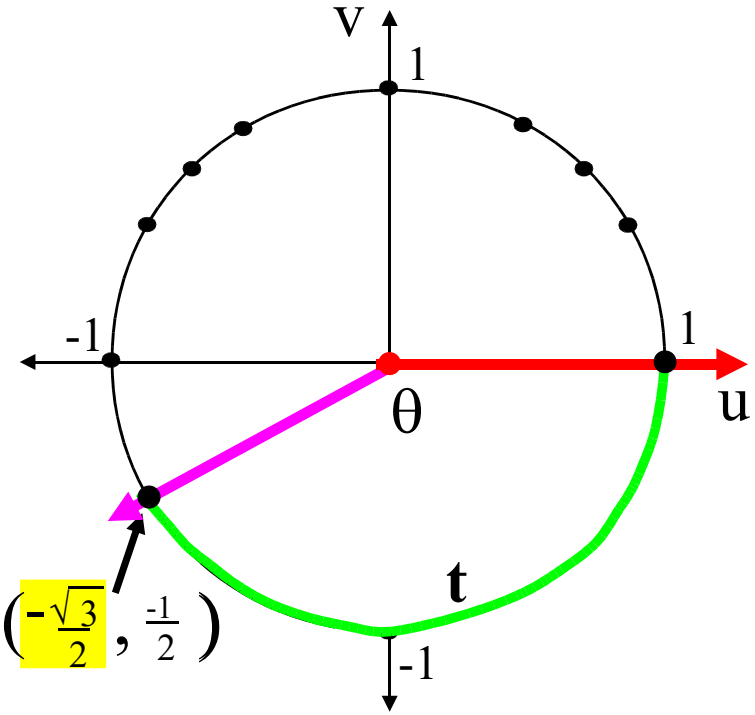

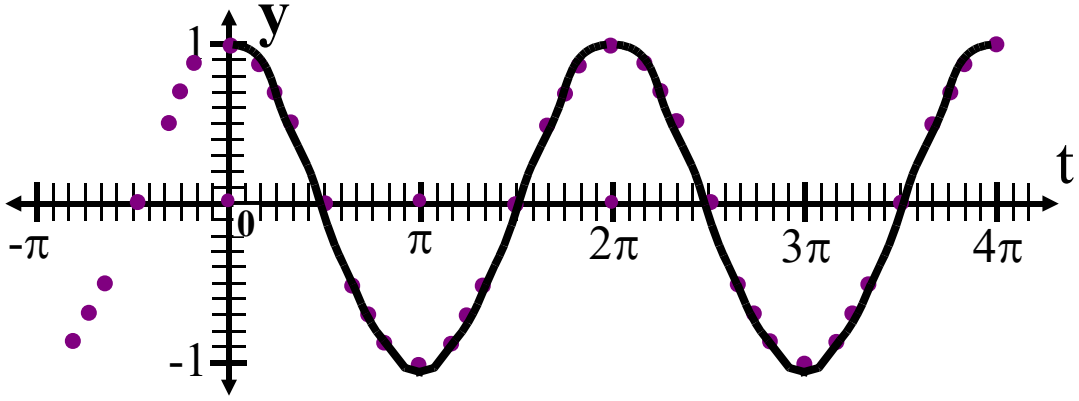

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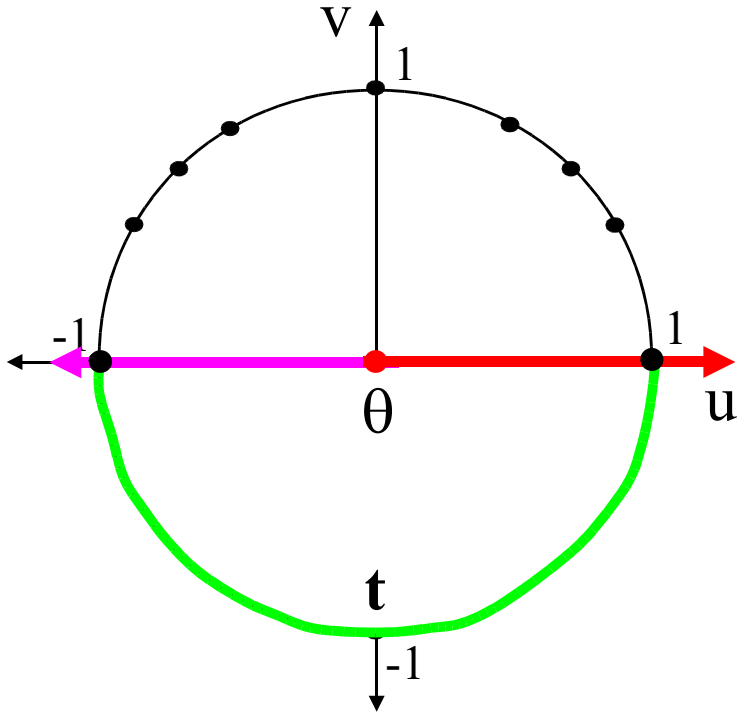

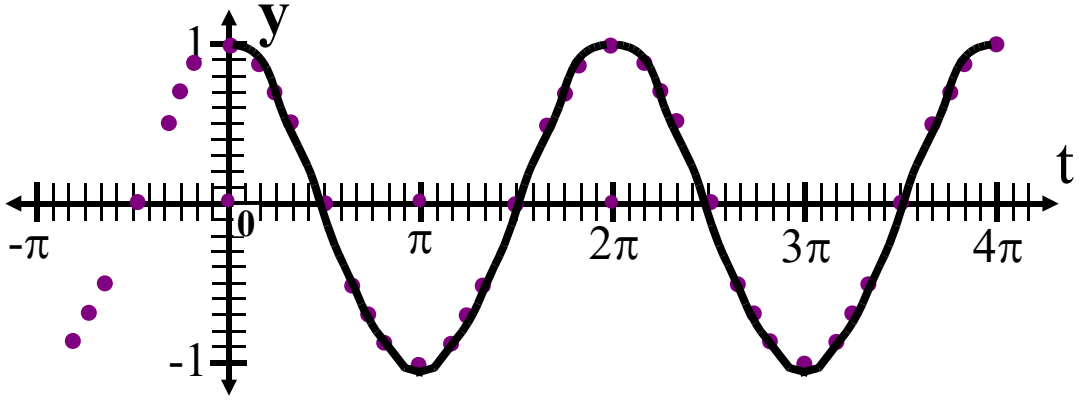

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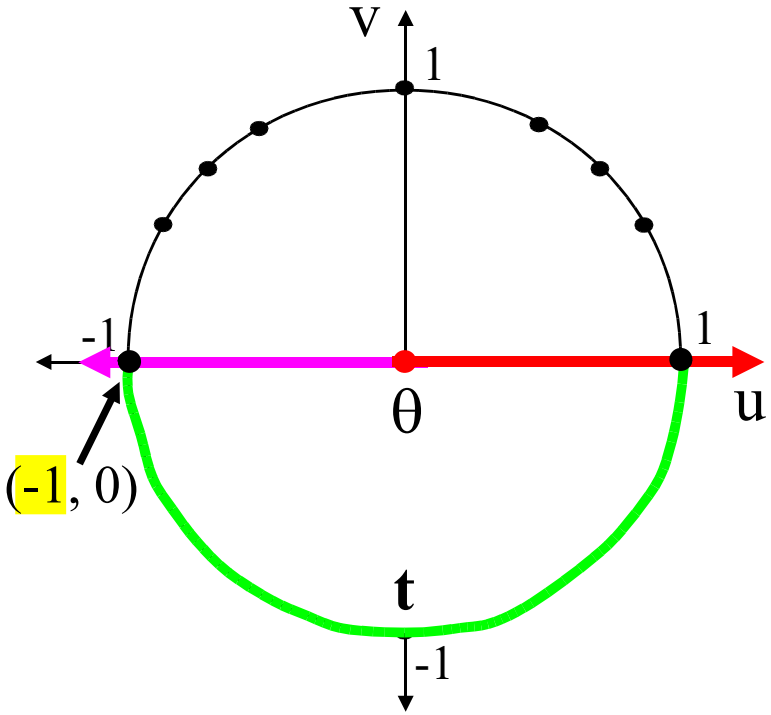

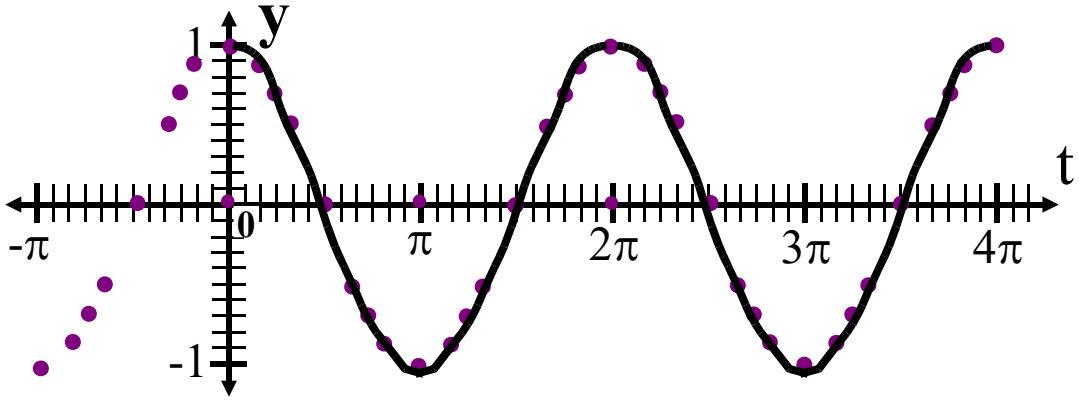

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Part 5 : The Circular Functions

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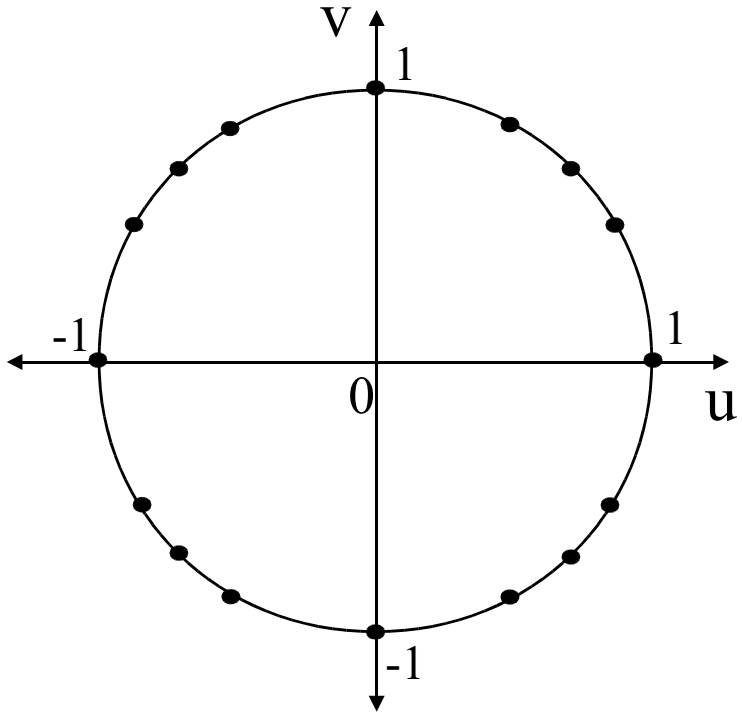

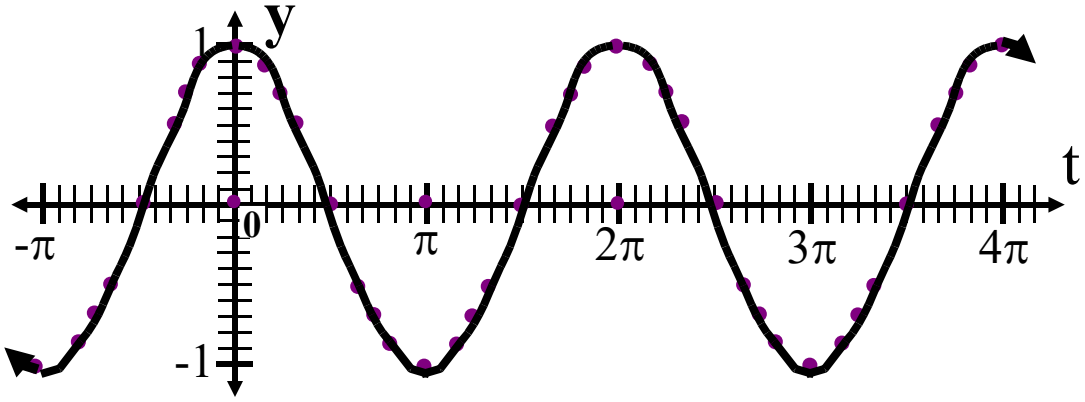

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-180°	$-\pi$	-1

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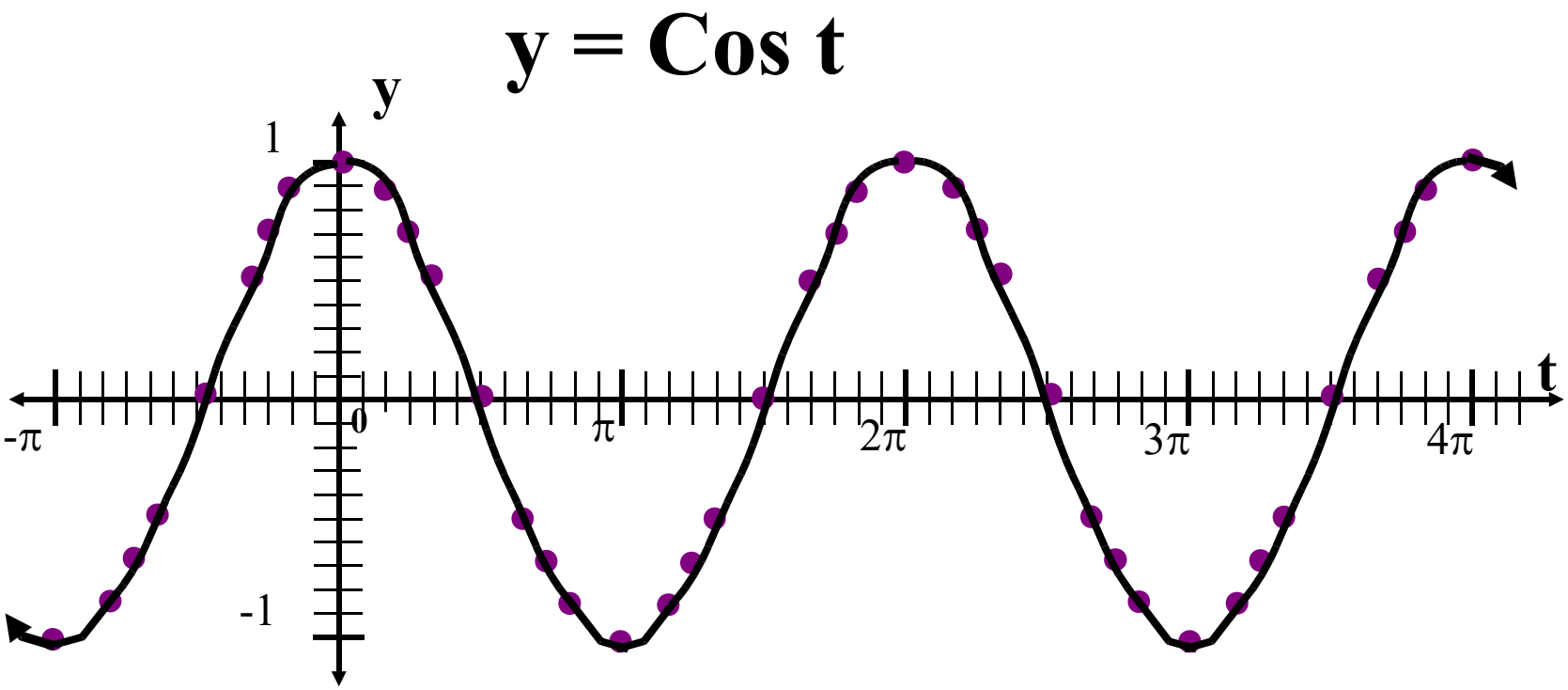
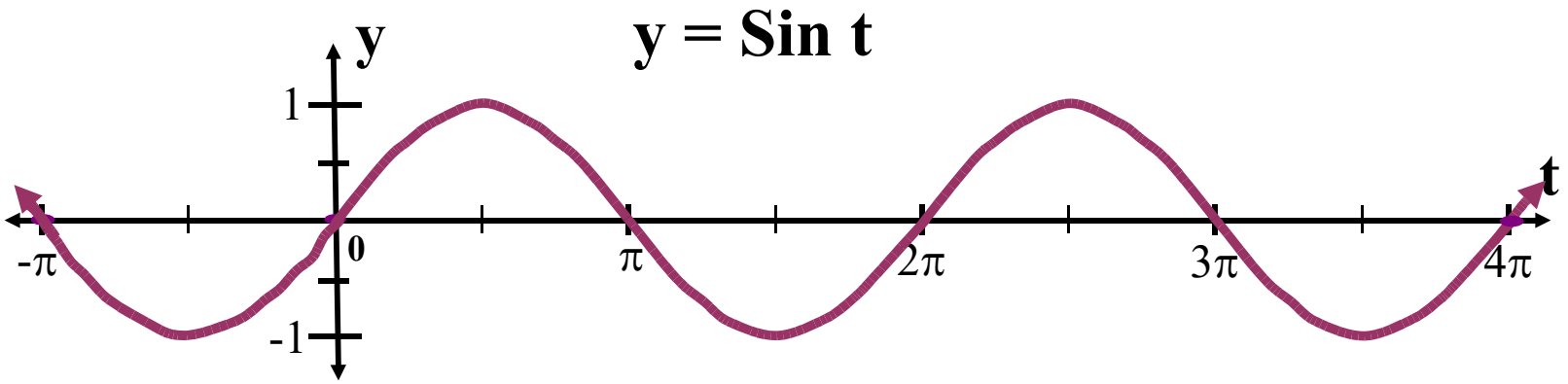
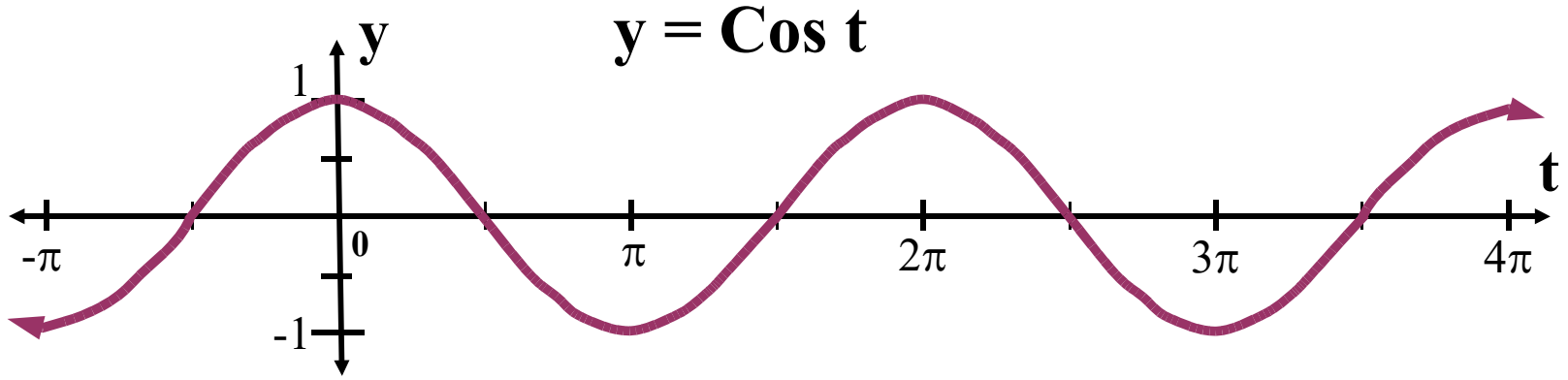


Teach Yourself Trigonometry

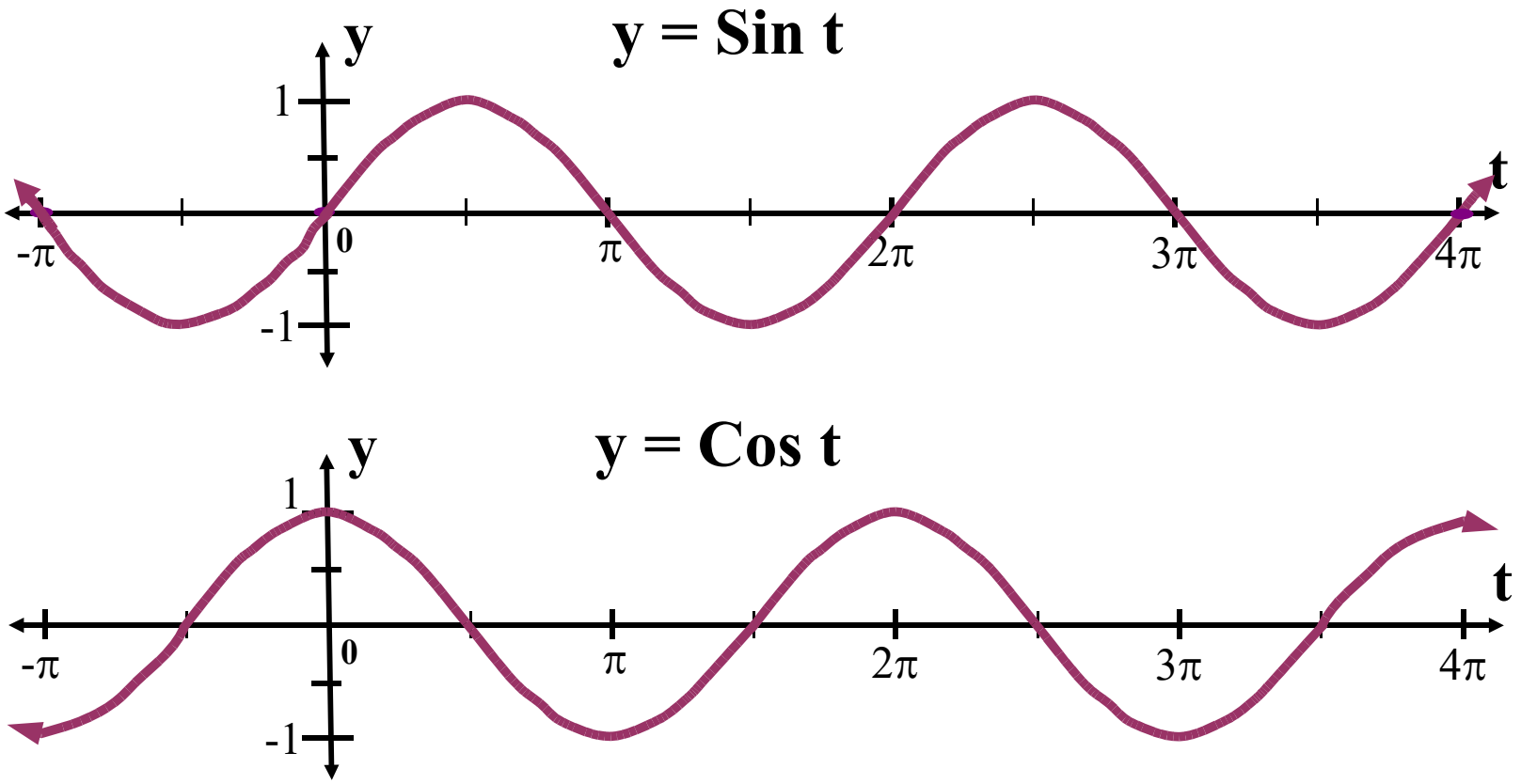
Here are the graphs of the sine and the cosine functions.





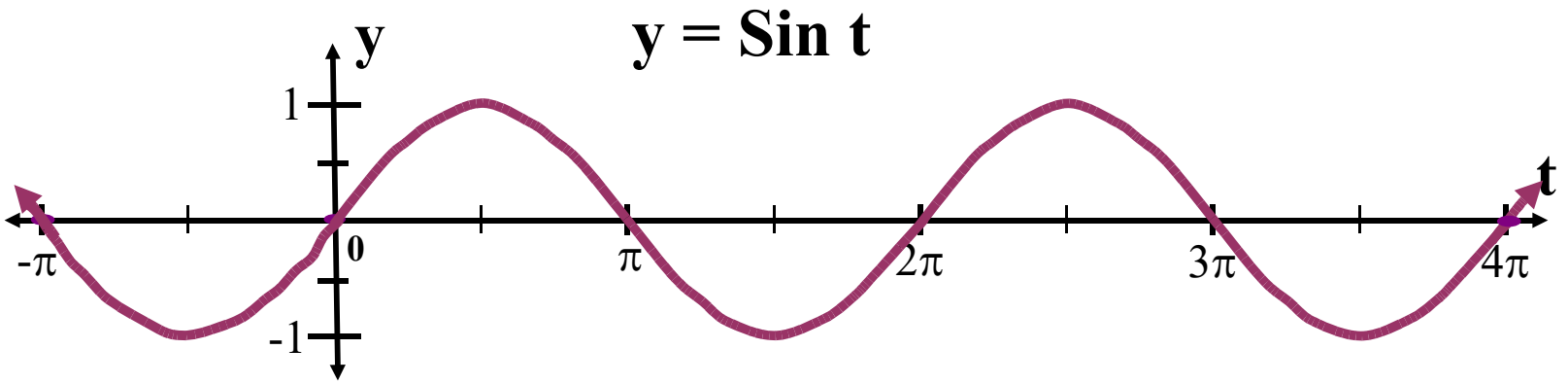
Teach Yourself Trigonometry

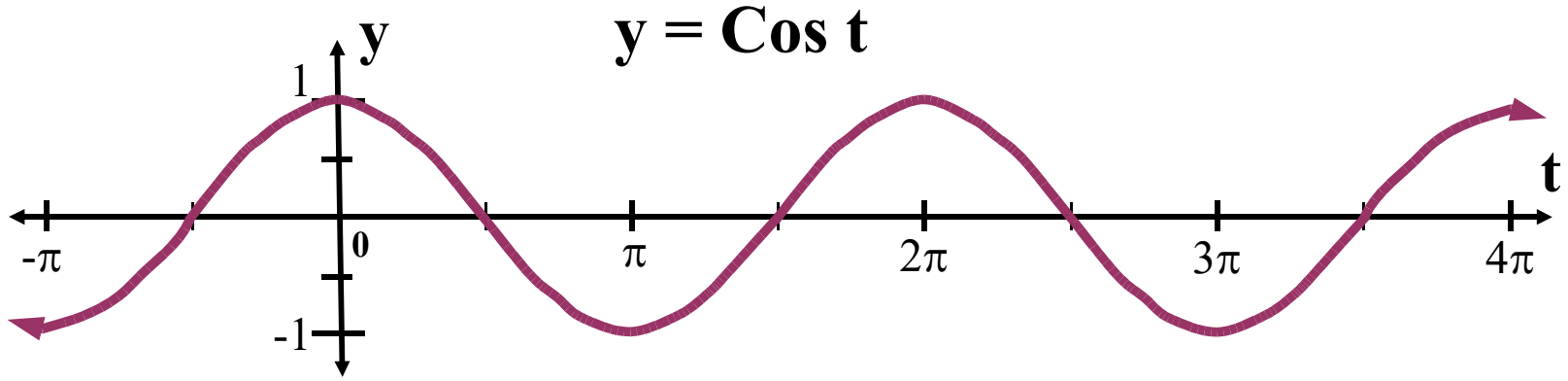
Here are the graphs of the sine and the cosine functions. In these graphs, the horizontal and the vertical scales are approximately the same.



Teach Yourself Trigonometry

Here are the graphs of the sine and the cosine functions. In these graphs, the horizontal and the vertical scales are approximately the same, so you are seeing the true shape of these functions.

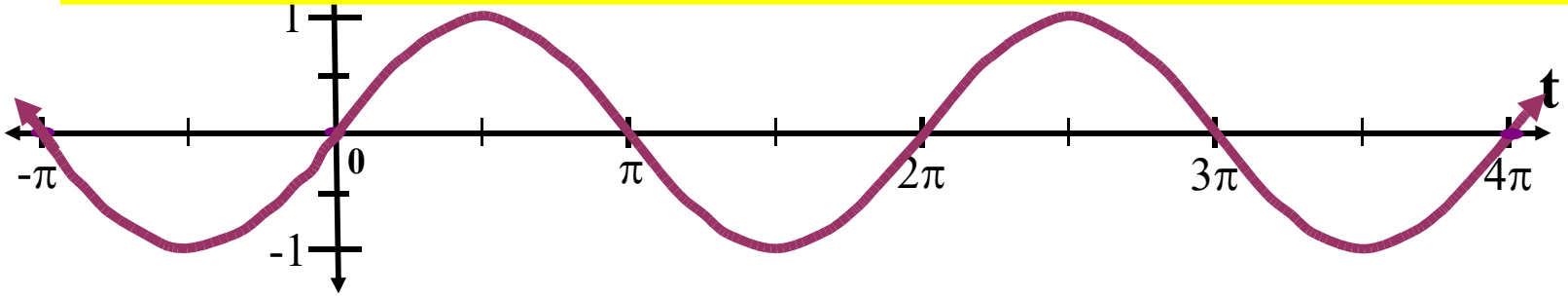


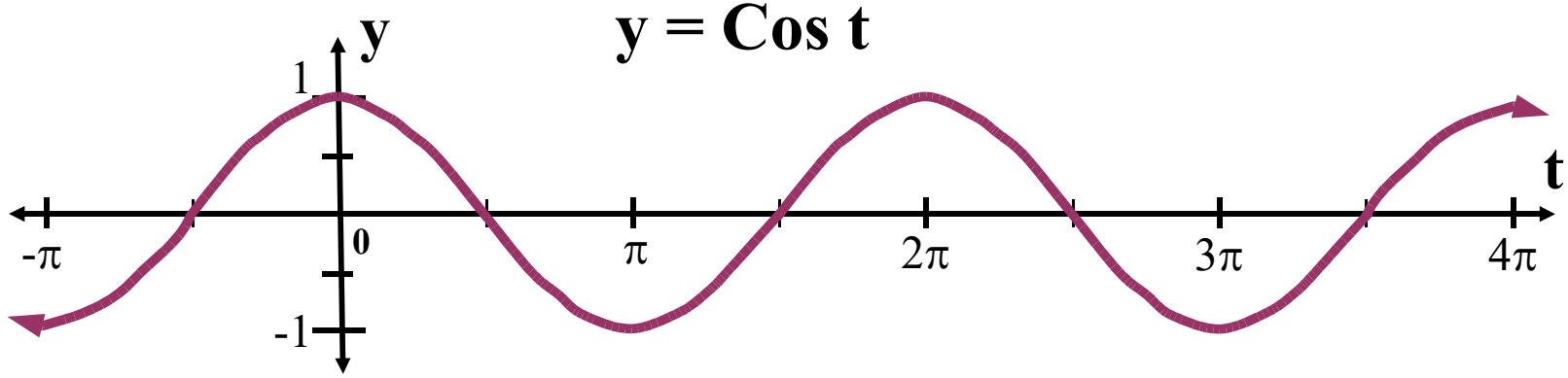


Teach Yourself Trigonometry

Here are the graphs of the sine and the cosine functions. In these graphs, the horizontal and the vertical scales are approximately the same, so you are seeing the true shape of these functions.

This is the end of this lesson.





Teach Yourself Trigonometry

Here are the graphs of the sine and the cosine functions. In these graphs, the horizontal and the vertical scales are approximately the same, so you are seeing the true shape of these functions.

This is the end of this lesson.
Part 6 introduces variations of the sine and cosine functions.