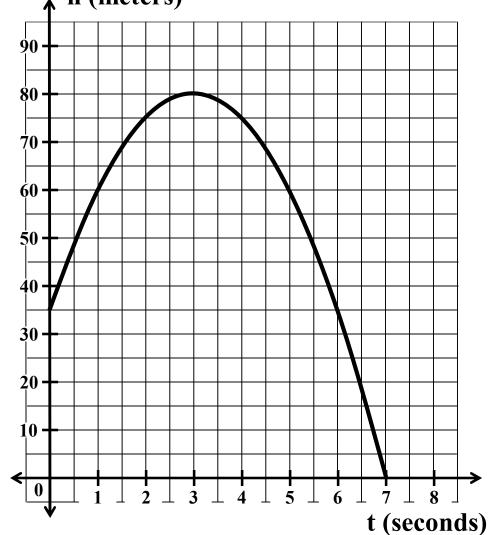
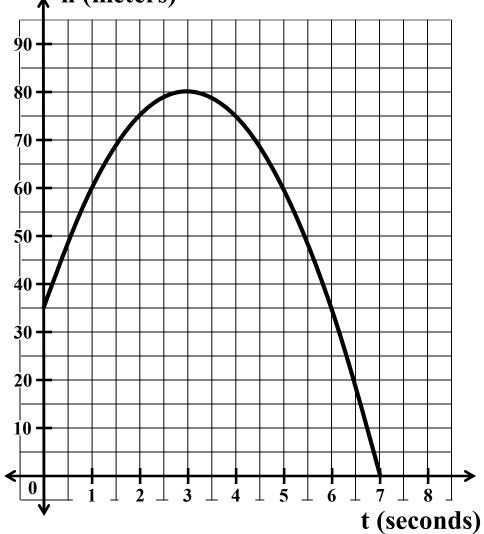
Calculus Unit 1 Lesson #5a The Velocity Function Class Worksheet 5a

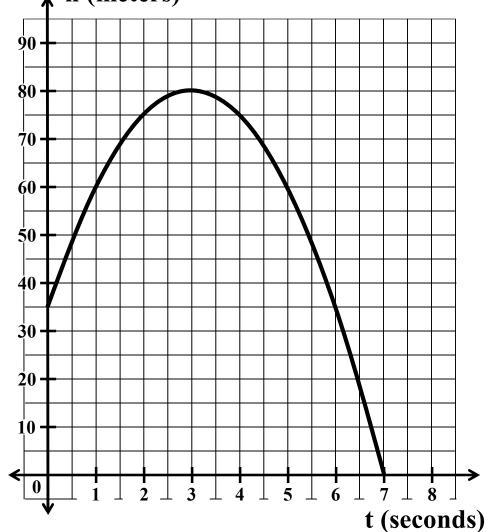


Our goal is to find a function for the velocity of the ball after t seconds.



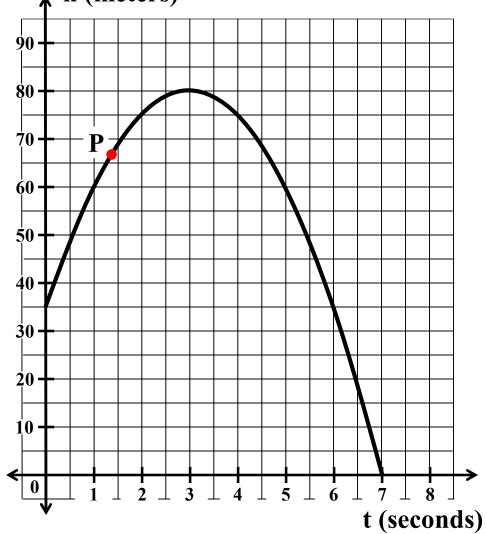
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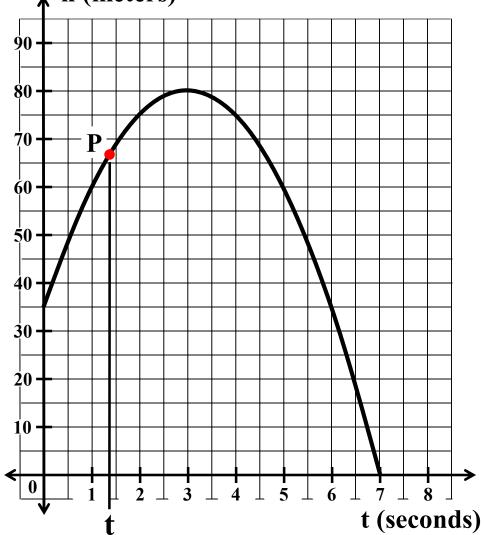
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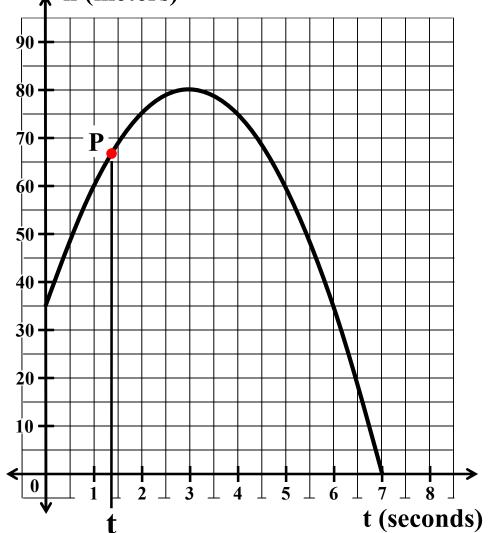
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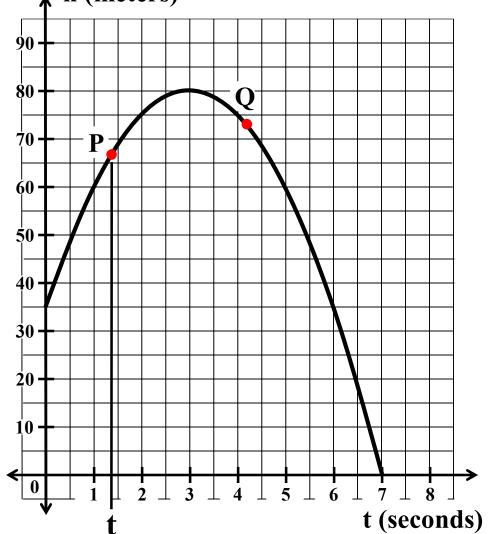
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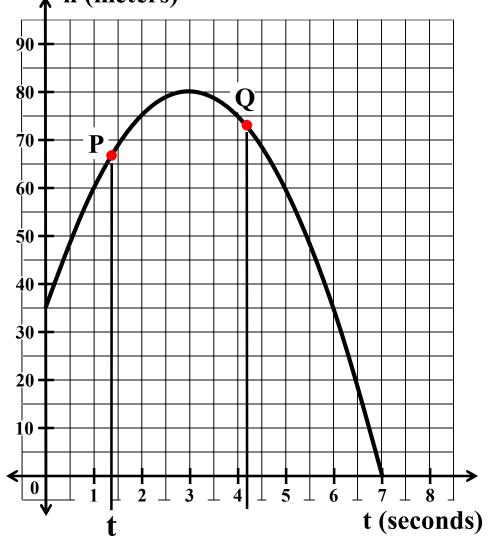
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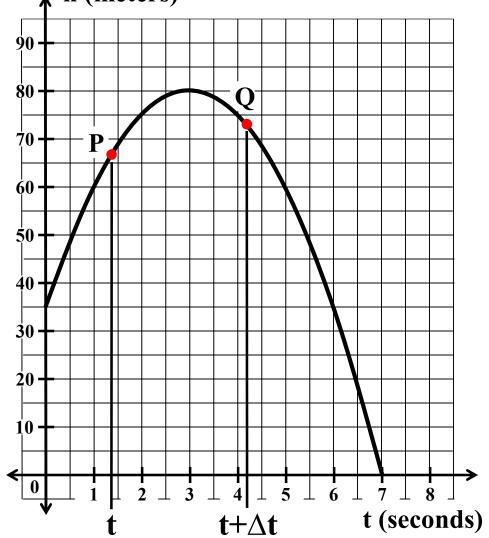
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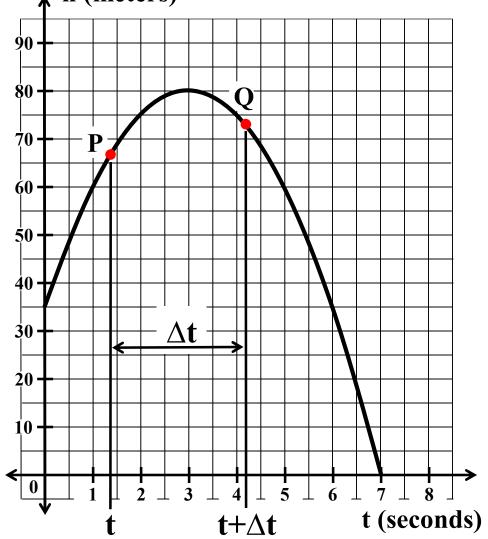
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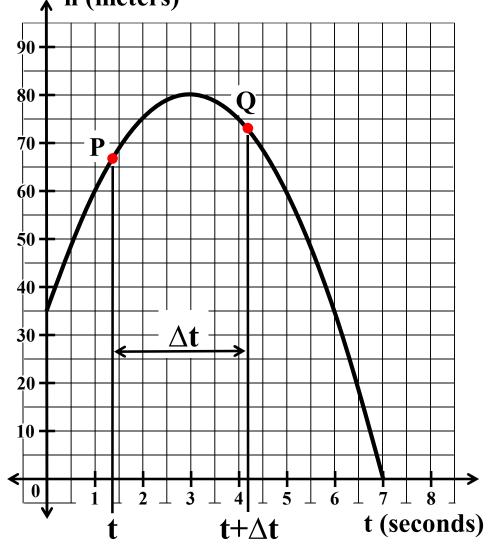


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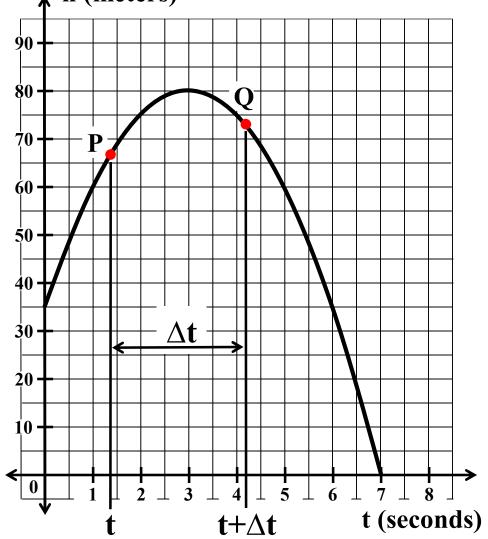
Note that if $\Delta t < 0$, then point Q would be to the left of point P on the graph.



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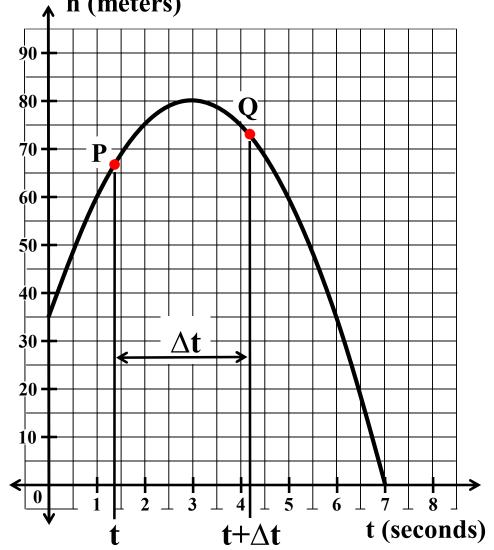


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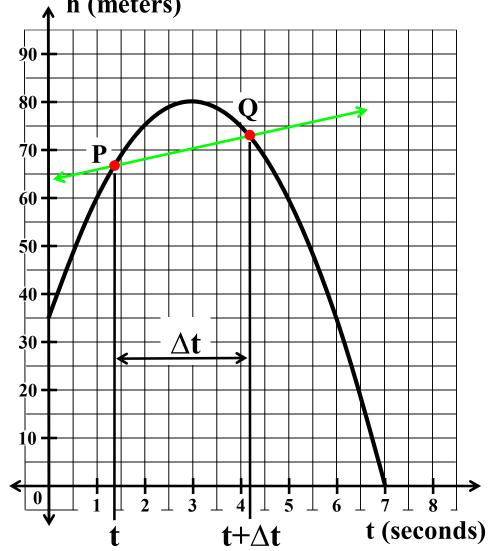


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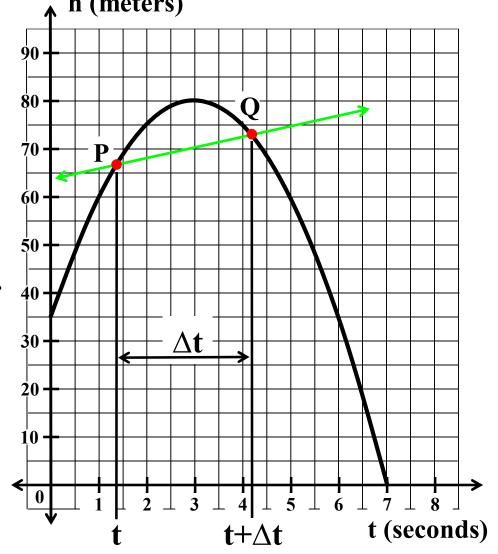
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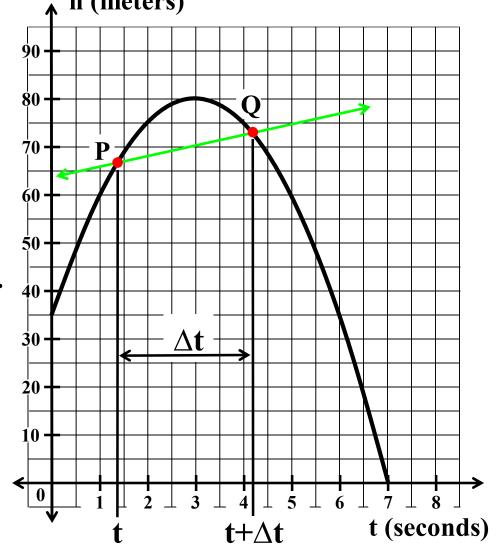
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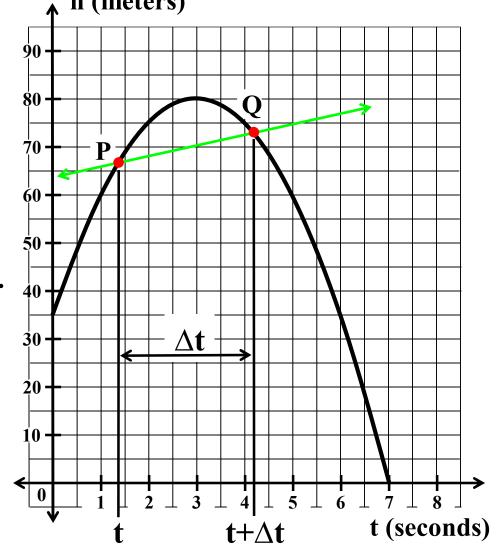
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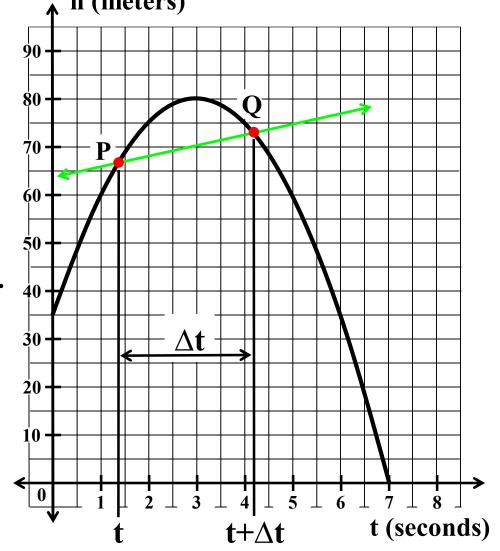
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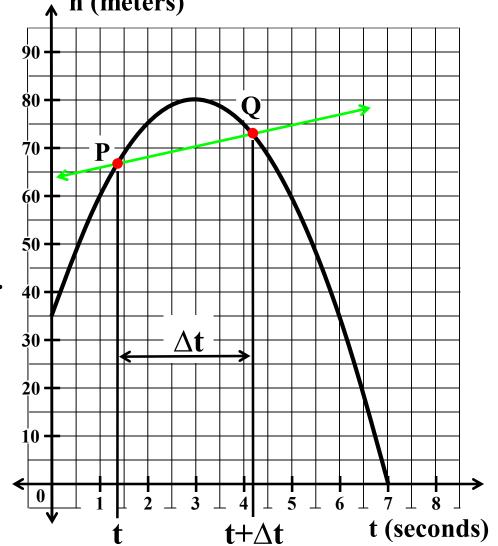
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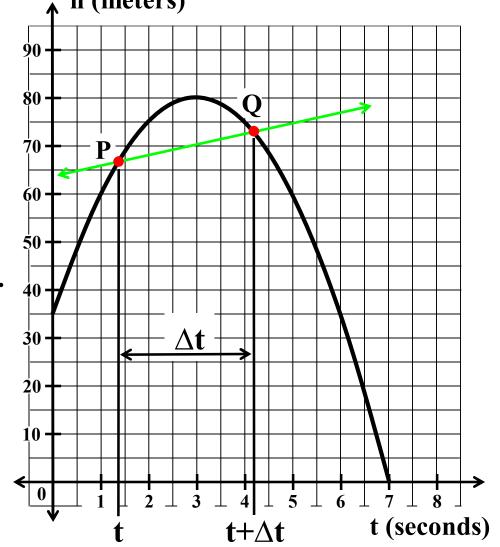
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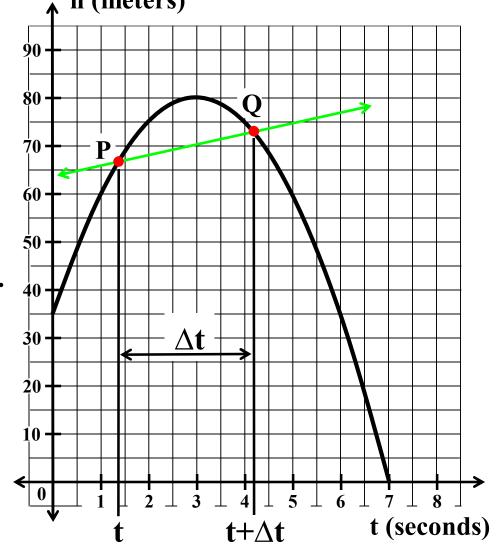
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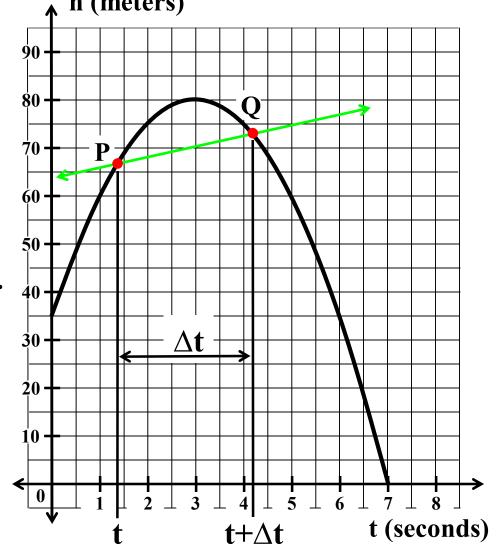
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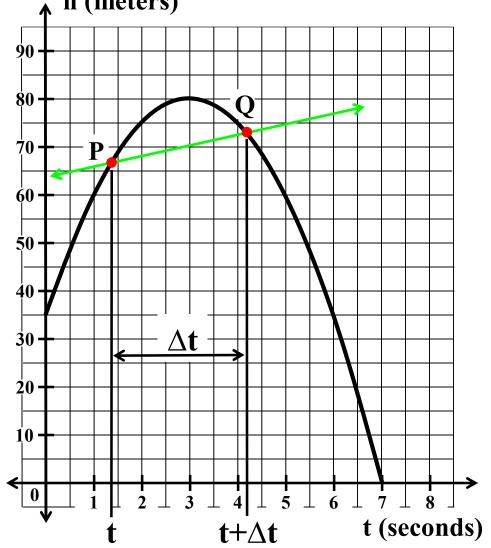
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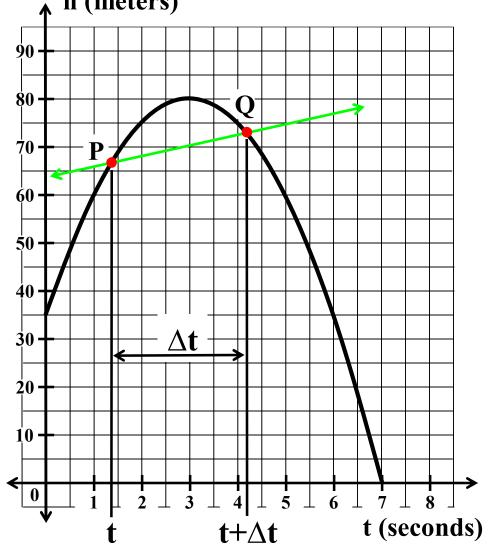
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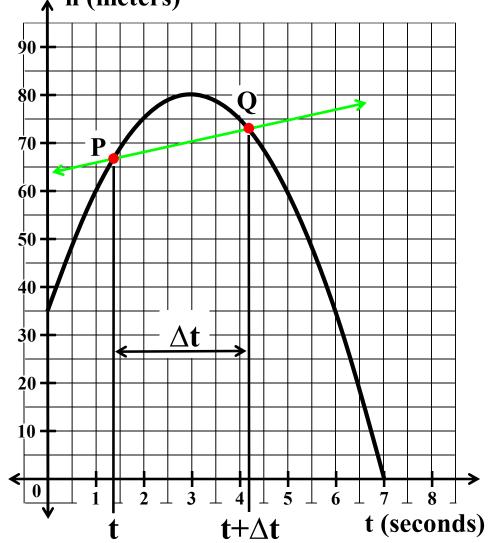
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This represents the <u>average velocity</u> of the ball over this time interval.



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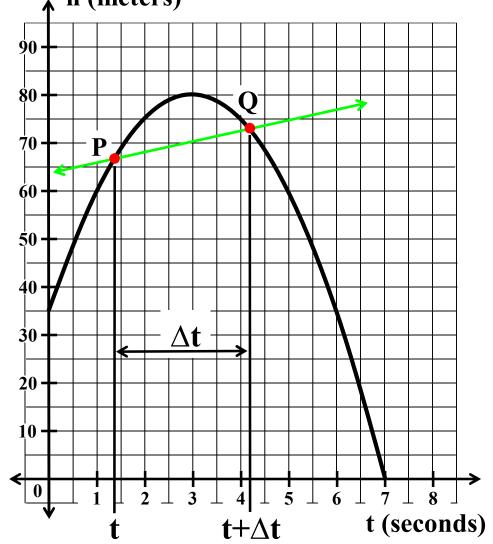
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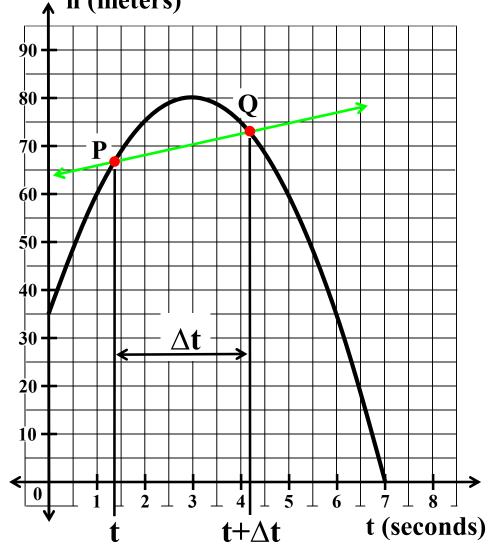
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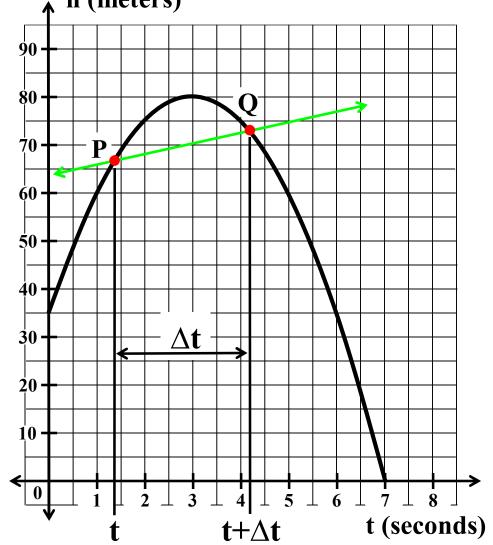
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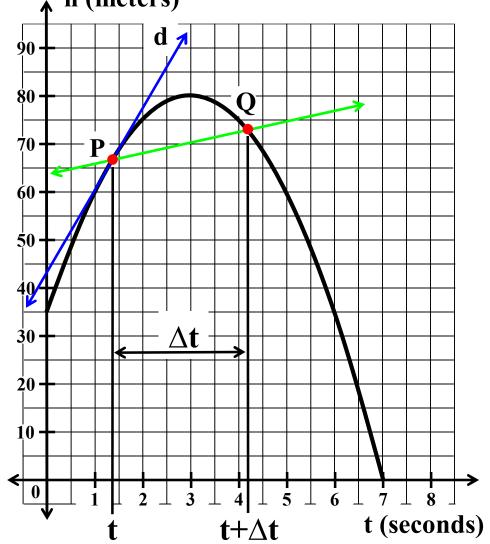
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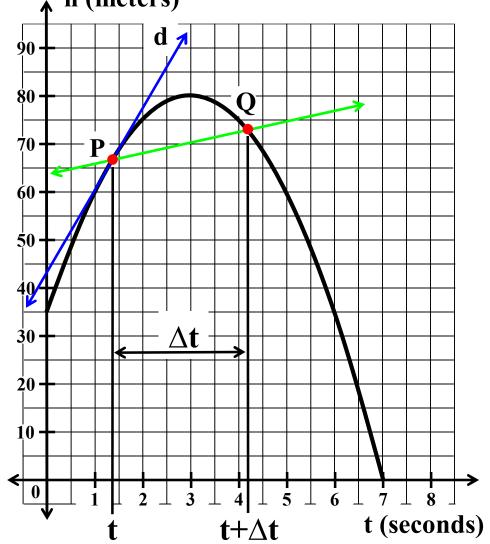
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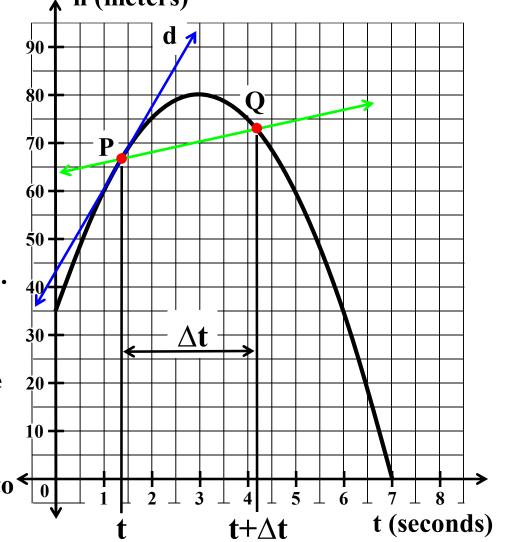
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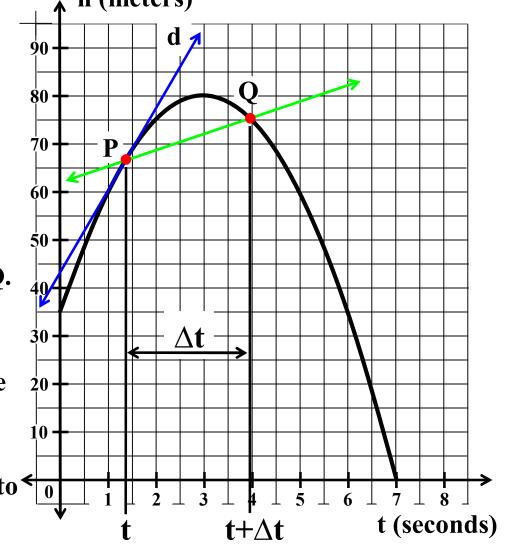
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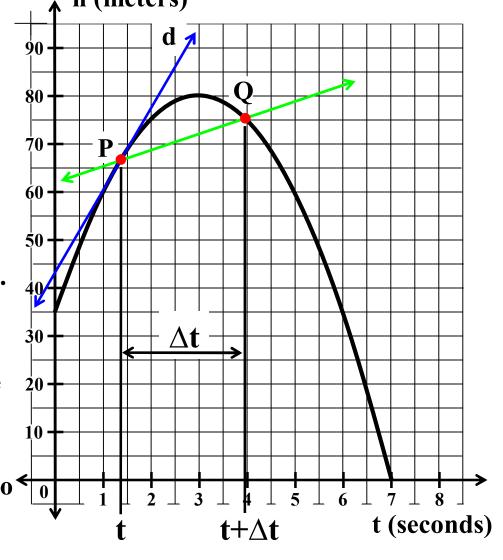
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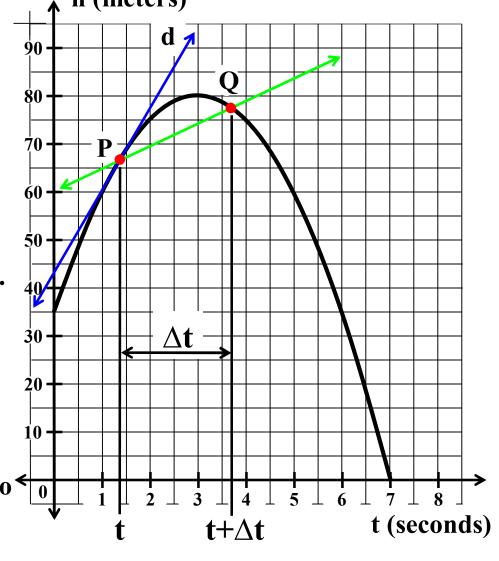
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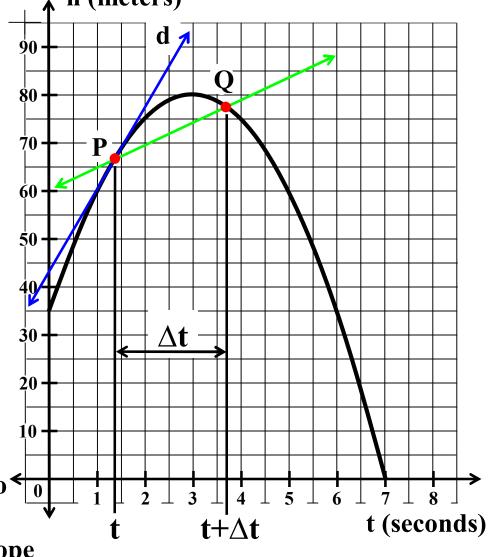
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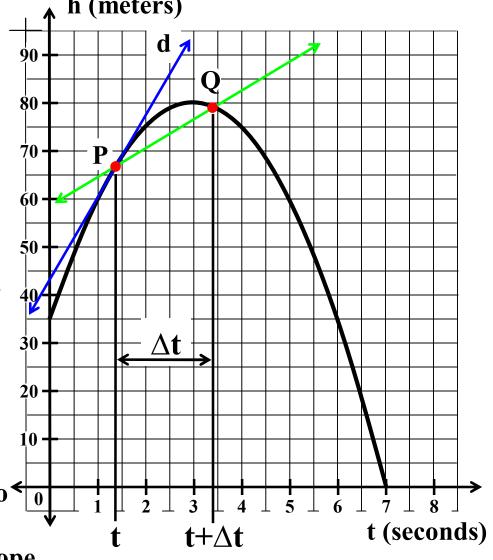
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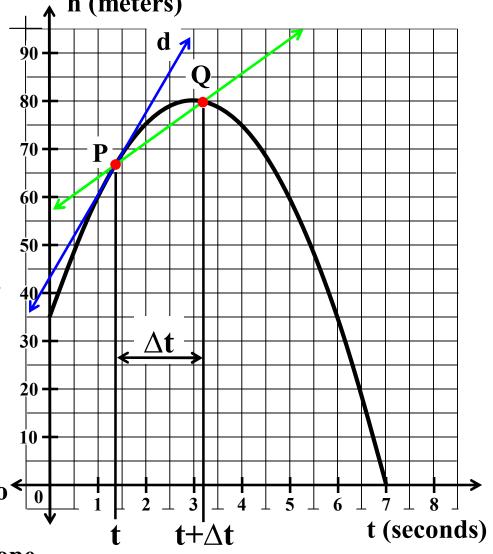
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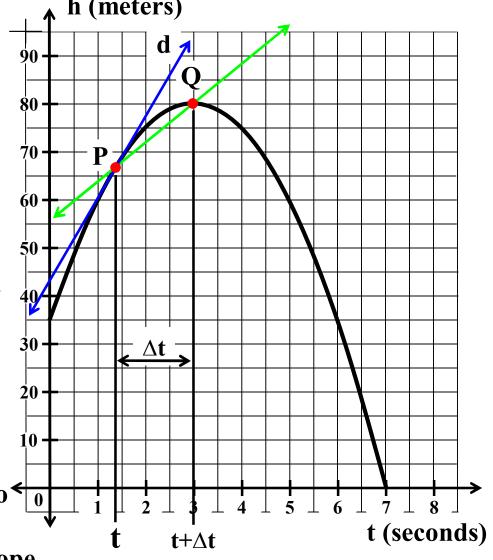
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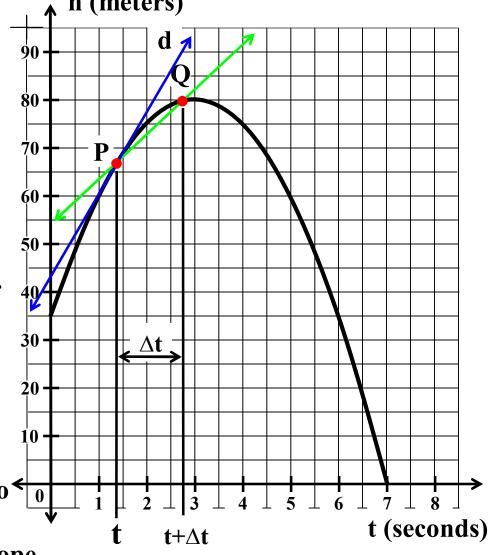
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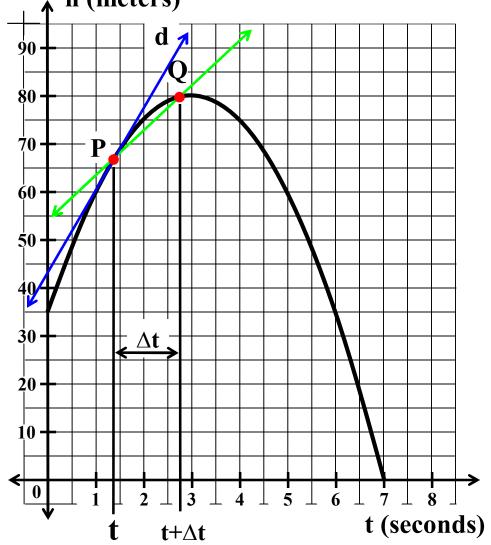
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Let P(t, f(t)) represent any point on the graph of h = f(t).

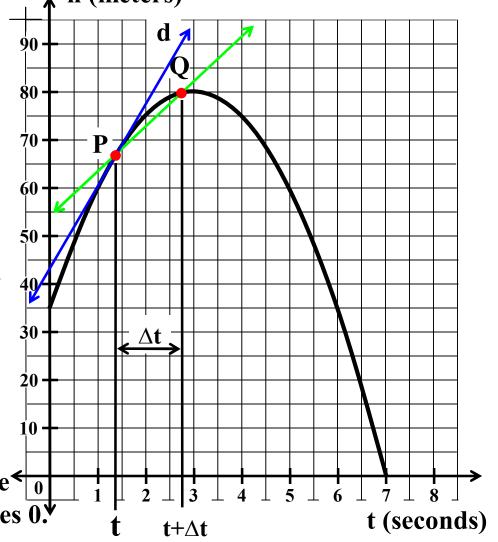
Let $Q(t + \Delta t, f(t + \Delta t))$ represent any other point on the graph of h = f(t).

We will represent the slope of line PQ.

$$\mathbf{V}_{avg} = \frac{\mathbf{f}(\mathbf{t} + \Delta \mathbf{t}) - \mathbf{f}(\mathbf{t})}{\Delta \mathbf{t}}$$

Line d is the line that is tangent to the graph at point P. The slope of line d is the <u>velocity of the ball at time t</u>.

The slope of line d is the limiting value ≤ 0 of the slope of line PQ as Δt approaches 0.



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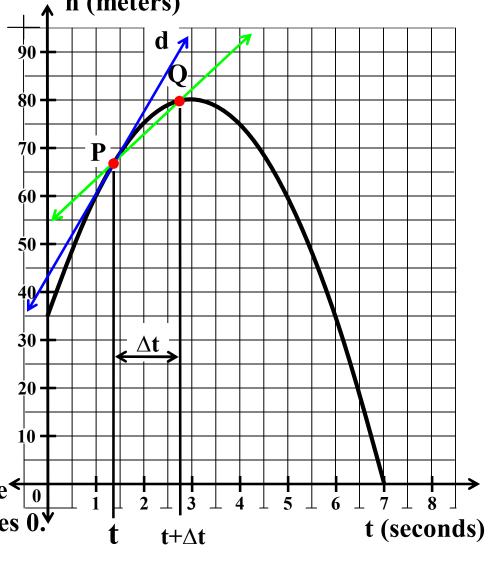
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Line d is the line that is tangent to the 2 graph at point P. The slope of line d is the <u>velocity of the ball at time t</u>. The slope of line d is the limiting value

of the slope of line PQ as
$$\Delta t$$
 approaches
Slope of d = $\lim_{\Delta t \to 0} \left[\frac{f(t + \Delta t) - f(t)}{\Delta t} \right]$



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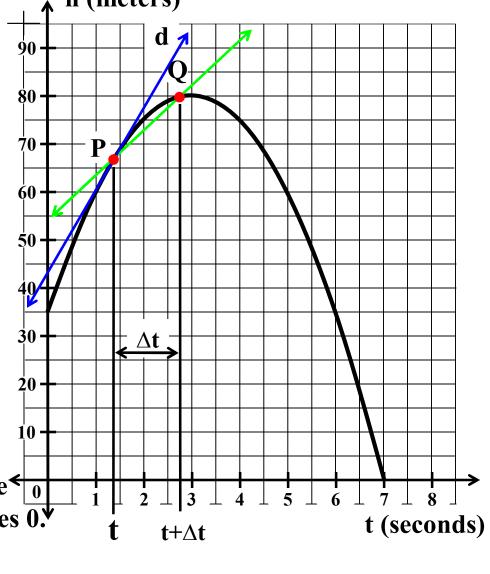
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$$\lim_{\Delta t \to 0} \left[\frac{f(t + \Delta t) - f(t)}{\Delta t} \right]$$



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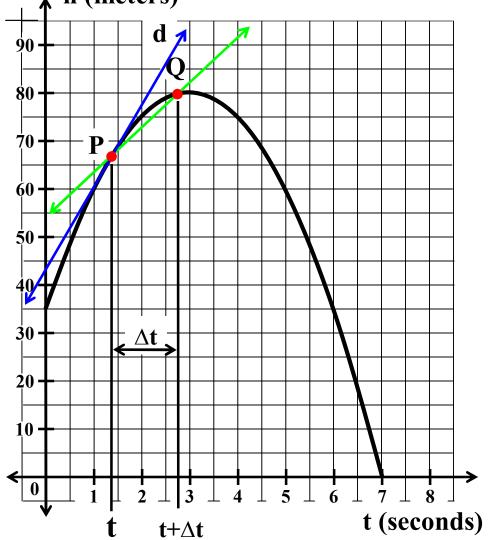
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$$\mathbf{V} = \underset{\Delta t \to \mathbf{0}}{\text{Lim}} \left[\frac{\mathbf{f}(\mathbf{t} + \Delta \mathbf{t}) - \mathbf{f}(\mathbf{t})}{\Delta \mathbf{t}} \right]$$



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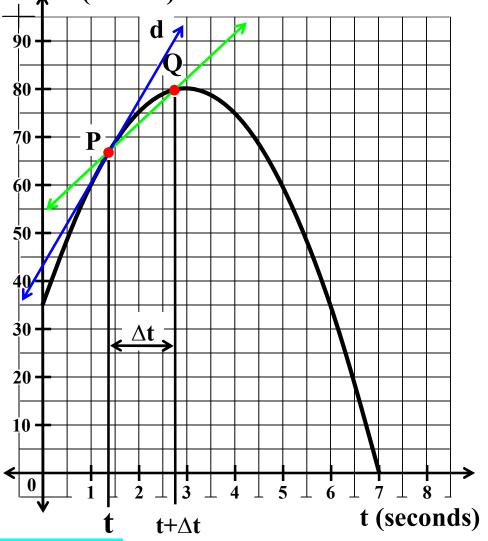
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$$\mathbf{V} = \underset{\Delta t \to \mathbf{0}}{\text{Lim}} \left[\frac{\mathbf{f}(\mathbf{t} + \Delta \mathbf{t}) - \mathbf{f}(\mathbf{t})}{\Delta \mathbf{t}} \right]$$



This, of course, is the derivative of function f !!!

A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

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 $\mathbf{V} =$

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V = f'(t) =

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t

A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t +

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0		
1		
2		
3		
4		
5		
6		
7		

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
→ 0		
1		
2		
3		
4		
5		
6		
7		

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V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
→ 0	35	
1		
2		
3		
4		
5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
→ 1		
2		
3		
4		
5		
6		
7		

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
→ 1	60	
2		
3		
4		
5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
→ 2		
3		
4		
5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
→ 2	75	
3		
4		
5		
6		
7		

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V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
→ 3		
4		
5		
6		
7		

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1. Express the velocity of the ball as a function of t.

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
→ 3	80	
4		
5		
6		
7		

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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	<mark>60</mark>	
2	75	
3	<mark>80</mark>	
→ 4		
5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	<mark>80</mark>	
→ 4	75	
5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
→ 5		
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
→ 5	60	
6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
→ 6		
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
→ 6	35	
7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
→ 7		

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
→ 7	0	

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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

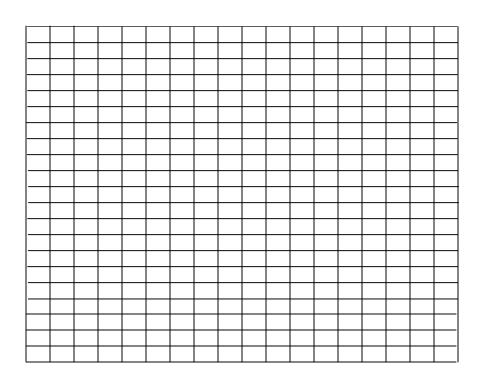
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V = f'(t) = -10t + 30

3. Graph function f below.

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



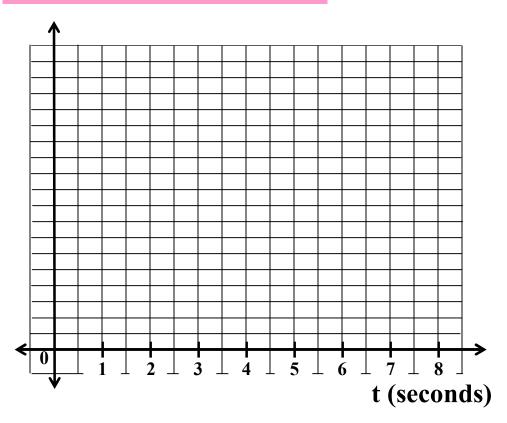
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V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	





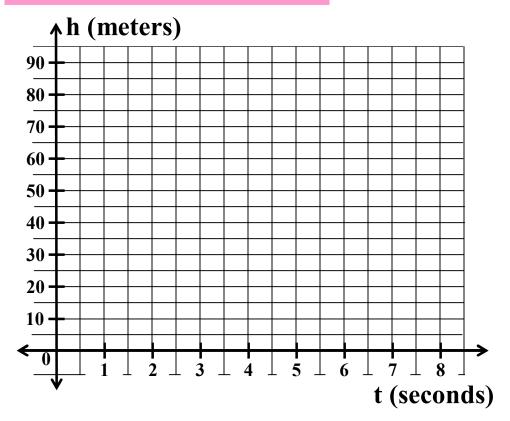
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1. Express the velocity of the ball as a function of t.

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2. Fill out the table below.

f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60



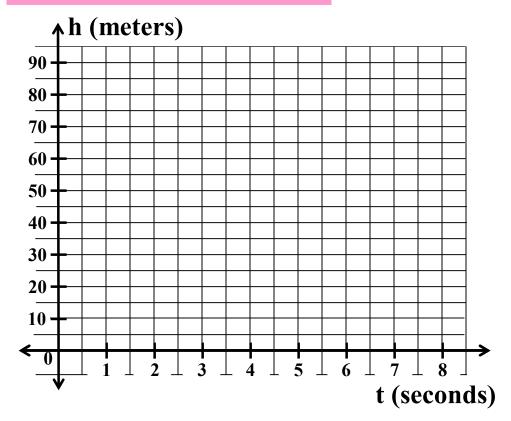
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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



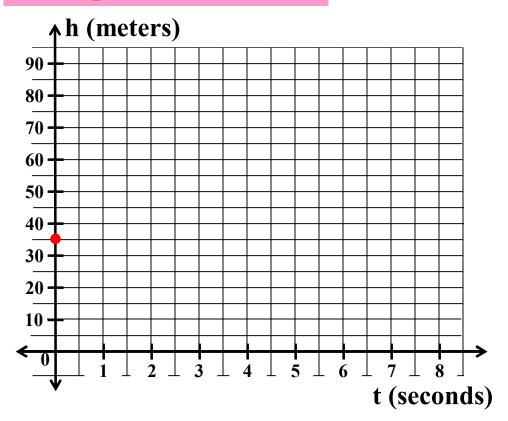
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f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	35 60 75 80 75 60



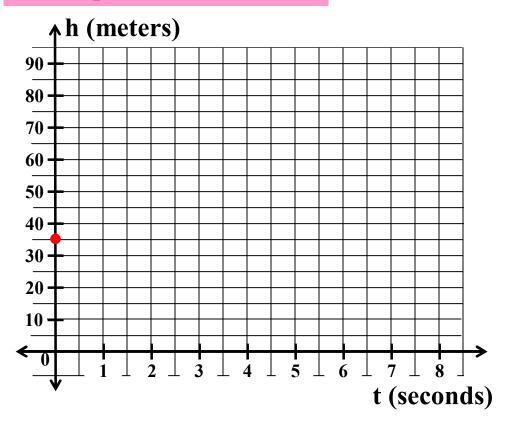
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f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60



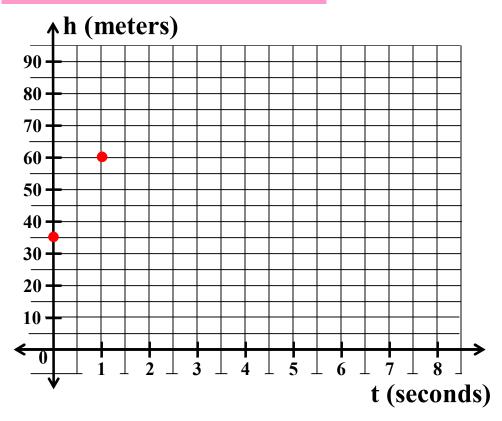
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0 35	
1 60	
2 75	
3 80	
4 75	
5 60	
6 35	
7 0	





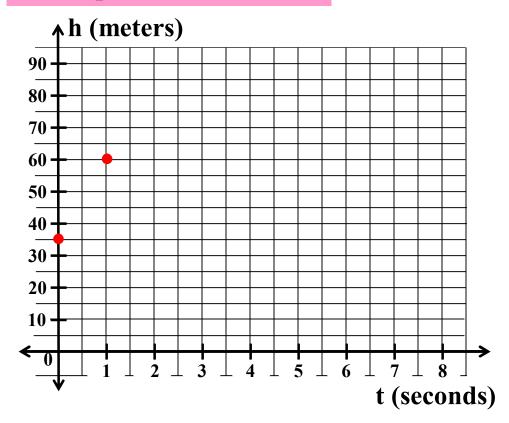
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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



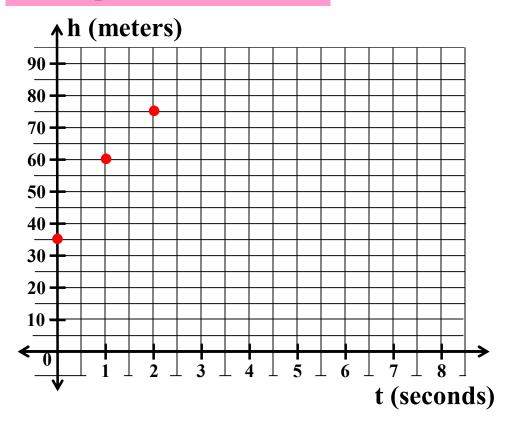
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V = f'(t) = -10t + 30

2. Fill out the table below.

5
5
)
5
)
5



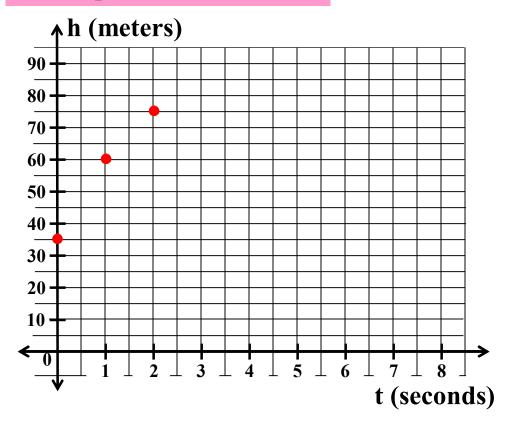
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f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60



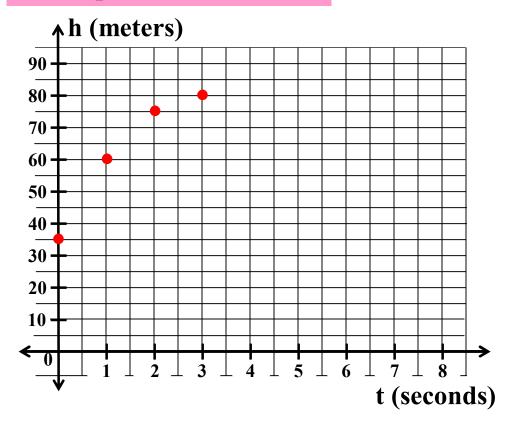
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2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	
	•	



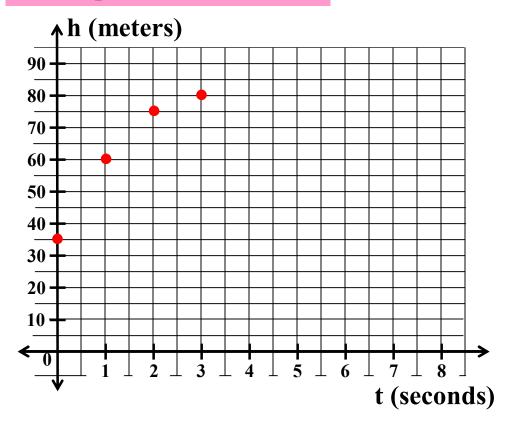
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2. Fill out the table below.

f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60



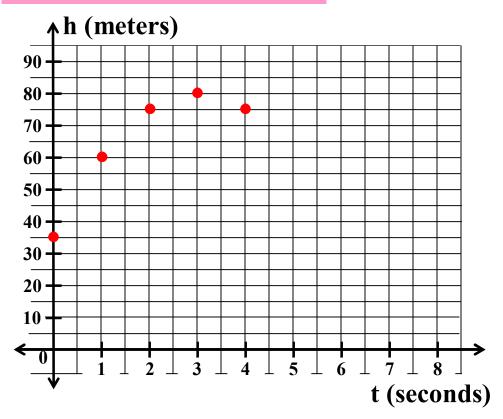
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V = f'(t) = -10t + 30

meters	meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	60 75 80 75 60





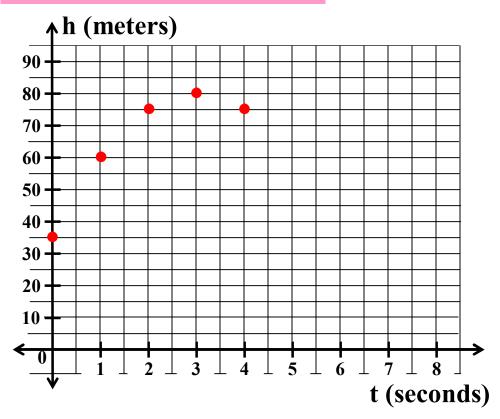
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f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60





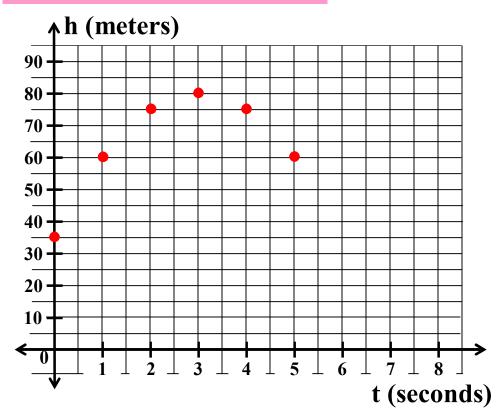
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35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60





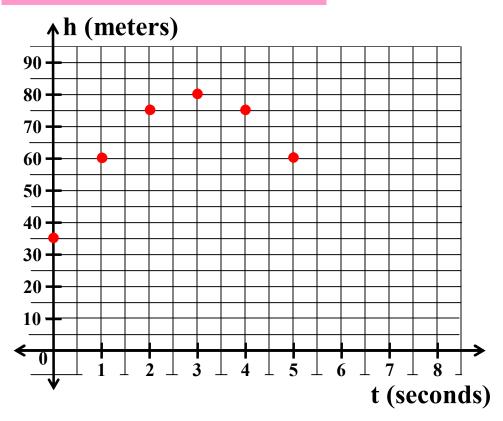
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t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	





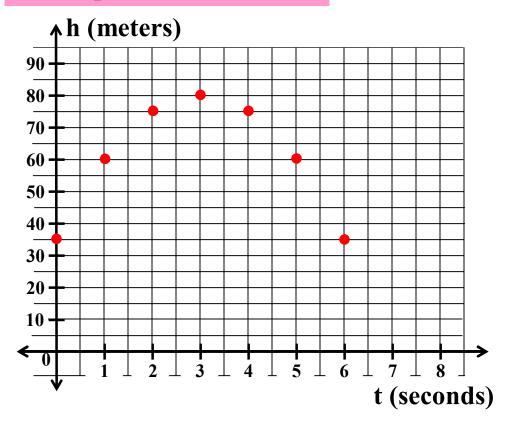
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60



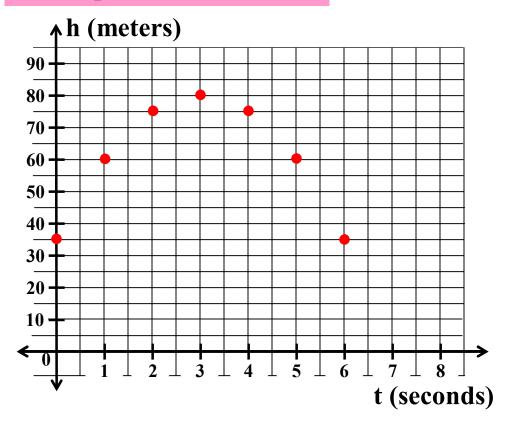
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

3. Graph function f below.



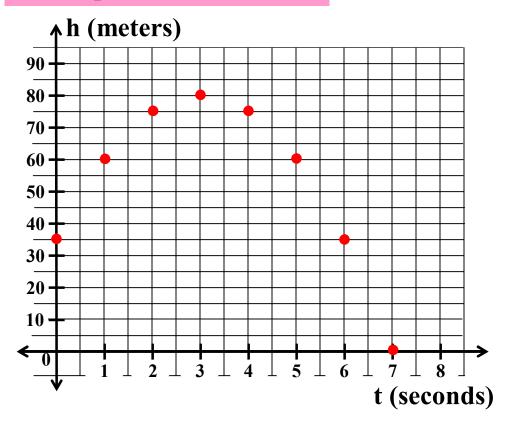
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

3. Graph function f below.



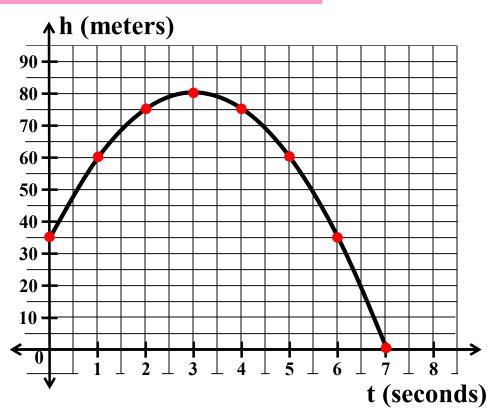
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

f(t) meters	f '(t) meters per second
35	
60	
75	
80	
75	
60	
35	
0	
	meters 35 60 75 80 75 60





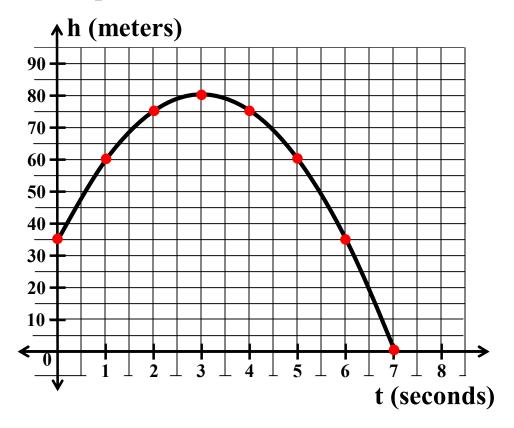
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

f(t) f '(t) t seconds meters per second meters 0 35 **60** 1 2 75 3 80 75 4 5 60 35 6 0 7

2. Fill out the table below.

V = f'(t) = -10t + 30



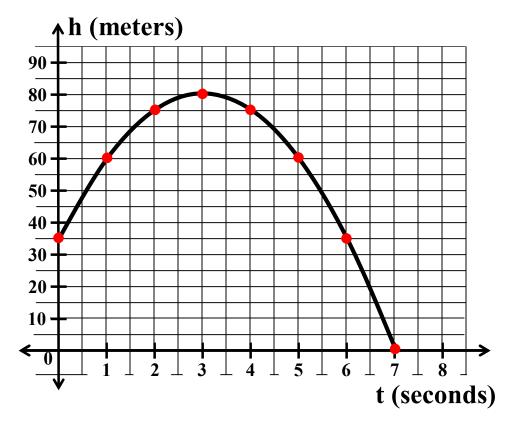
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
→ 0	35	
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



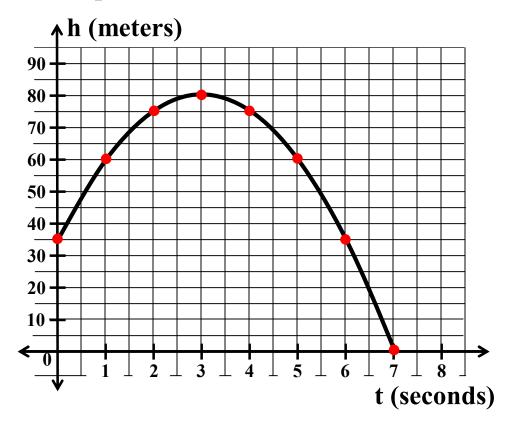
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
→ 0	35	30
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



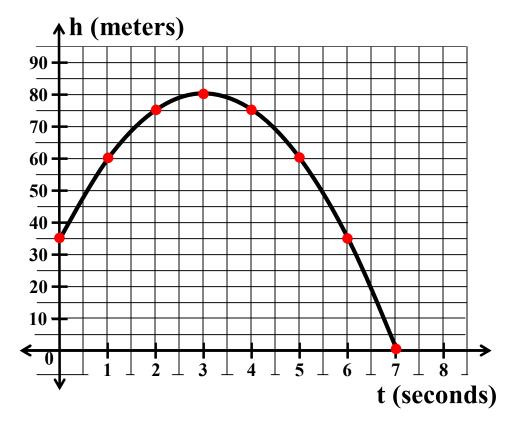
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



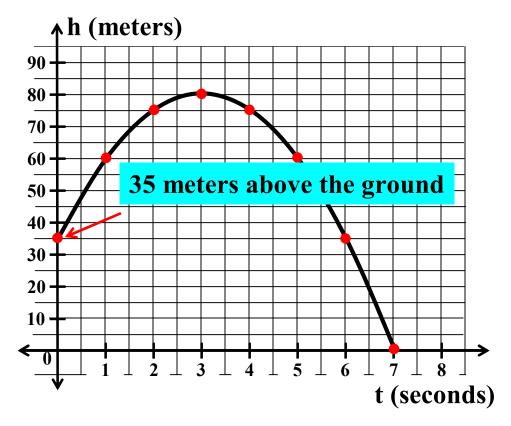
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	



A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below. **3.** Graph function f below. f '(t) **f(t)** t **∧**h (meters) seconds meters meters per second 90 0 35 30 🔸 80 **60** 1 70 moving up at 30 meters per second 60 2 75 35 meters above the ground 50 3 80 **40** 75 4 30 5 60 $20 \cdot$ 10 -35 6 0 5 7 0 t (seconds)

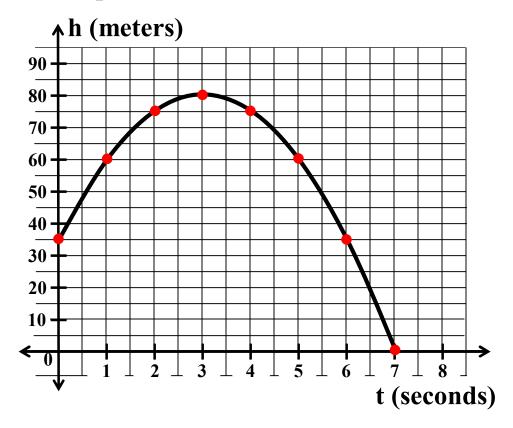
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	30
→ 1	60	
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

3. Graph function f below.



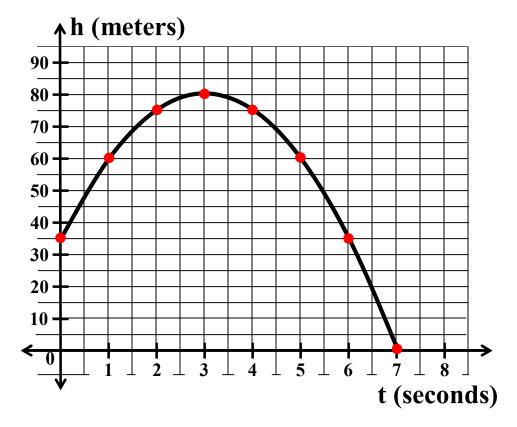
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

t seconds	f(t) meters	f '(t) meters per second
0	35	30
→ 1	60	20
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

3. Graph function f below.



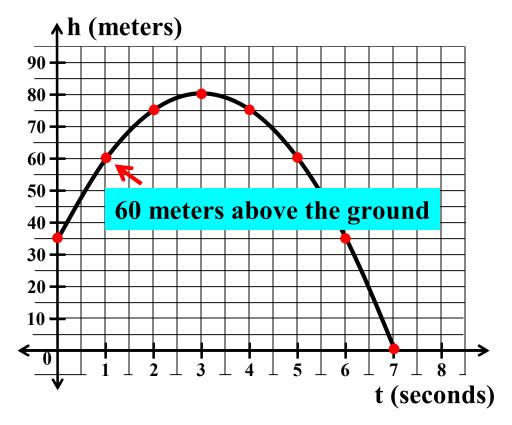
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
→ 1	60	20
2	75	
3	80	
4	75	
5	60	
6	35	
7	0	

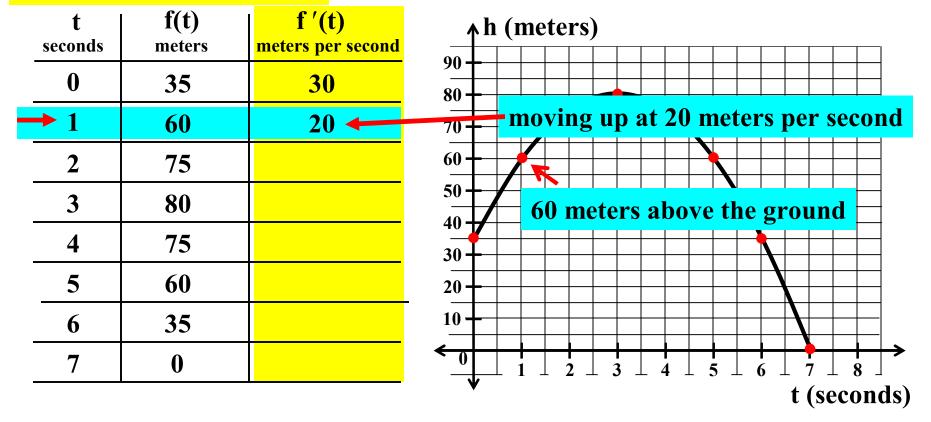


A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.



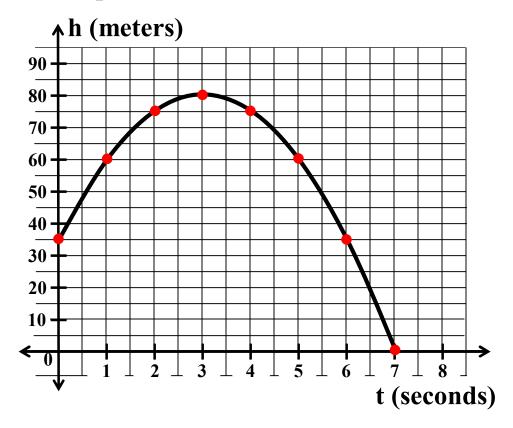
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
▶ 2	75	
 3	80	
 4	75	
5	60	
6	35	
7	0	



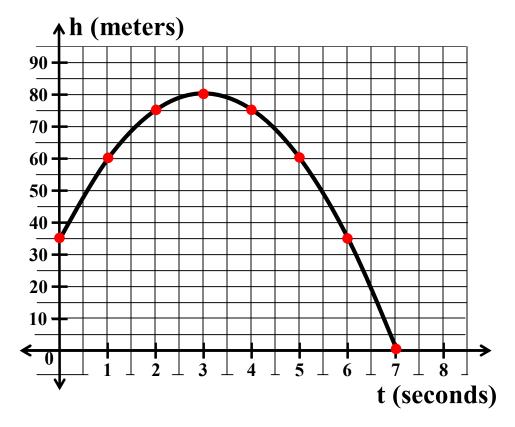
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

S	t econds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
-	2	75	10
	3	80	
	4	75	
	5	60	
	6	35	
	7	0	



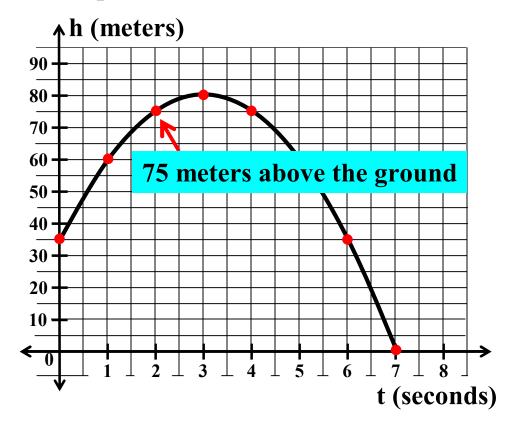
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

sec	t onds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
	2	75	10
	3	80	
	4	75	
	5	60	
	6	35	
	7	0	

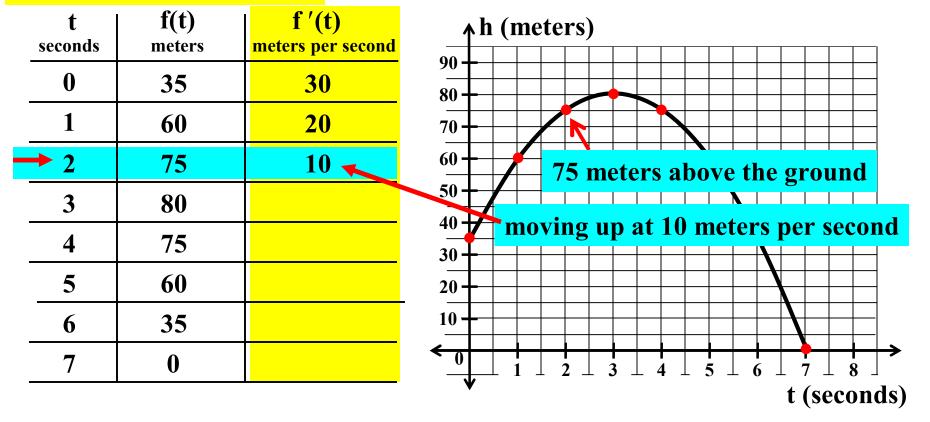


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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.



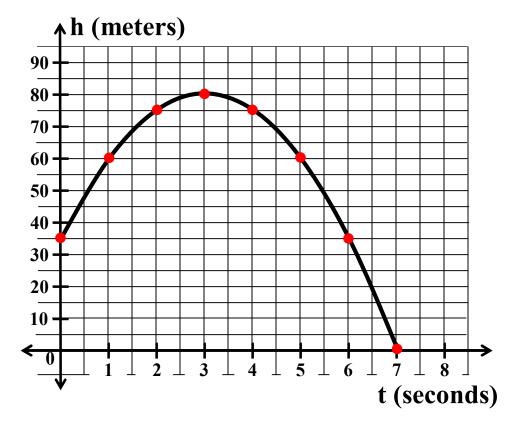
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

	t seconds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
	2	75	10
	→ 3	80	
	4	75	
_	5	60	
_	6	35	
-	7	0	



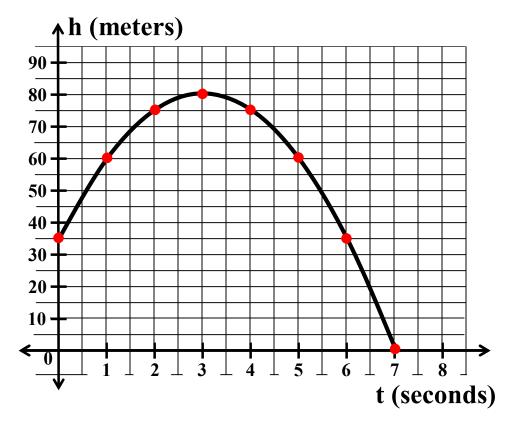
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
→ 3	80	0
4	75	
5	60	
6	35	
7	0	



A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

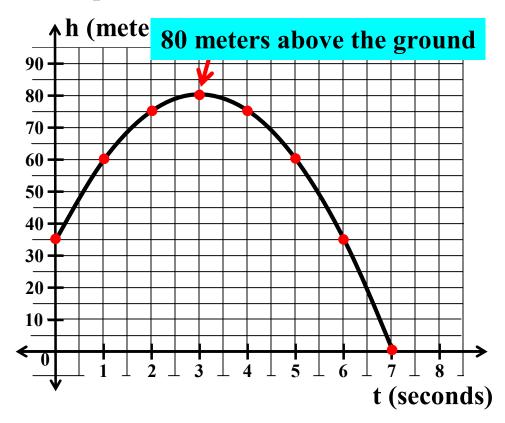
1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
→ 3	80	0
4	75	
5	60	
6	35	
7	0	

3. Graph function f below.

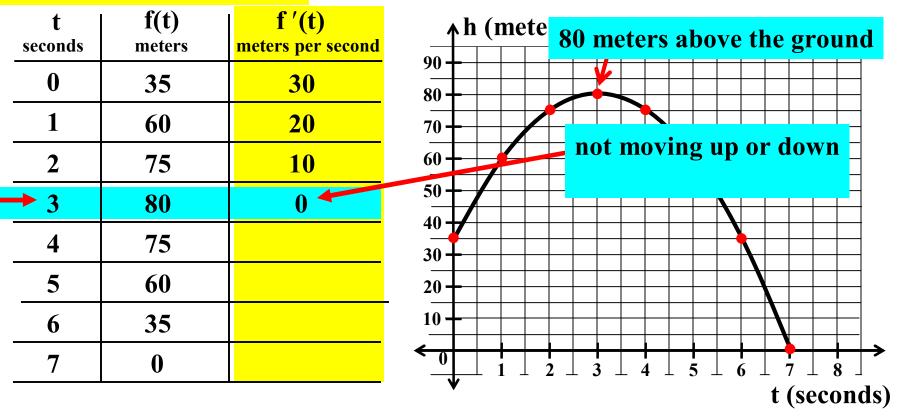


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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

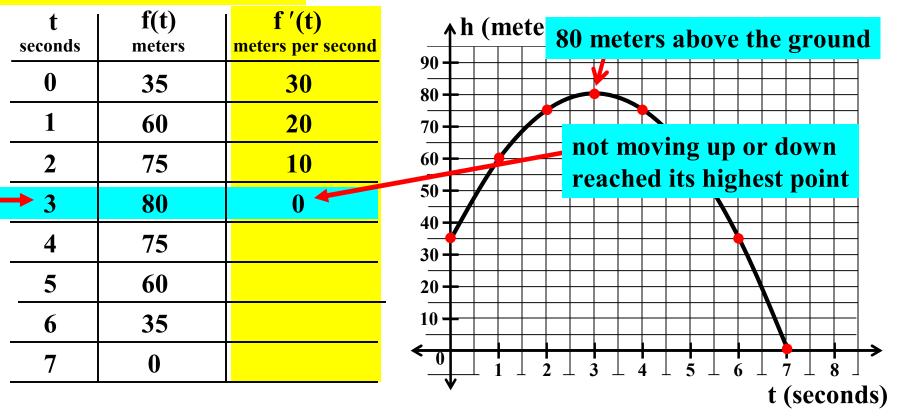


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V = f'(t) = -10t + 30

2. Fill out the table below.



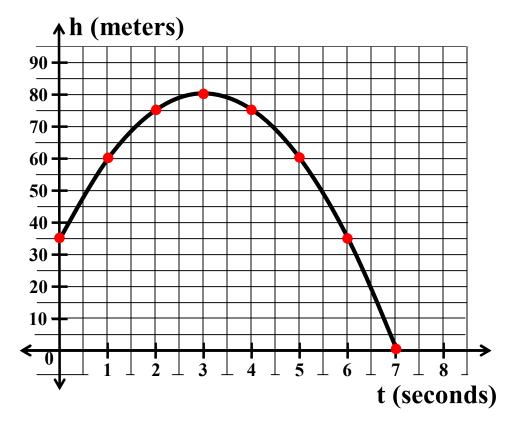
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
→ 4	75	
5	60	
6	35	
7	0	



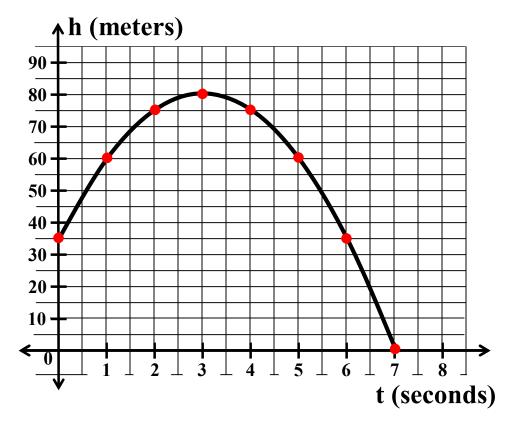
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

	t seconds	f(t) meters	f '(t) meters per second
	0	35	30
-	1	60	20
-	2	75	10
	3	80	0
	→ 4	75	-10
-	5	60	
-	6	35	
	7	0	



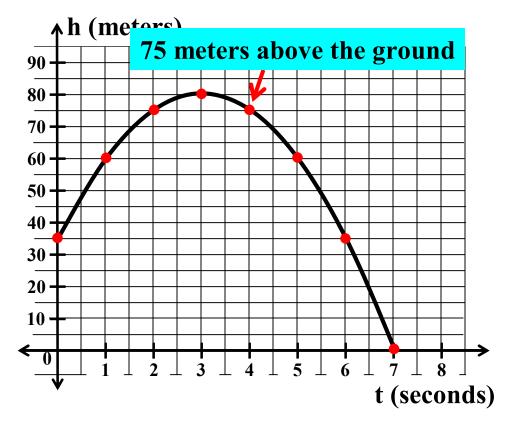
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t secon	ds f(t)	
0	35	30
1	60	20
2	75	10
3	80	0
→ 4	75	-10
5	60	
6	35	
7	0	

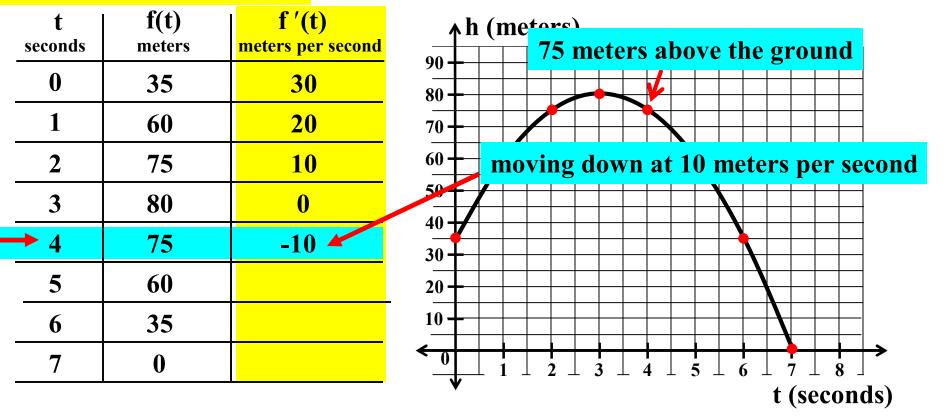


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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.



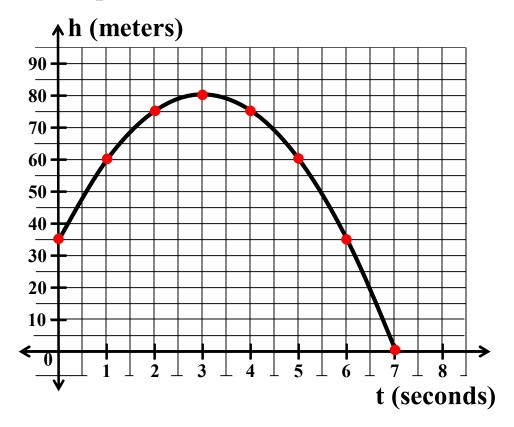
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

	t seconds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
	2	75	10
	3	80	0
	4	75	-10
	→ 5	60	
	6	35	
,	7	0	



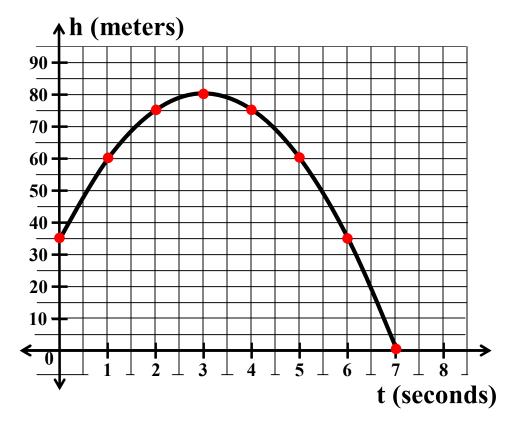
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

	t seconds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
	2	75	10
	3	80	0
	4	75	-10
	→ 5	60	-20
	6	35	
,	7	0	



A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

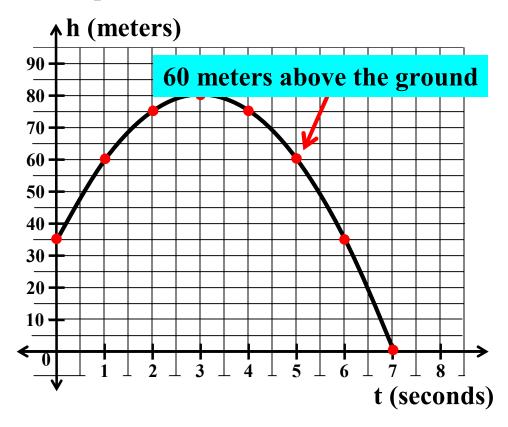
1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
→ 5	60	-20
6	35	
7	0	

3. Graph function f below.

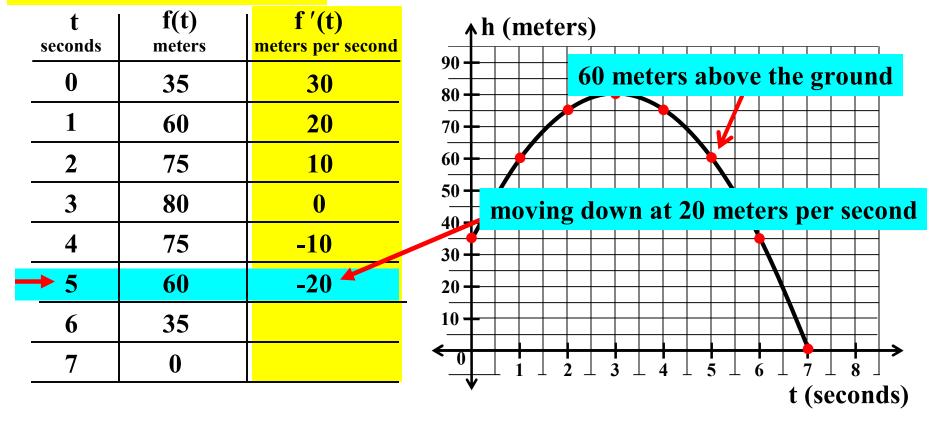


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V = f'(t) = -10t + 30

2. Fill out the table below.



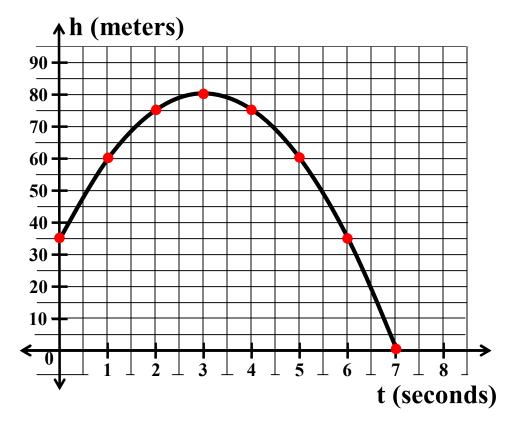
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
→ 6	35	
7	0	



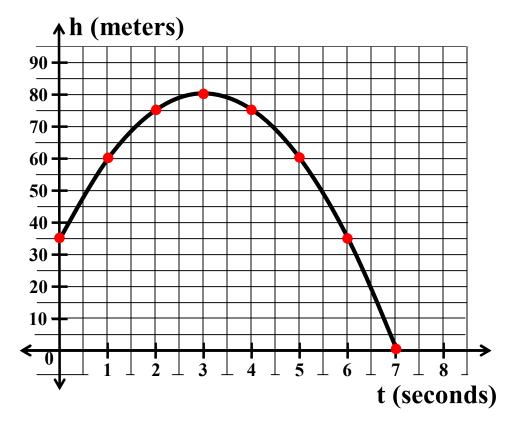
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t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
▶ 6	35	-30
7	0	



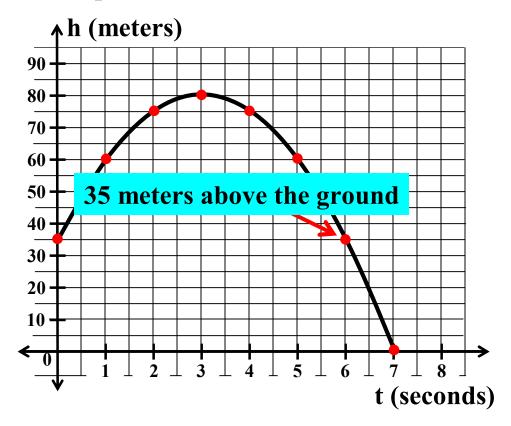
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2. Fill out the table below.

	t seconds	f(t) meters	f '(t) meters per second
	0	35	30
	1	60	20
-	2	75	10
-	3	80	0
_	4	75	-10
_	5	60	-20
	• 6	35	-30
	7	0	

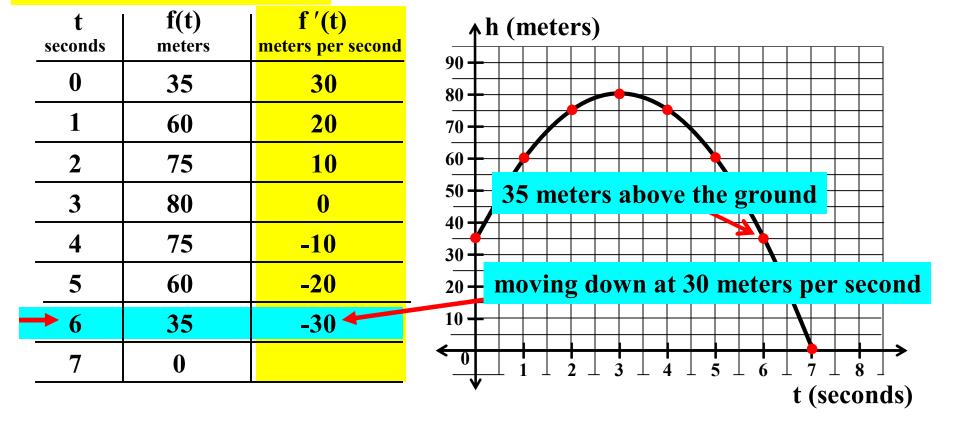


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V = f'(t) = -10t + 30

2. Fill out the table below.



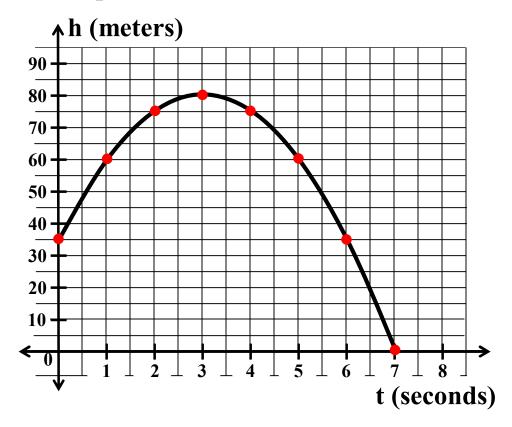
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
6	35	-30
→ 7	0	



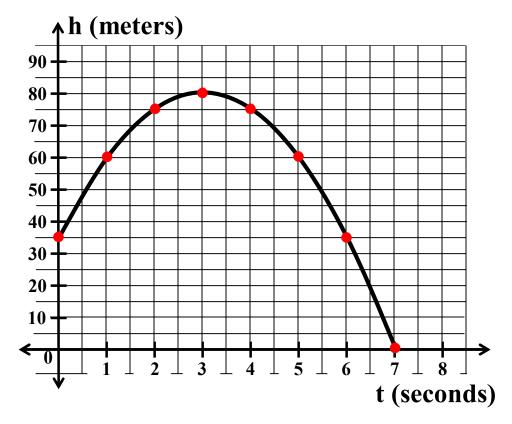
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1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t	f(t)	f '(t)
seconds	meters	meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
6	35	-30
→ 7	0	-40



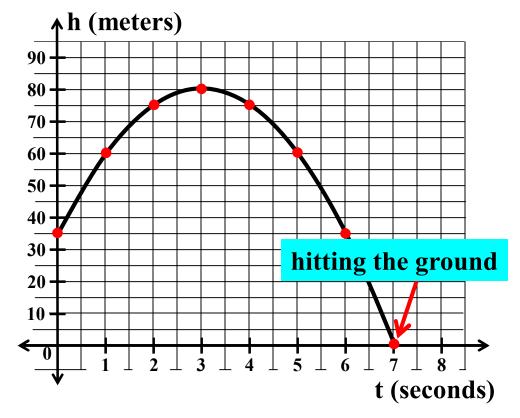
A steel ball is propelled upward in such a way that its height, h, in meters, above the ground after t seconds is given by the function $h = f(t) = -5t^2 + 30t + 35$.

1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
6	35	-30
→ 7	0	-40

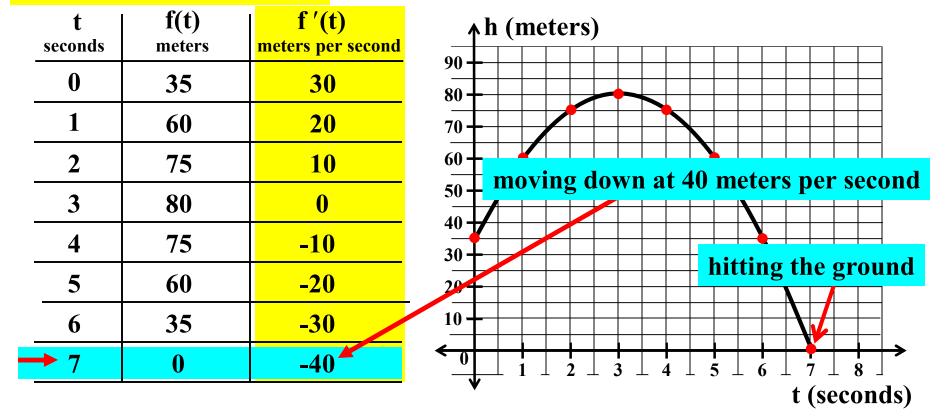


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1. Express the velocity of the ball as a function of t.

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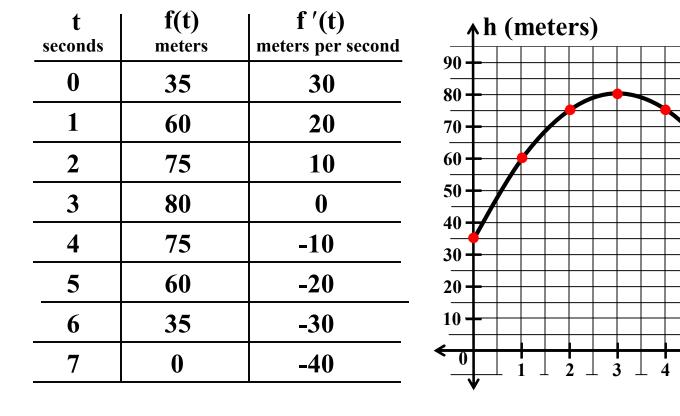
1. Express the velocity of the ball as a function of t.

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.

t (seconds)



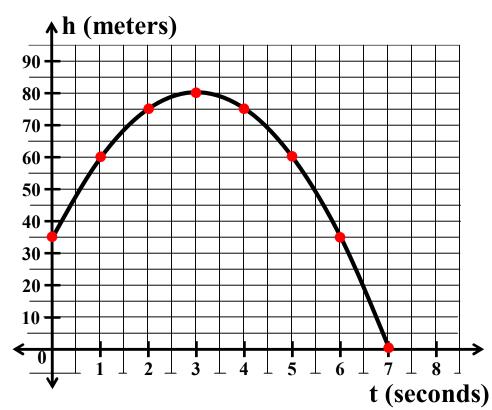
$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.



t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
6	35	-30
7	0	-40

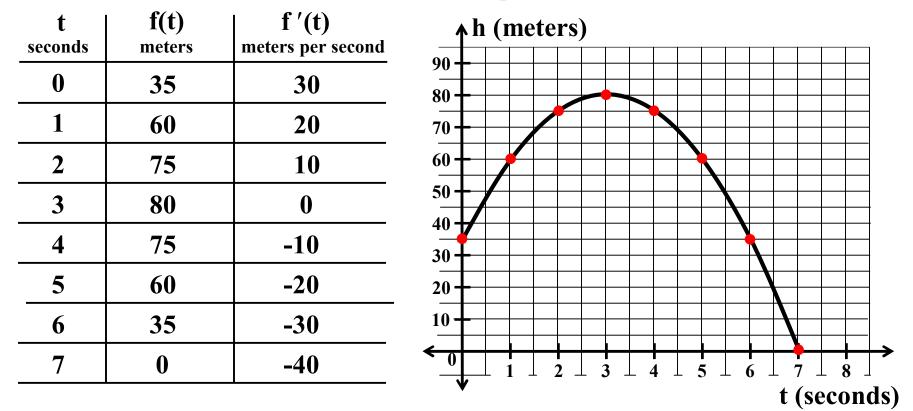


$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



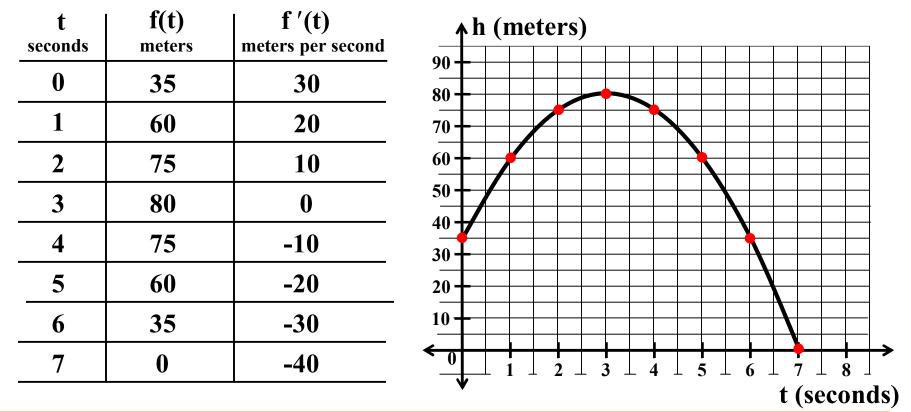
- 4. How high above the ground is the ball after 2 seconds?
- 5. What is the velocity of the ball after 2 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



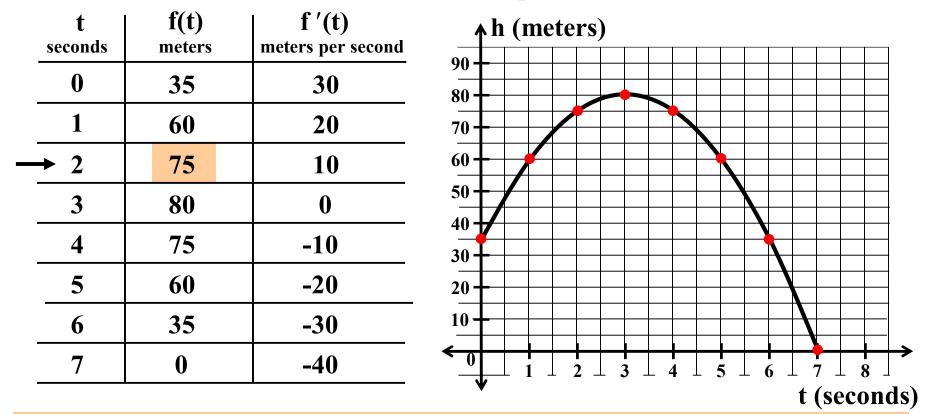
4. How high above the ground is the ball after 2 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.

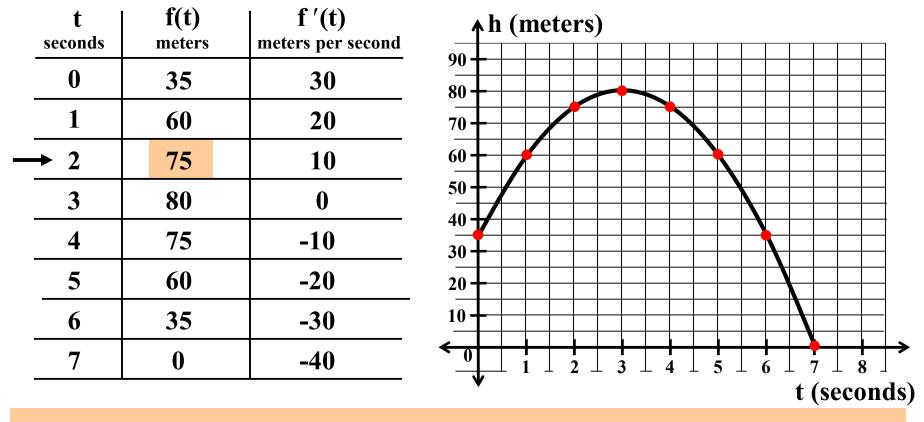


4. How high above the ground is the ball after 2 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.



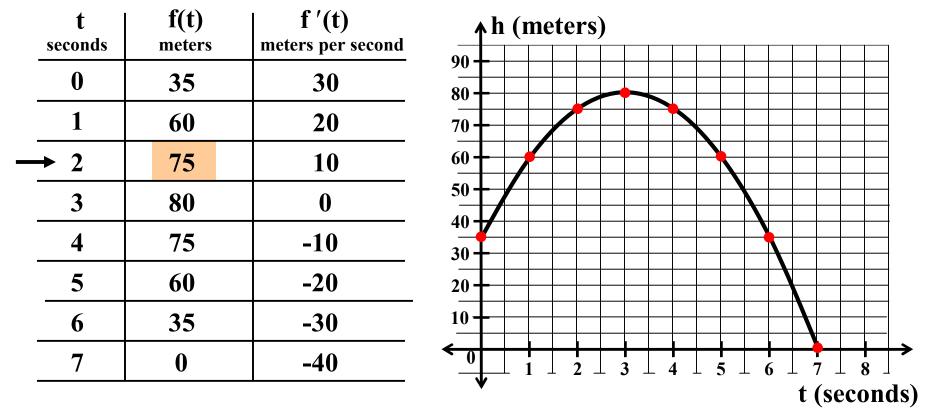
- 4. How high above the ground is the ball after 2 seconds? <u>75 meters</u>
- 5. What is the velocity of the ball after 2 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





4. How high above the ground is the ball after 2 seconds? <u>75</u>

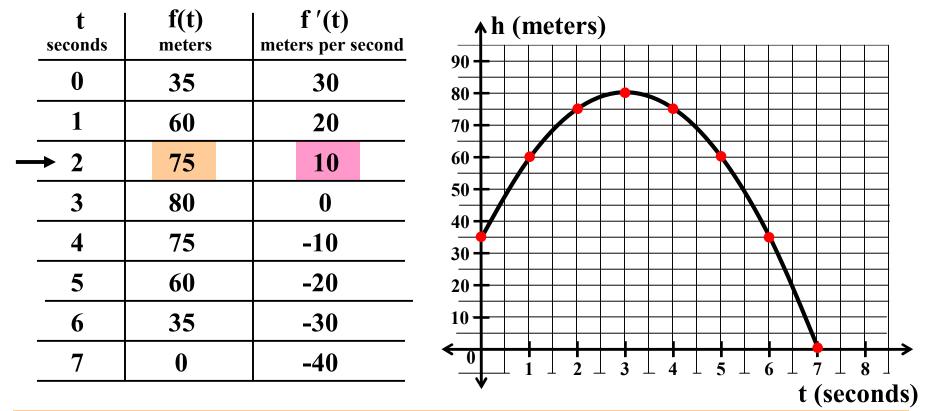
75 meters

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





4. How high above the ground is the ball after 2 seconds? <u>75</u>

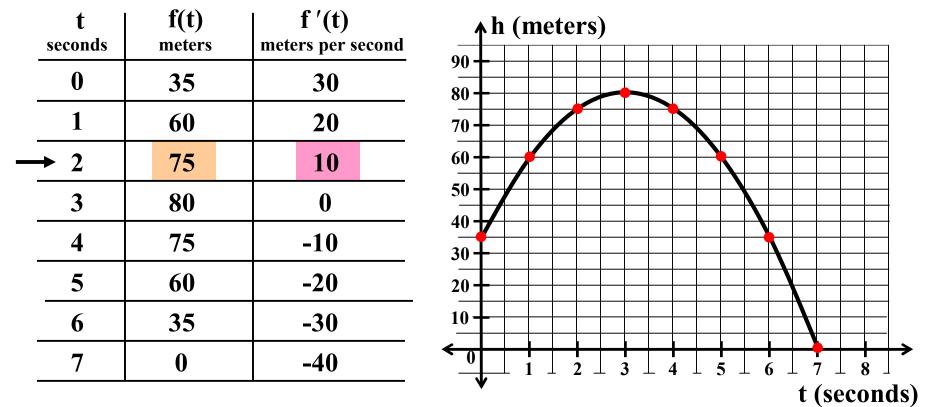
75 meters

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





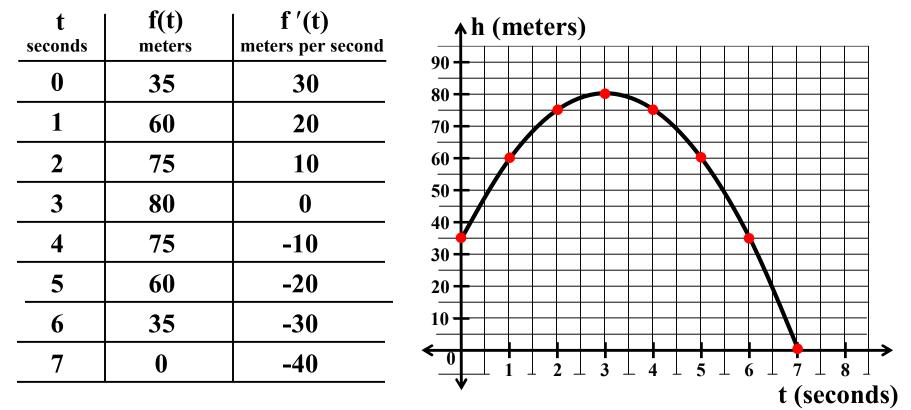
4. How high above the ground is the ball after 2 seconds? <u>75 meters</u>

5. What is the velocity of the ball after 2 seconds? <u>moving up at 10 mps.</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.



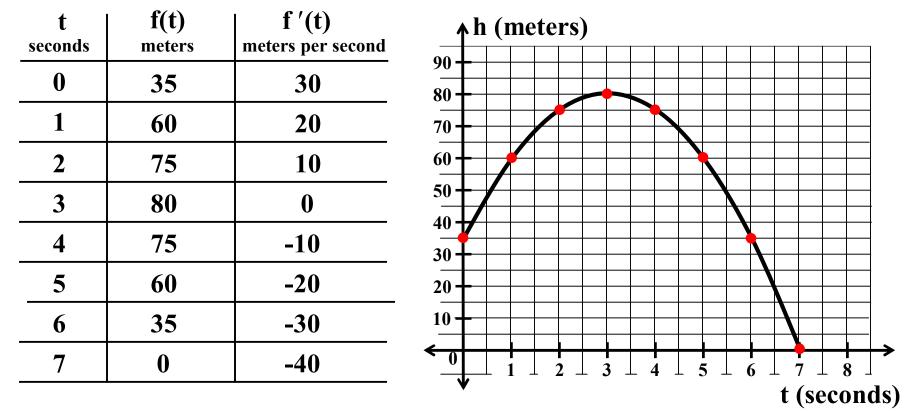
- 4. How high above the ground is the ball after 2 seconds? <u>75 meters</u>
- 5. What is the velocity of the ball after 2 seconds? <u>moving up at 10 mps.</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



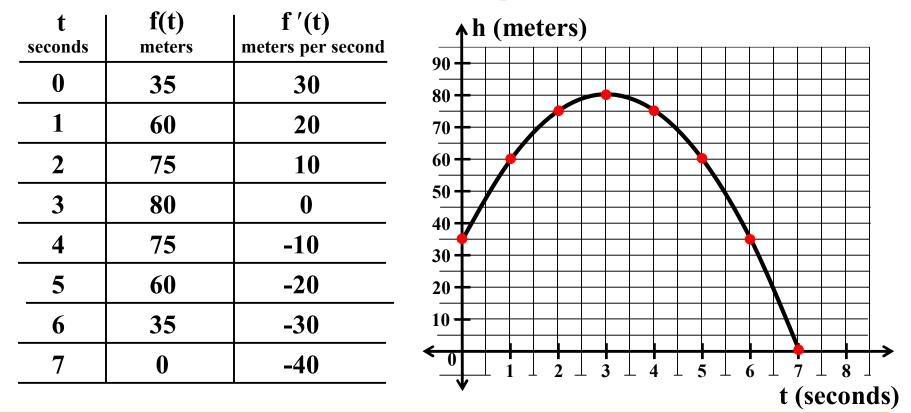
6. How high above the ground is the ball after 5 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



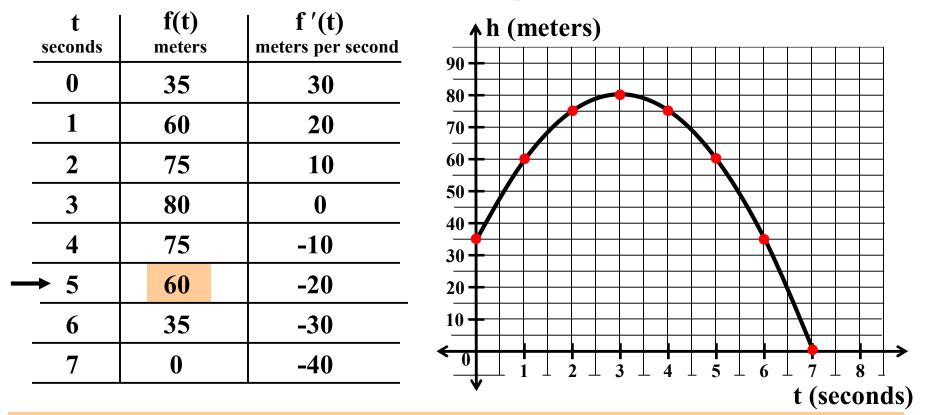
6. How high above the ground is the ball after 5 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



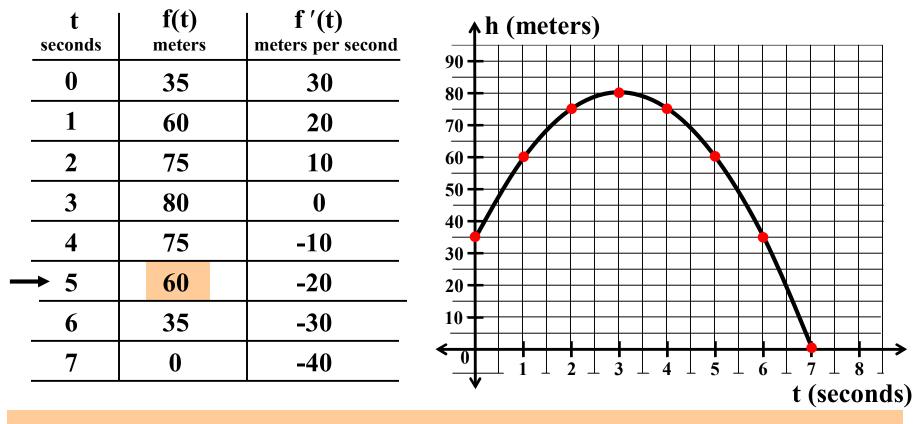
6. How high above the ground is the ball after 5 seconds?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





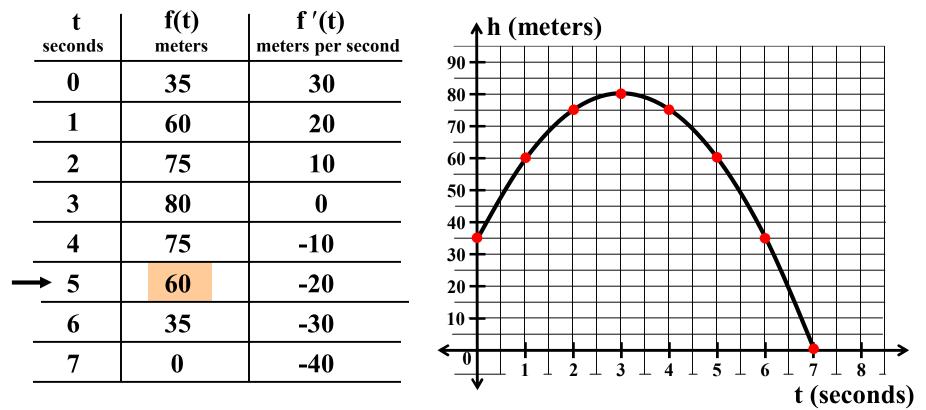
6. How high above the ground is the ball after 5 seconds? <u>60 meters</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



6. How high above the ground is the ball after 5 seconds?

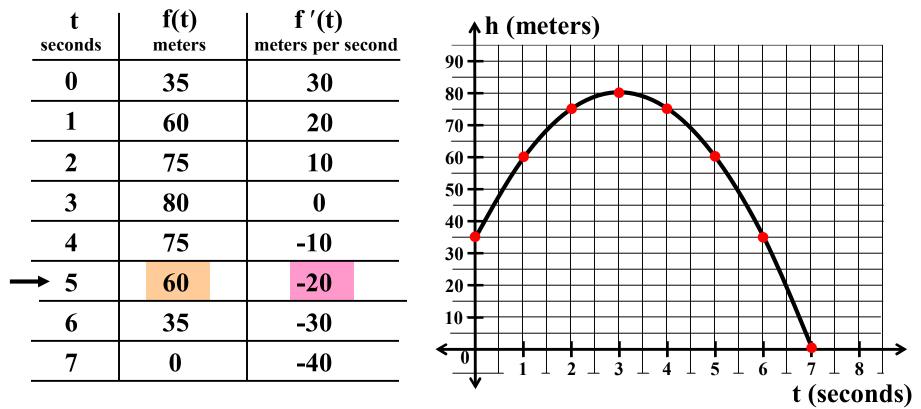
<u>60 meters</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





6. How high above the ground is the ball after 5 seconds?

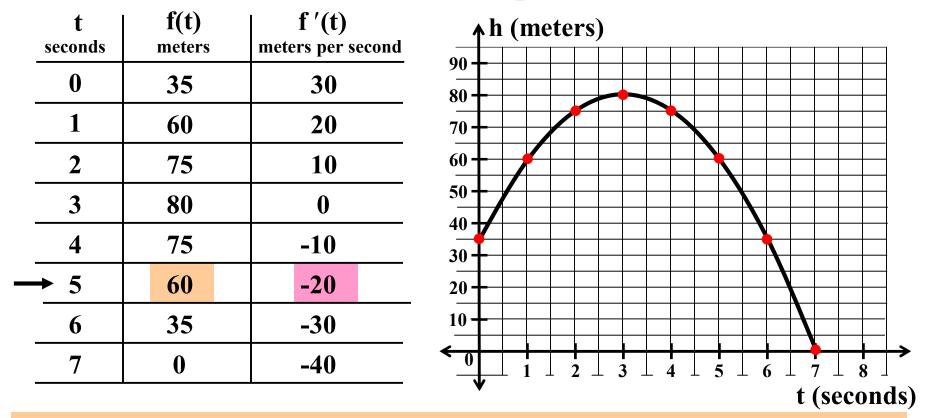
<u>60 meters</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



6. How high above the ground is the ball after 5 seconds? <u>60 meters</u>

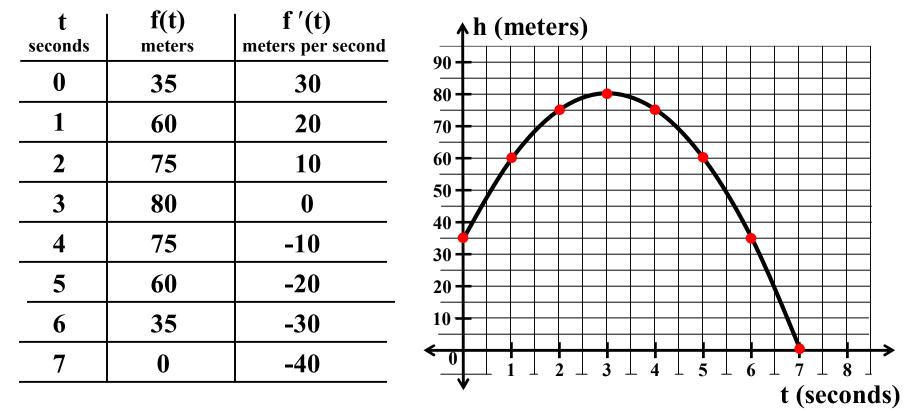
7. What is the velocity of the ball after 5 seconds? moving down at 20 mps.

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



6. How high above the ground is the ball after 5 seconds? <u>60 meters</u>

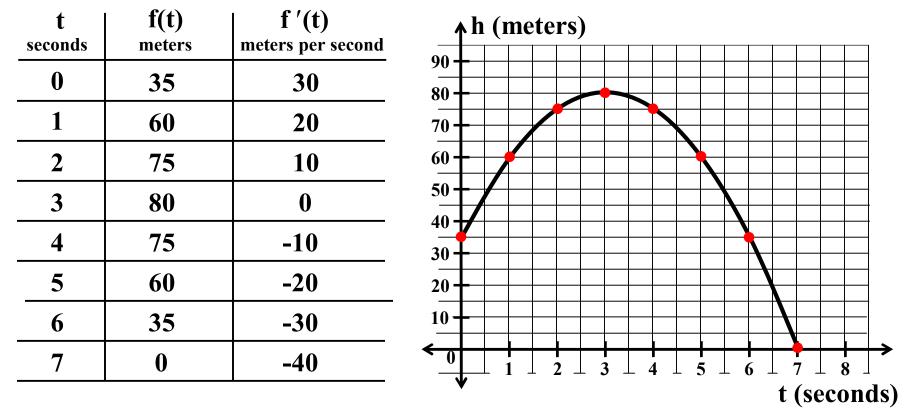
7. What is the velocity of the ball after 5 seconds? <u>moving down at 20 mps.</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





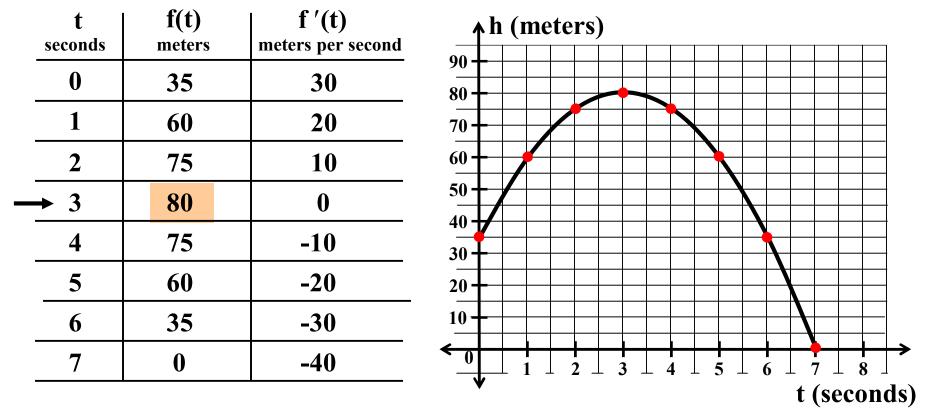
8. What is the maximum height of the ball in its flight?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





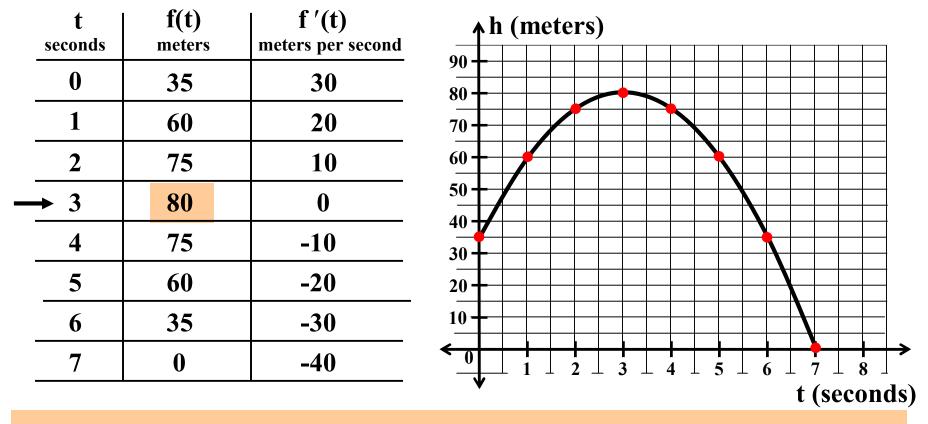
8. What is the maximum height of the ball in its flight?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





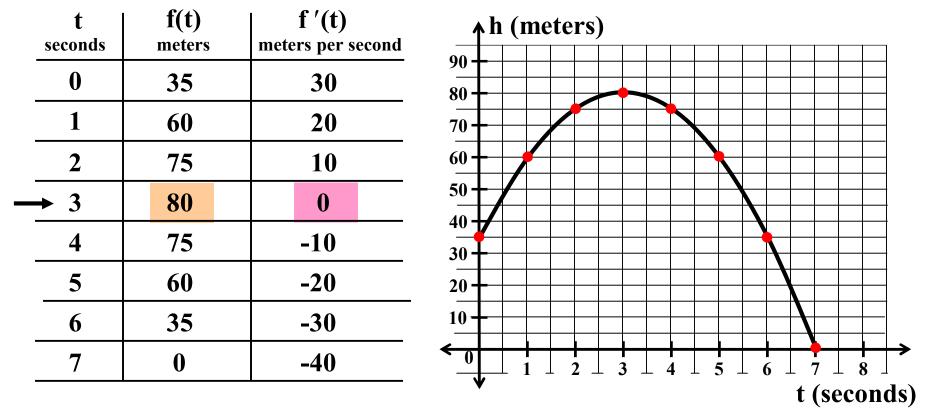
8. What is the maximum height of the ball in its flight? <u>80 meters</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





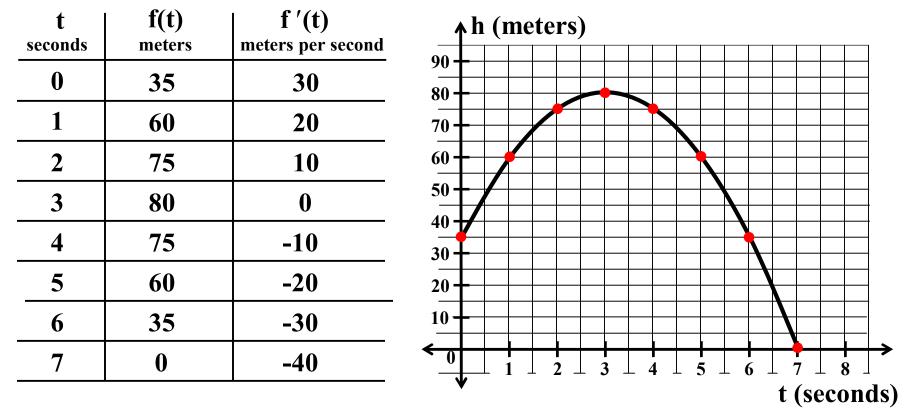
8. What is the maximum height of the ball in its flight? <u>80 meters</u> The maximum value of h = f(t) occurs when v = f'(t) = 0 !!

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.





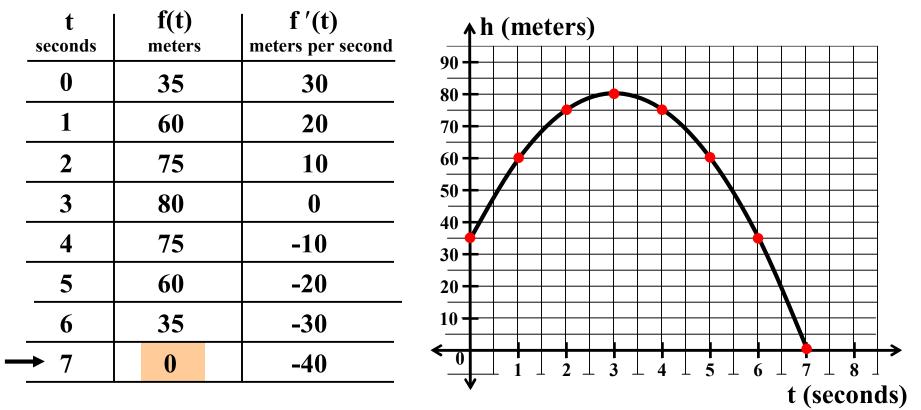
9. How fast is the ball moving as it hits the ground?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



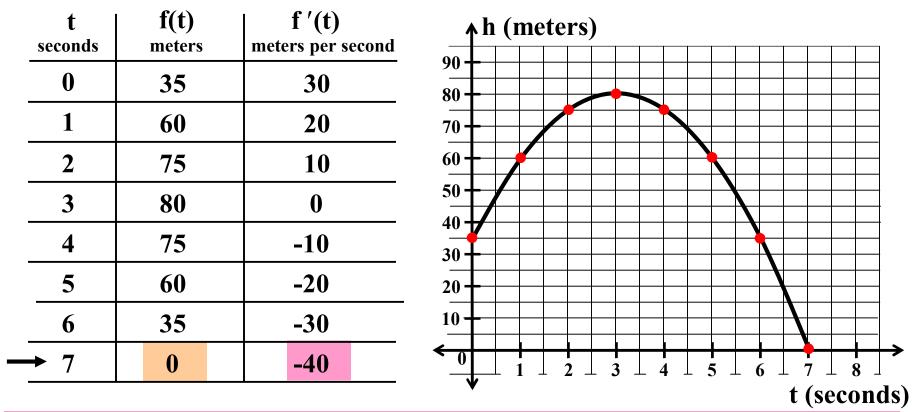
9. How fast is the ball moving as it hits the ground?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



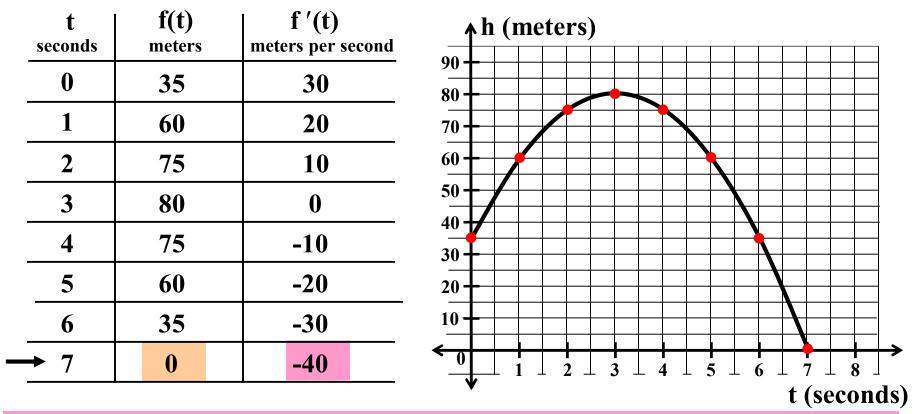
9. How fast is the ball moving as it hits the ground?

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



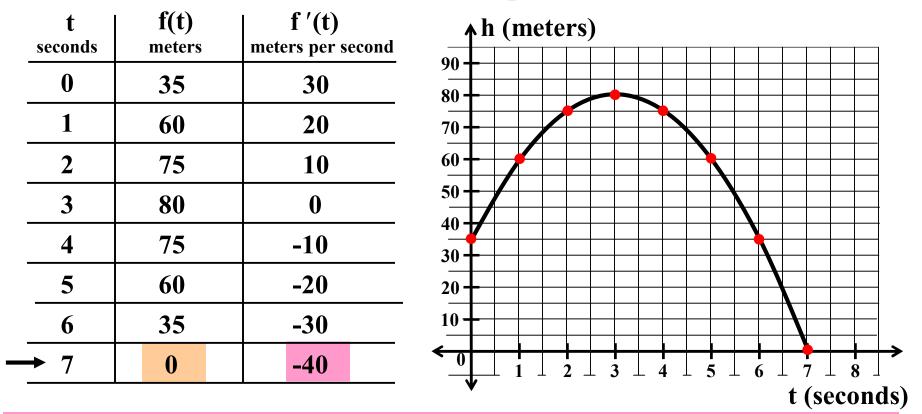
9. How fast is the ball moving as it hits the ground? <u>40 meters per second</u>

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



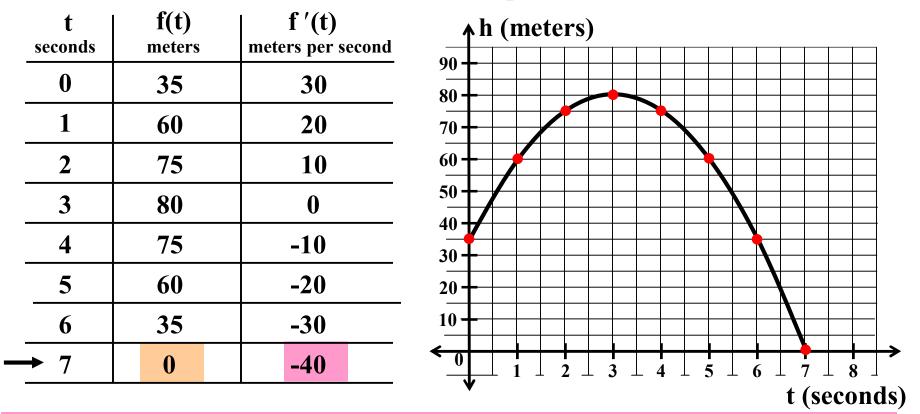
 9. How fast is the ball moving as it hits the ground? <u>40 meters per second</u> This is called the impact speed.

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.

3. Graph function f below.



9. How fast is the ball moving as it hits the ground? <u>40 meters per second</u> This is called the impact speed. (Speed is never negative.)

$$h = f(t) = -5t^2 + 30t + 35$$

V = f'(t) = -10t + 30

2. Fill out the table below.



t seconds	f(t) meters	f '(t) meters per second
0	35	30
1	60	20
2	75	10
3	80	0
4	75	-10
5	60	-20
6	35	-30
7	0	-40

