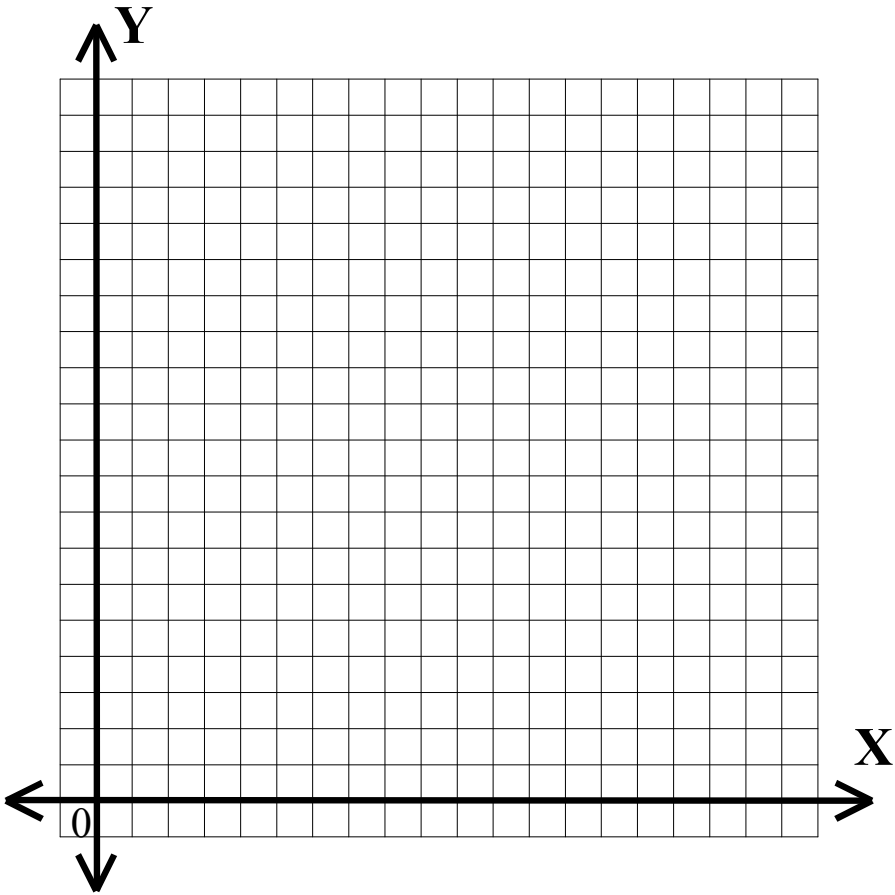


Algebra II Lesson #5 Unit 4
Class Worksheet #5
For Worksheets #5 & #6

Algebra II Class Worksheet #5 Unit 4

A small firm manufactures bracelets and necklaces. The total number of necklaces and bracelets it can manufacture per day is 24. Each bracelet requires 1 hour of labor to make, and each necklace requires .5 hours of labor to make. The total number of hours of labor available per day is 16. The profit on each bracelet is \$4, and the profit on each necklace is \$3. How many bracelets and how many necklaces should the company make per day in order to maximize its profits.



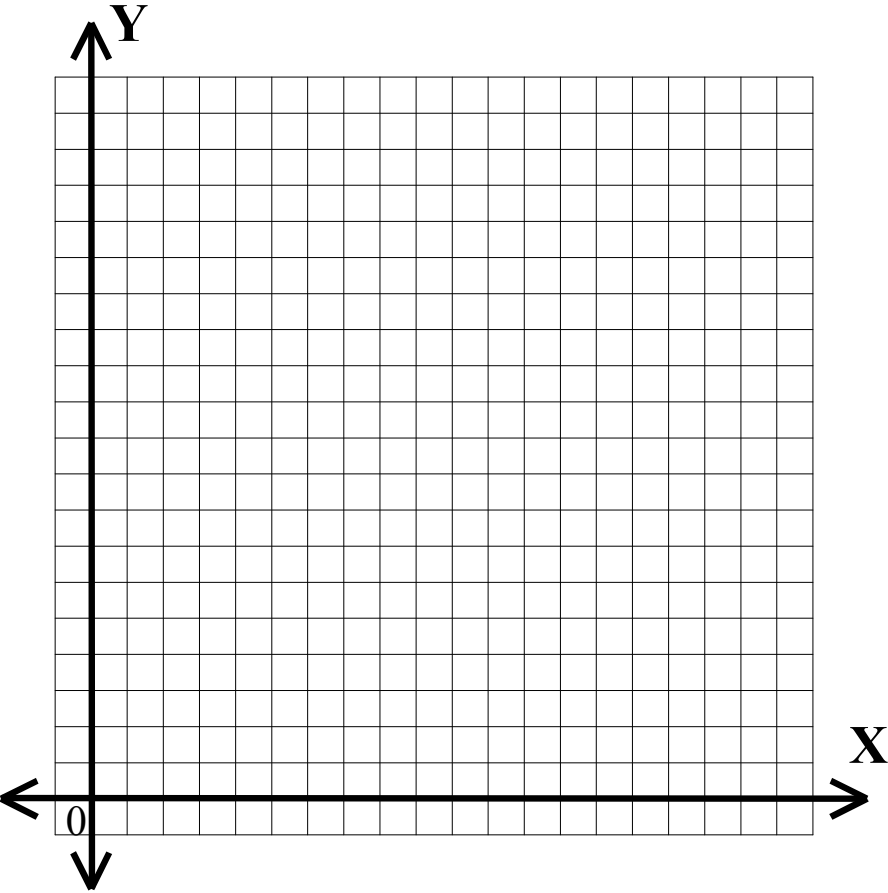
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number

bracelets

necklaces



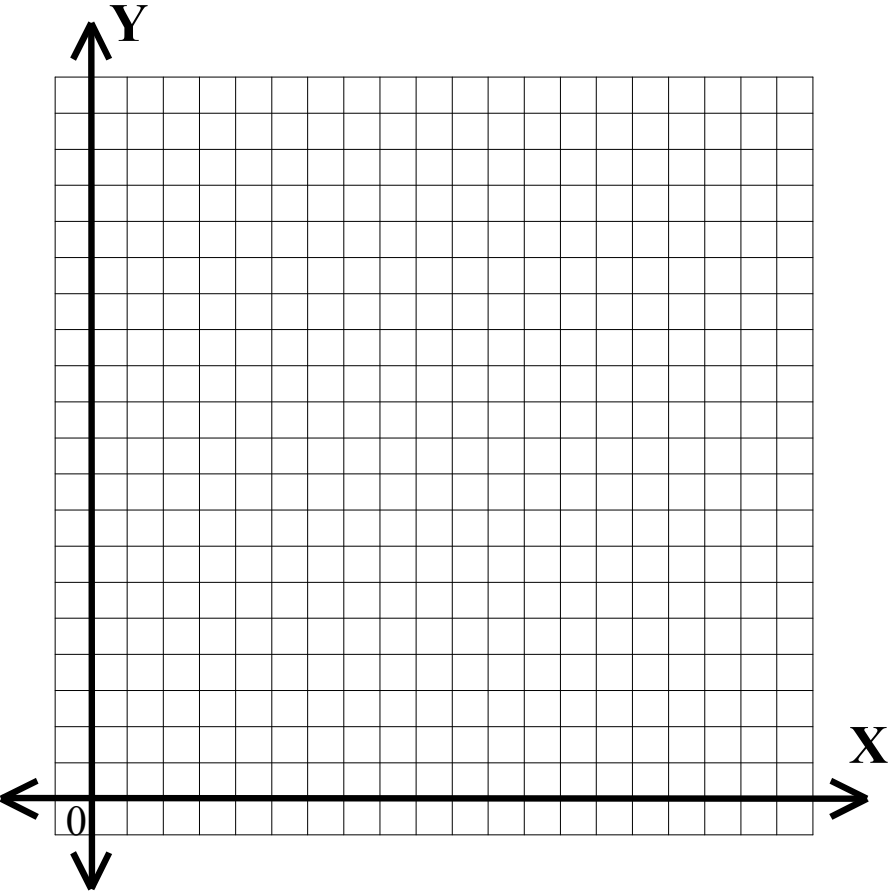
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number

bracelets **x**

necklaces **y**



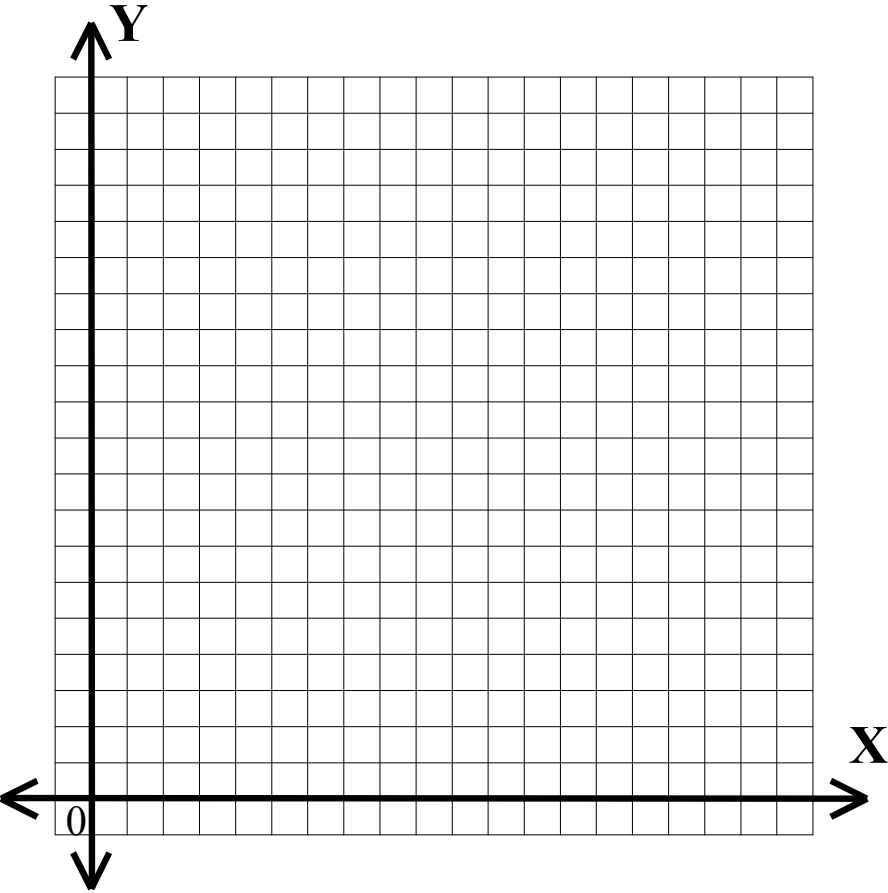
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number

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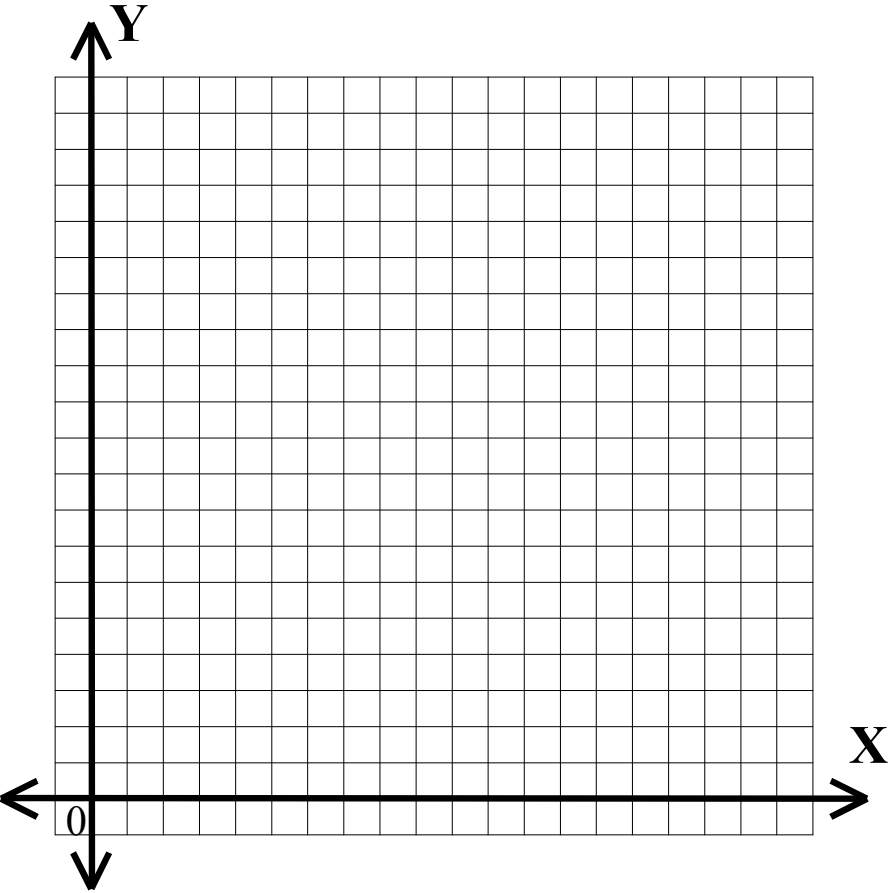
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number

bracelets x

necklaces y

$x + y$



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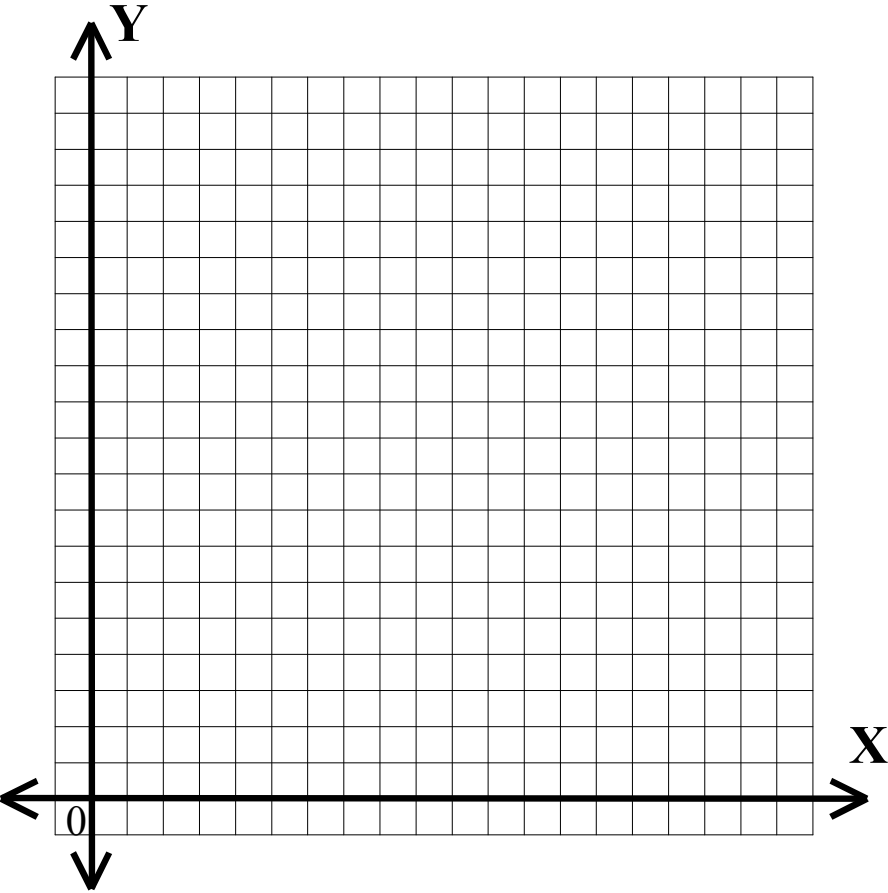
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number

bracelets x

necklaces y

$$x + y \leq$$



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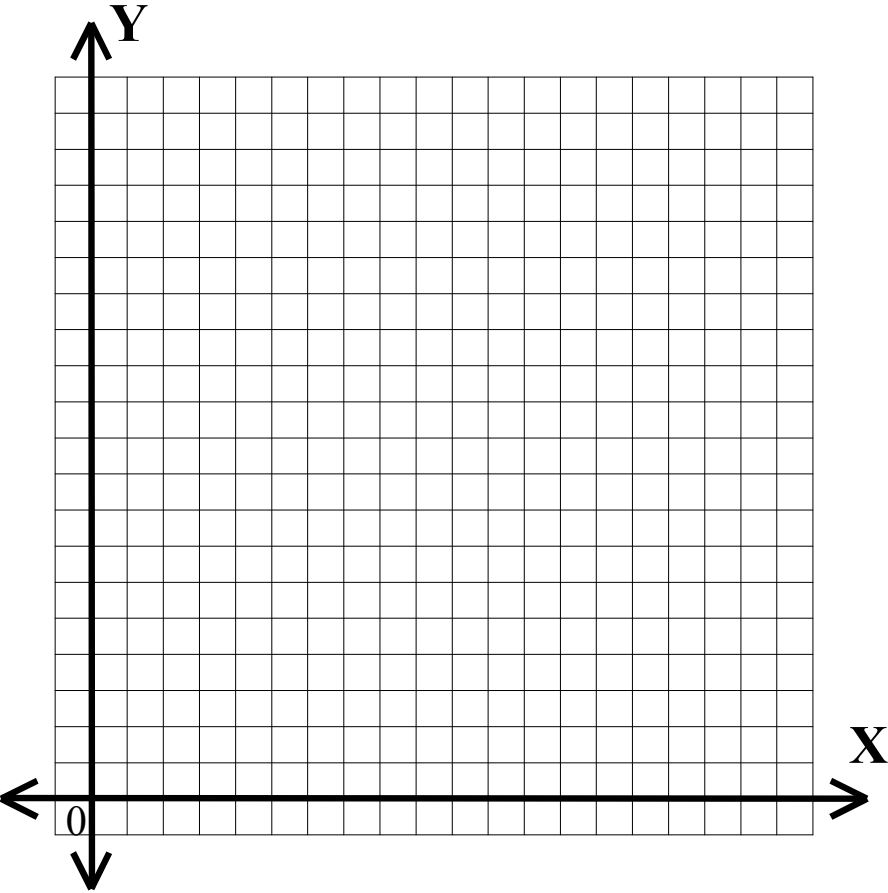
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necklaces **y**

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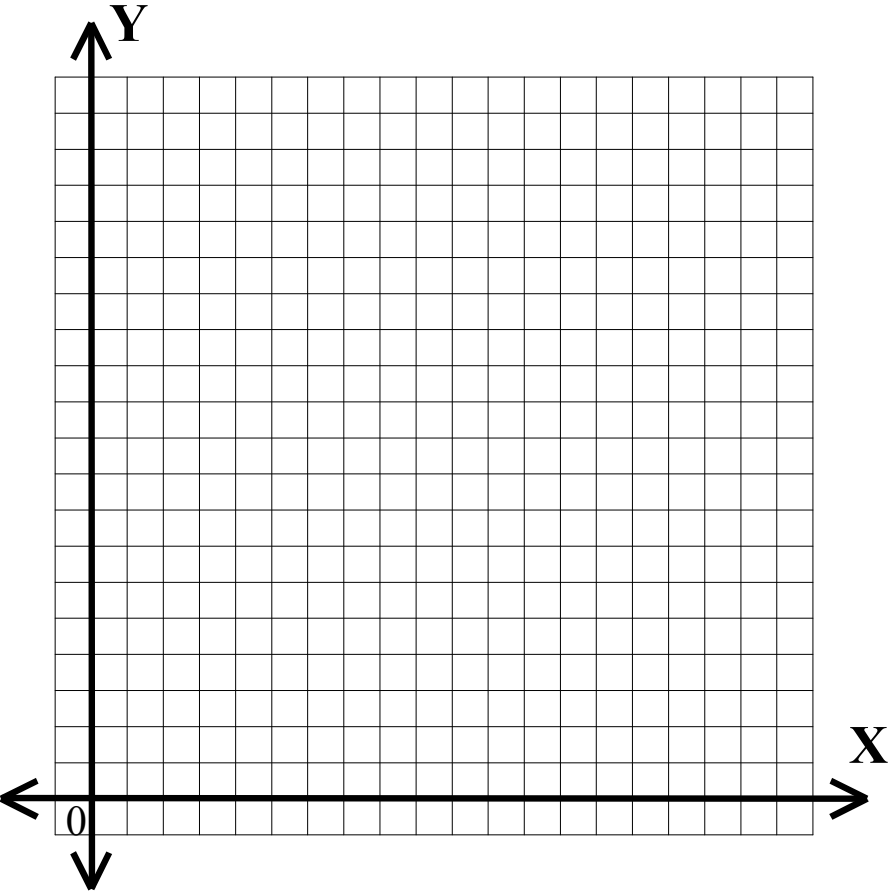
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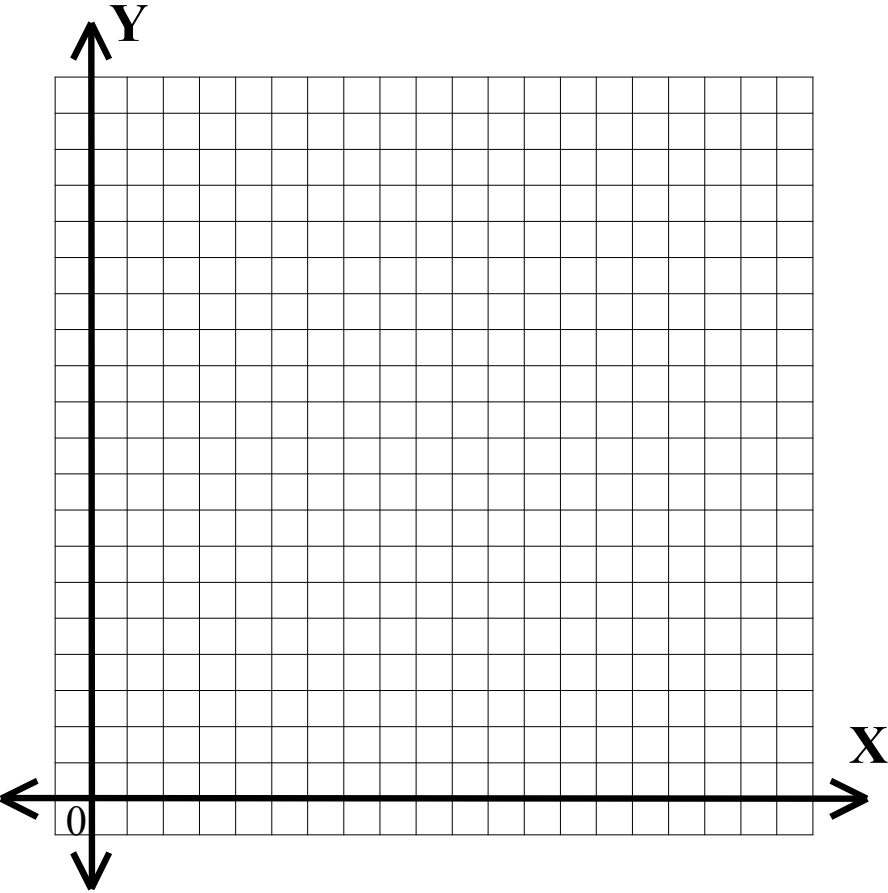
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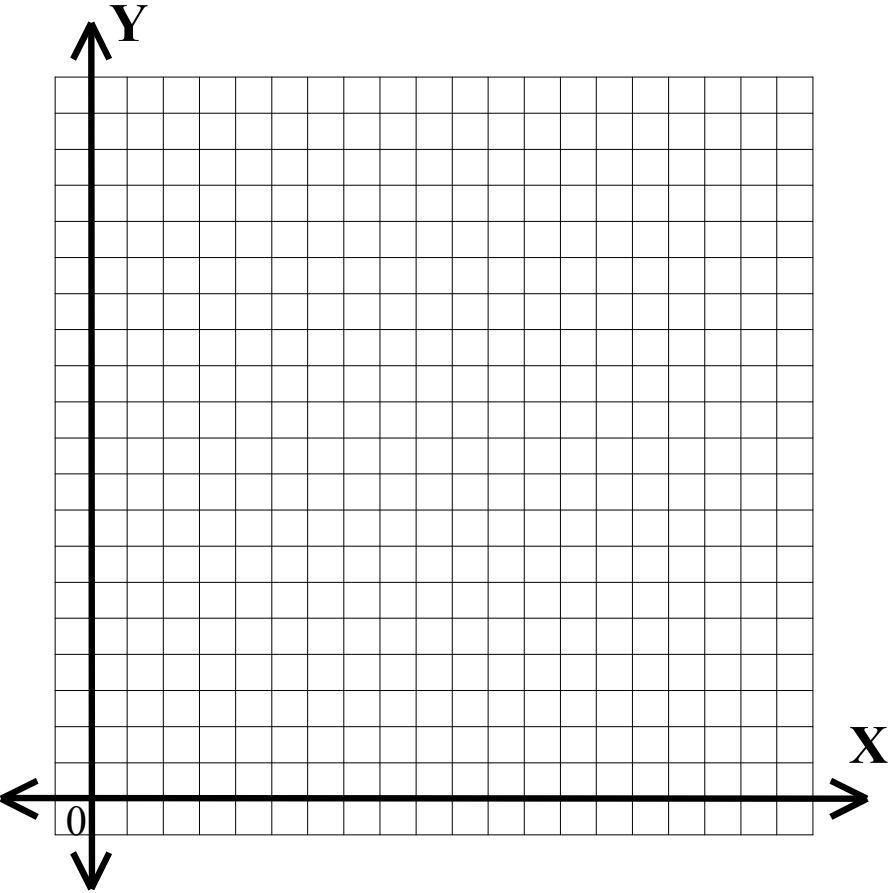
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	number	labor (hours)
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necklaces	y	
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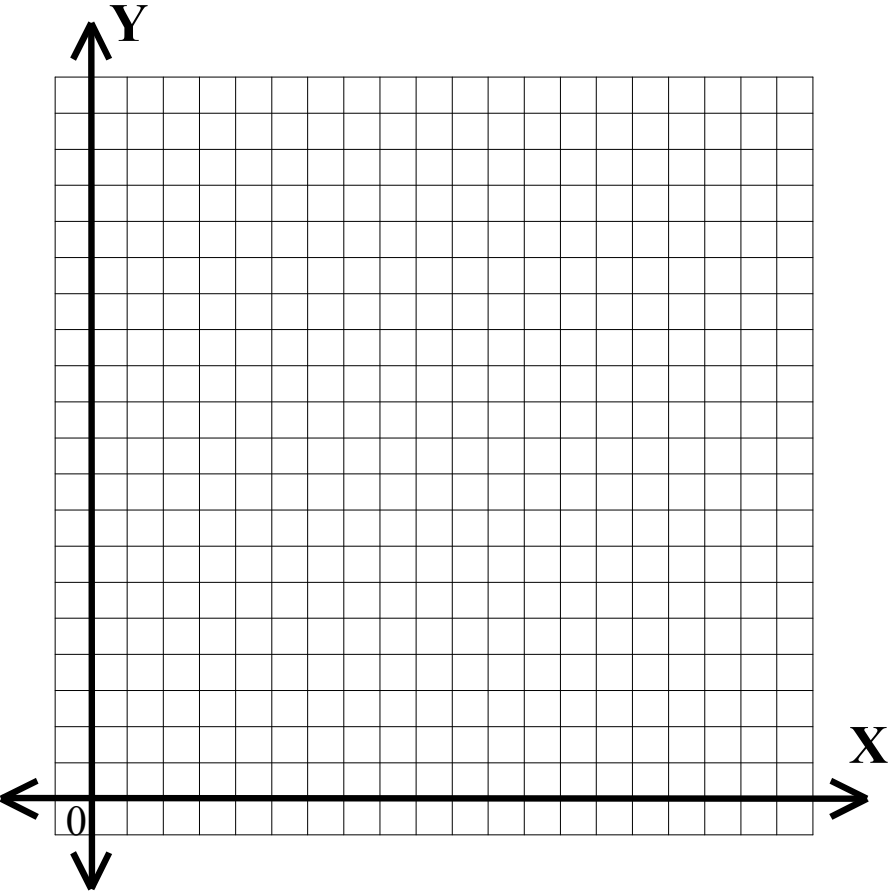


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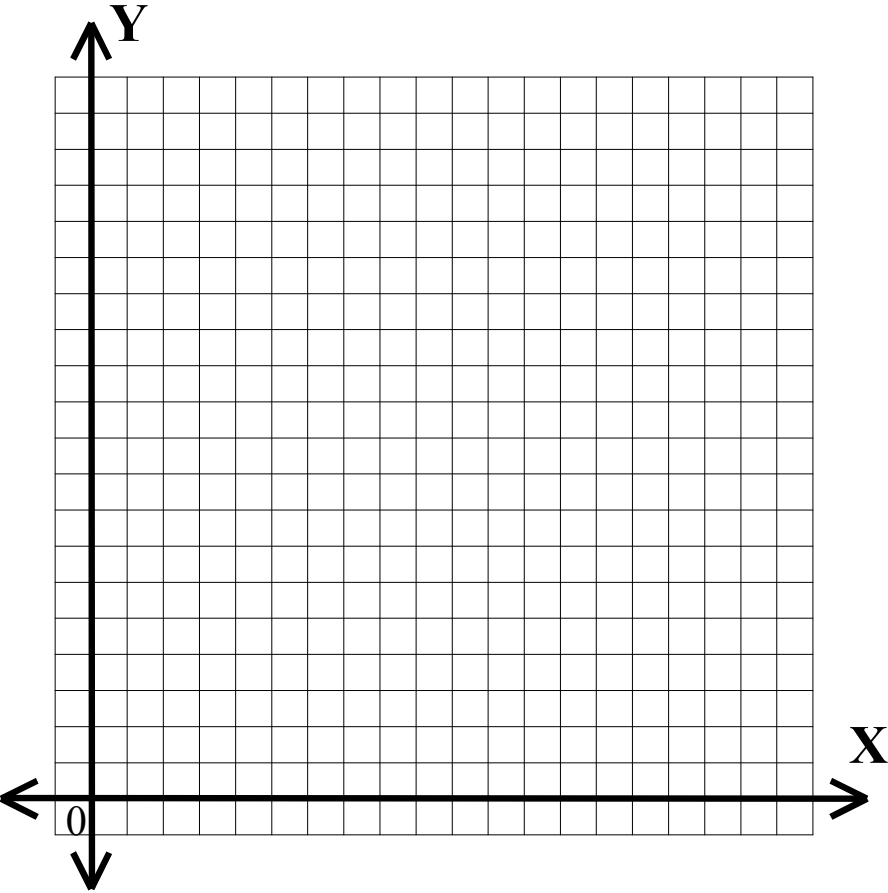


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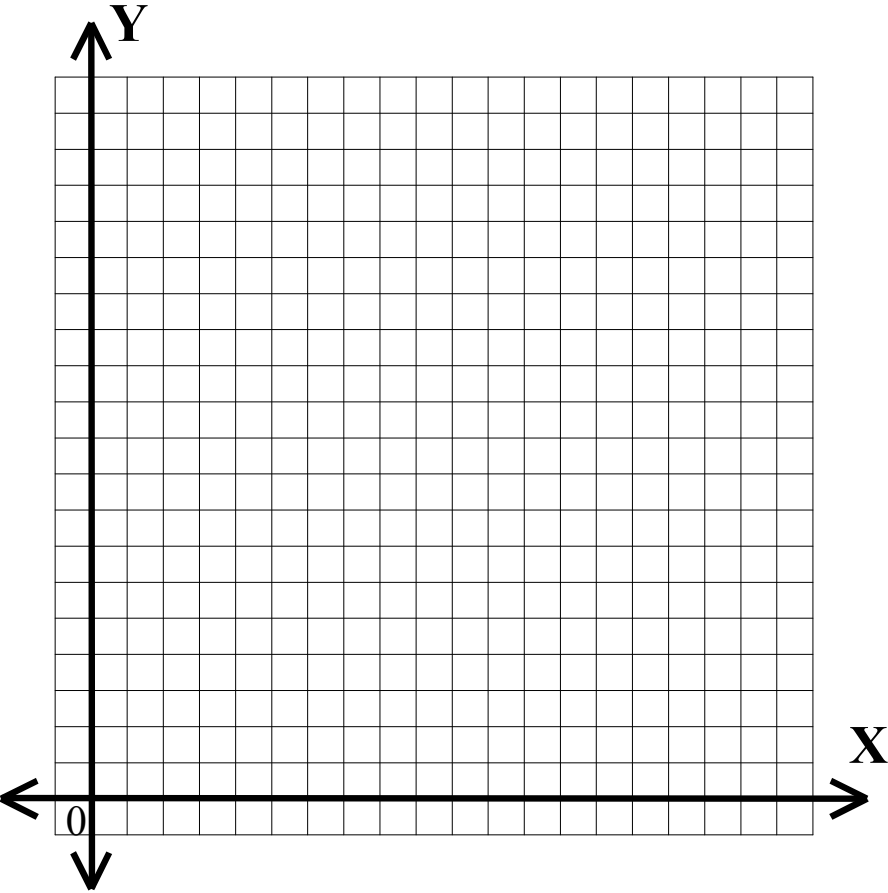


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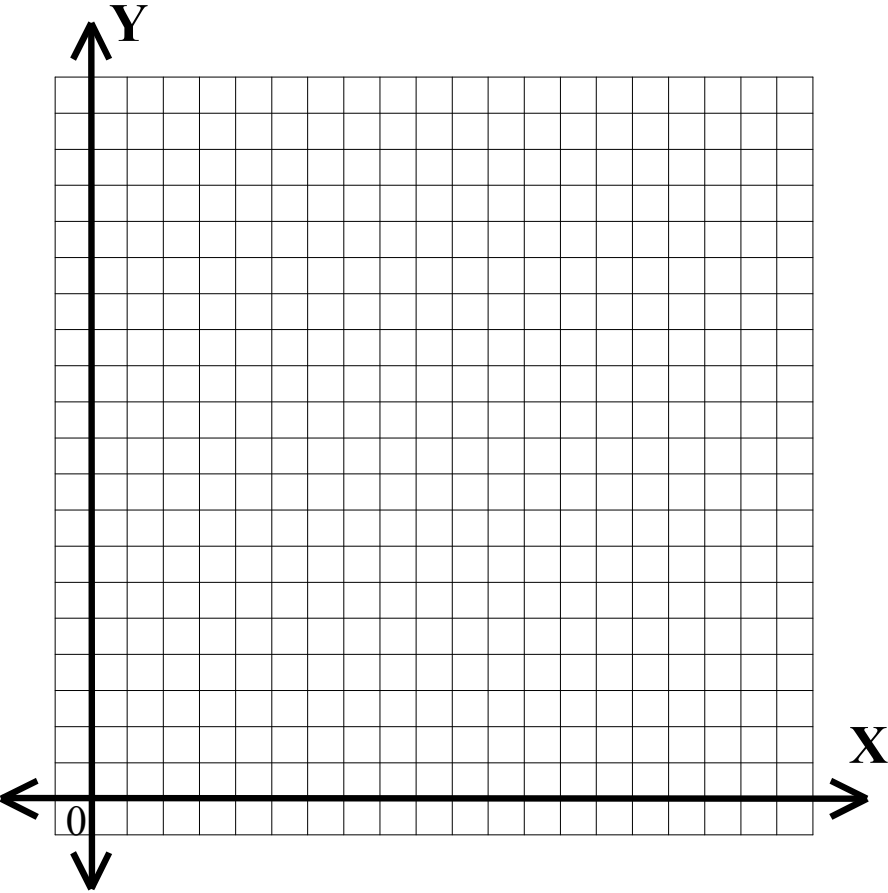


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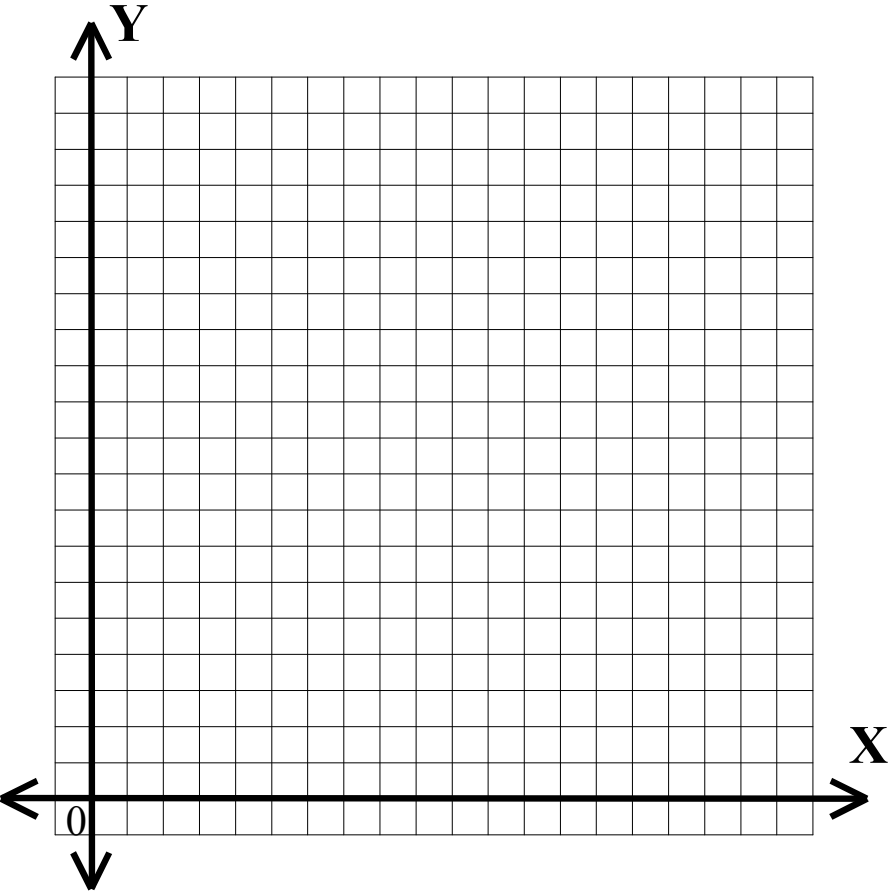
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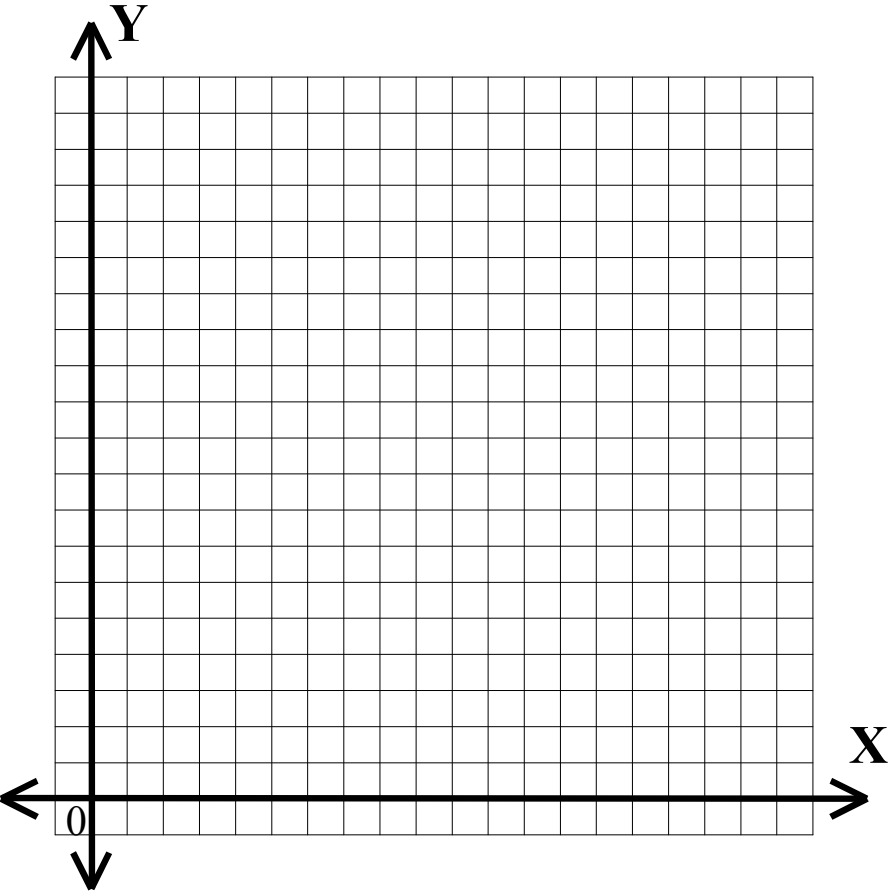
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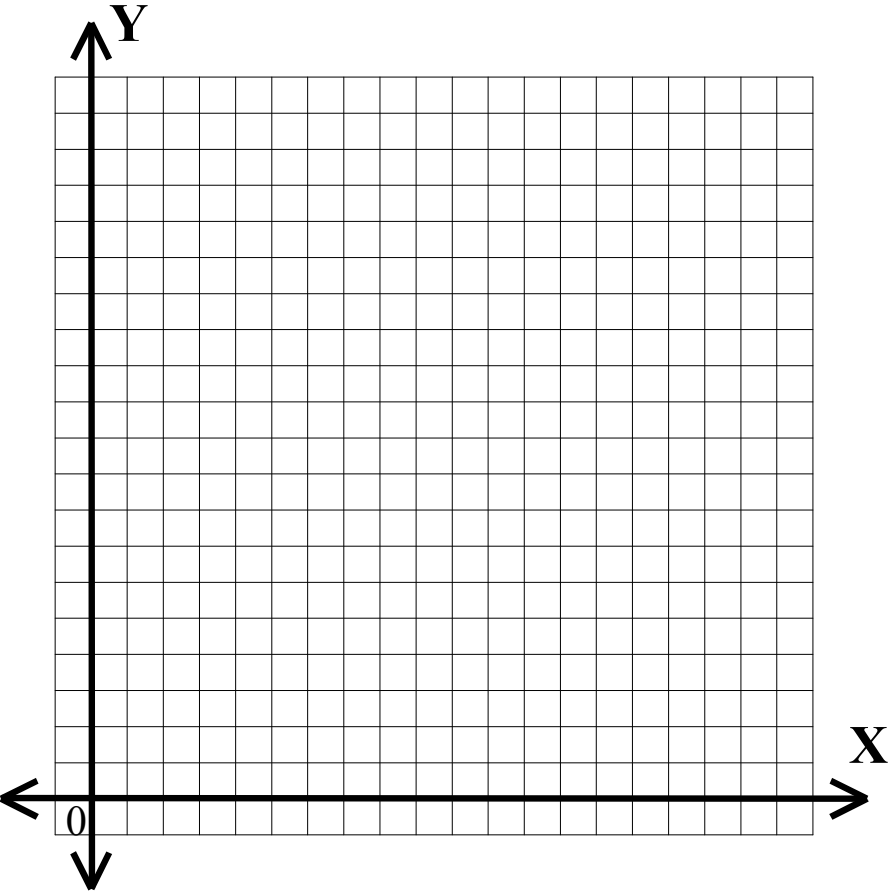
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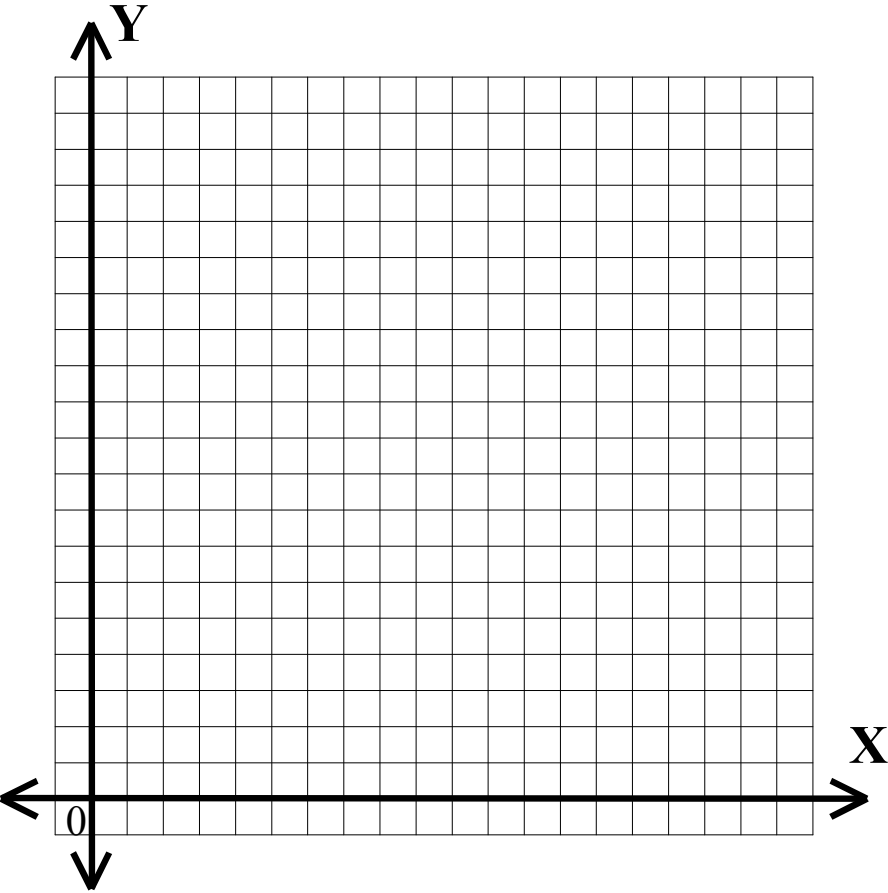
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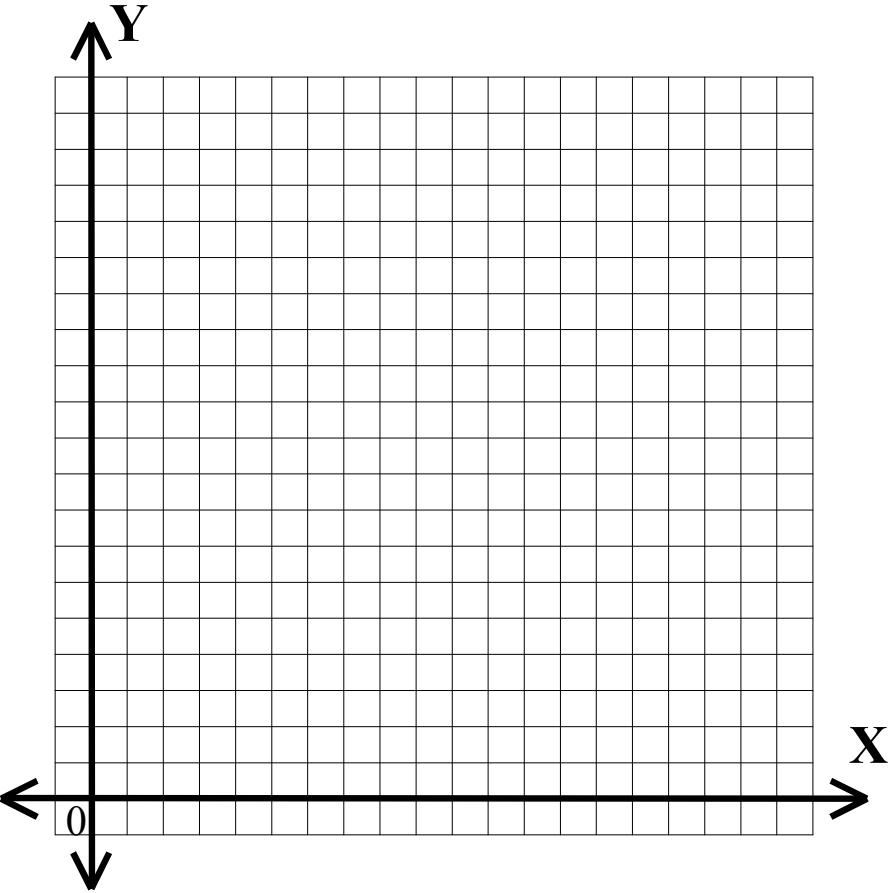
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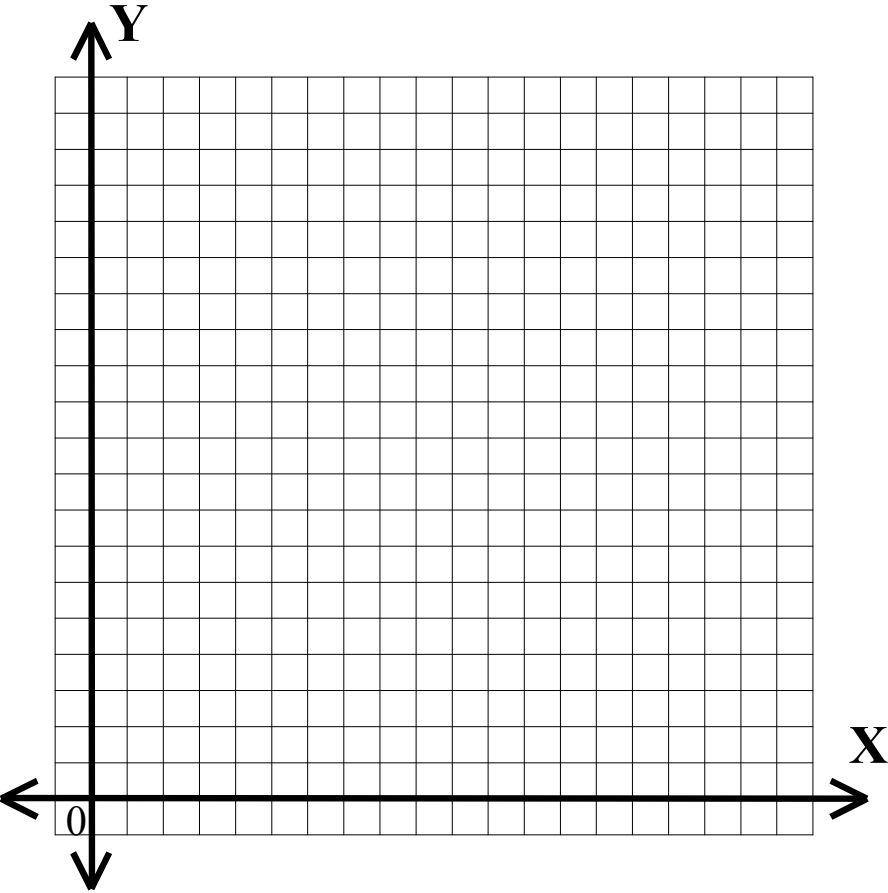
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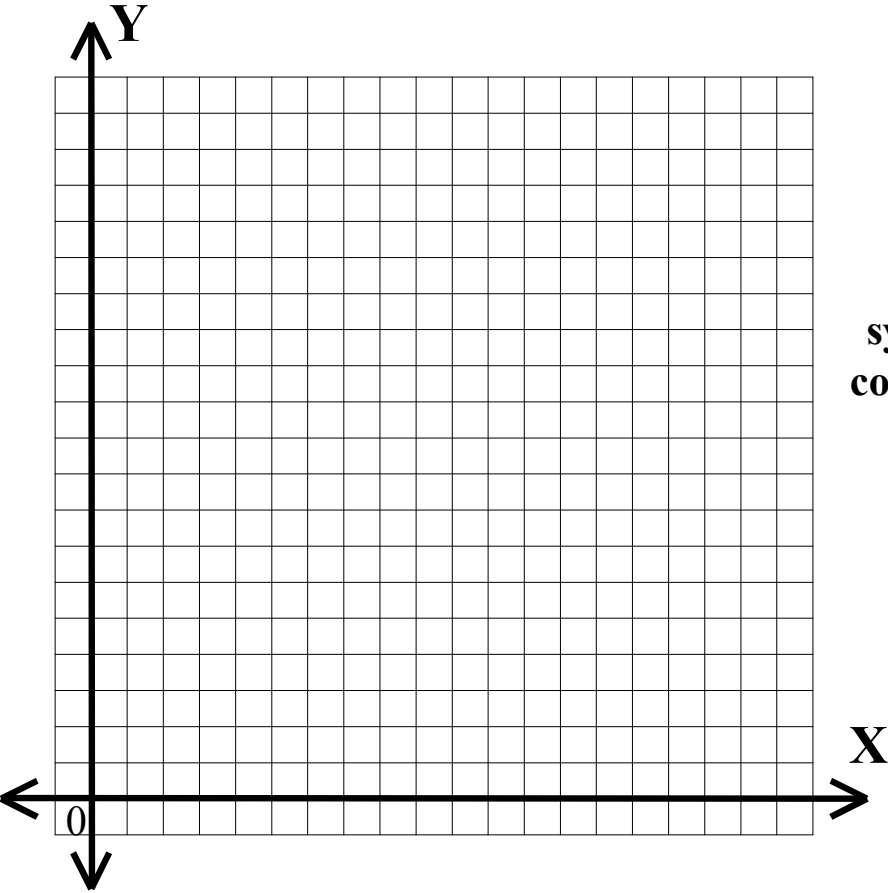
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system of constraints

$$\begin{cases} x + y \leq 24 \\ x + .5y \leq 16 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



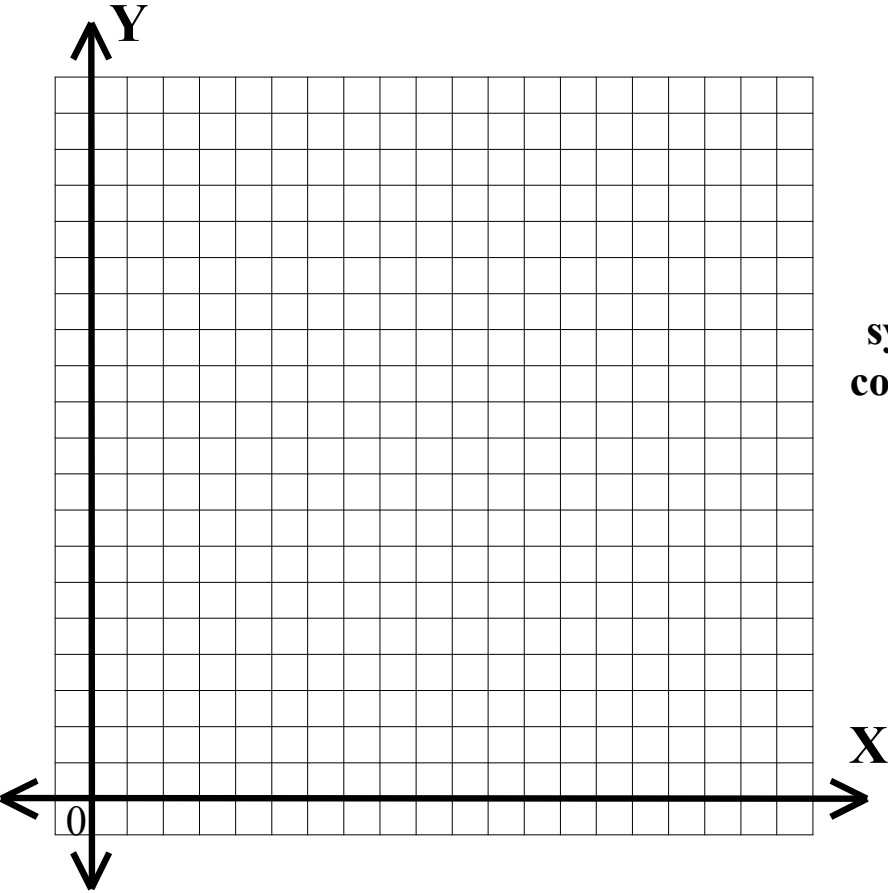
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$$\begin{cases} x + y \leq 24 \\ x + .5y \leq 16 \\ x \geq 0 \\ y \geq 0 \end{cases} \Rightarrow y \leq -x + 24$$



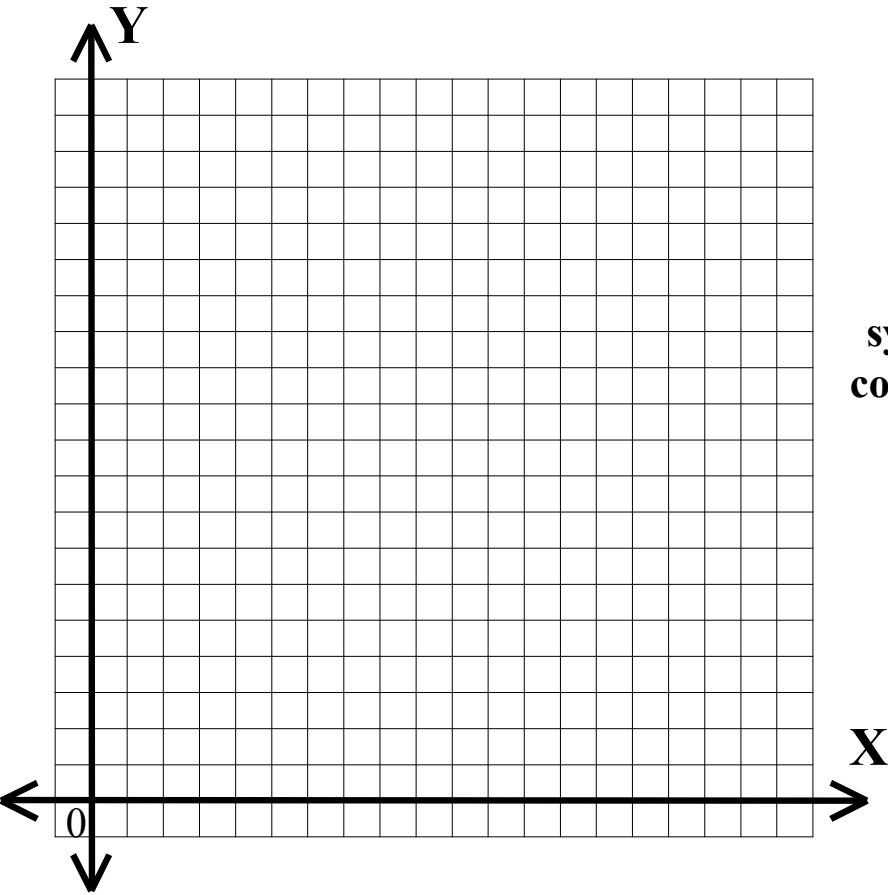
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system of constraints

$$\begin{cases} x + y \leq 24 & \Rightarrow y \leq -x + 24 \\ x + .5y \leq 16 & \Rightarrow y \leq -2x + 32 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



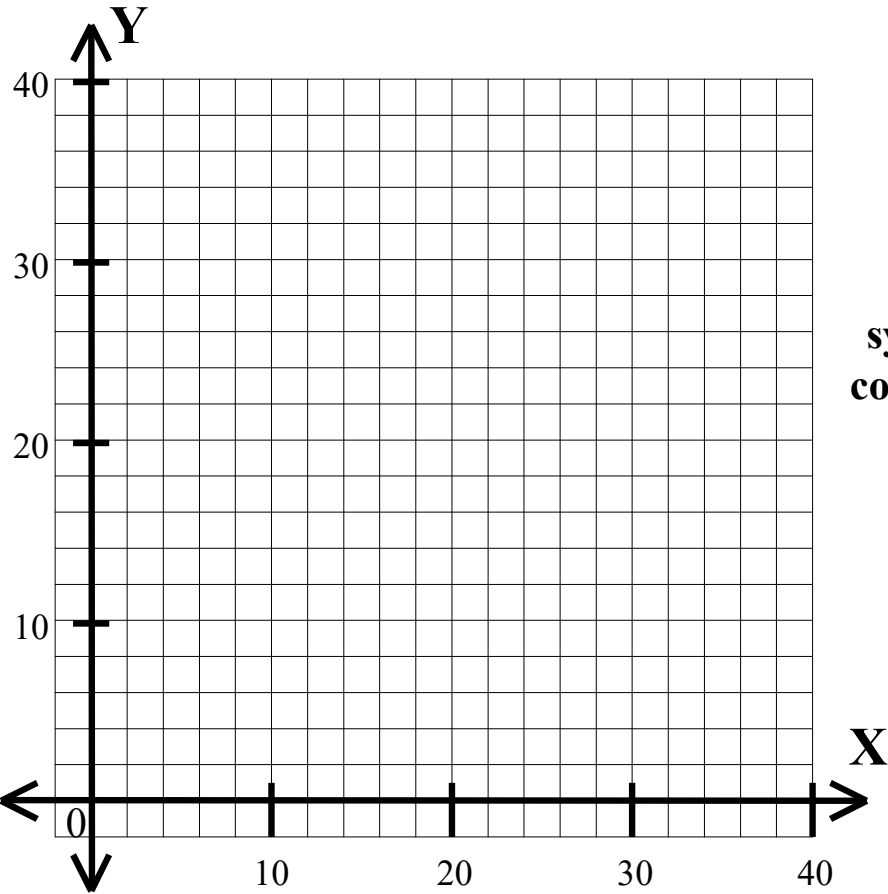
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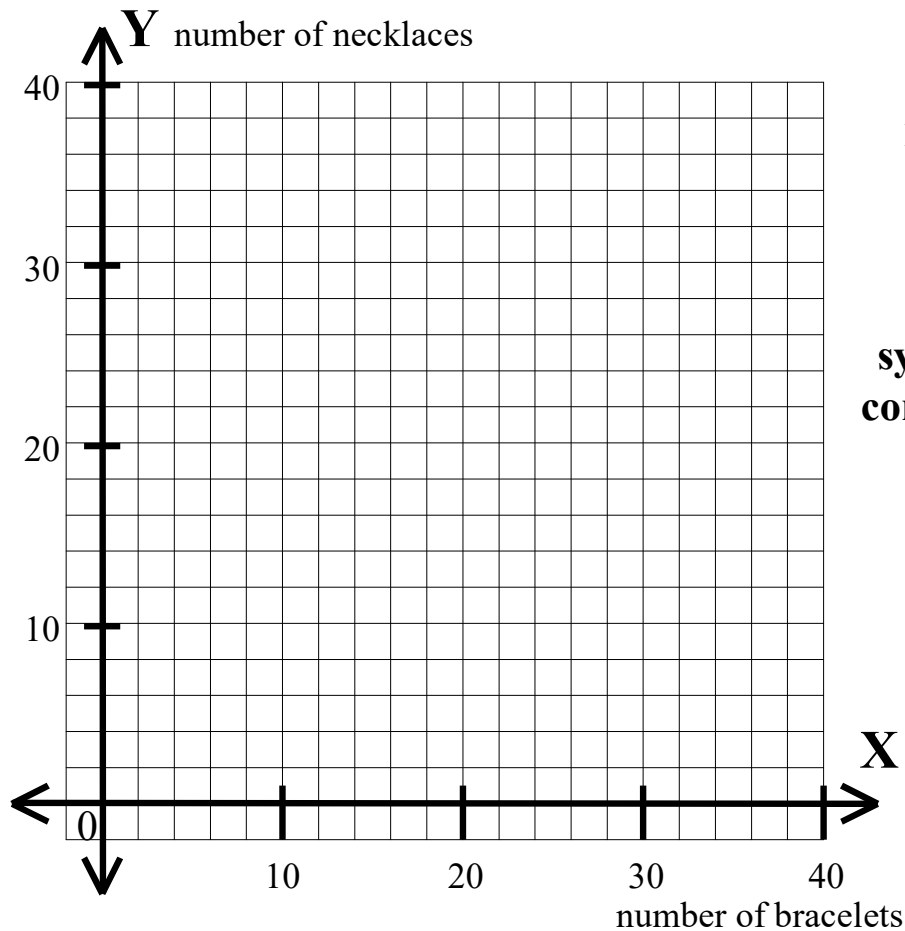
system of constraints

$$\left\{ \begin{array}{l} x + y \leq 24 \\ x + .5y \leq 16 \\ x \geq 0 \\ y \geq 0 \end{array} \right. \begin{array}{l} \Rightarrow y \leq -x + 24 \\ \Rightarrow y \leq -2x + 32 \end{array}$$



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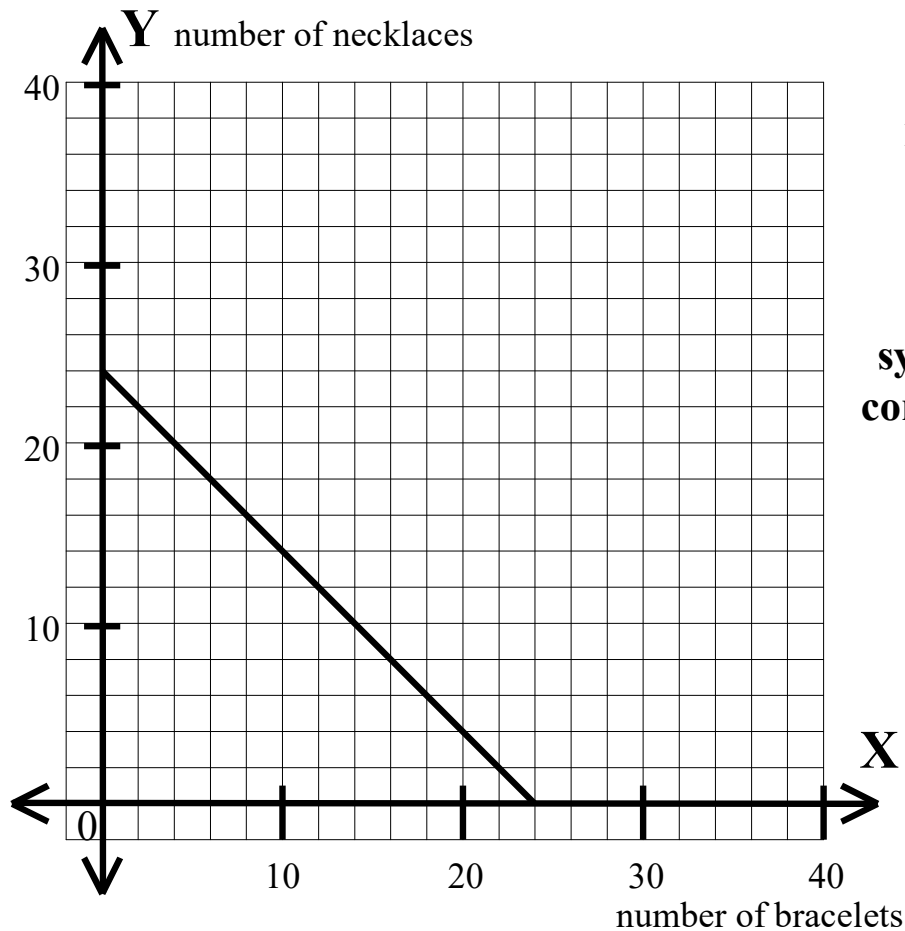


	number	labor (hours)
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system of constraints	{	$x + y \leq 24$	⇒	$y \leq -x + 24$
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system of constraints

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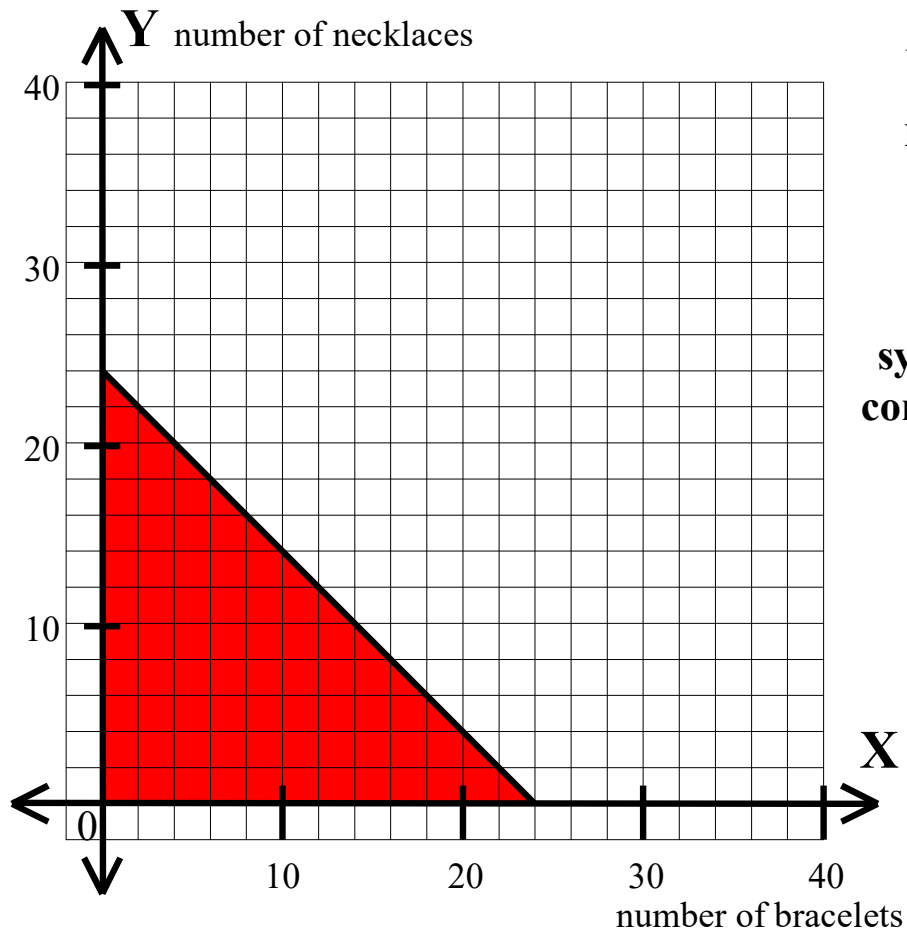
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\Rightarrow
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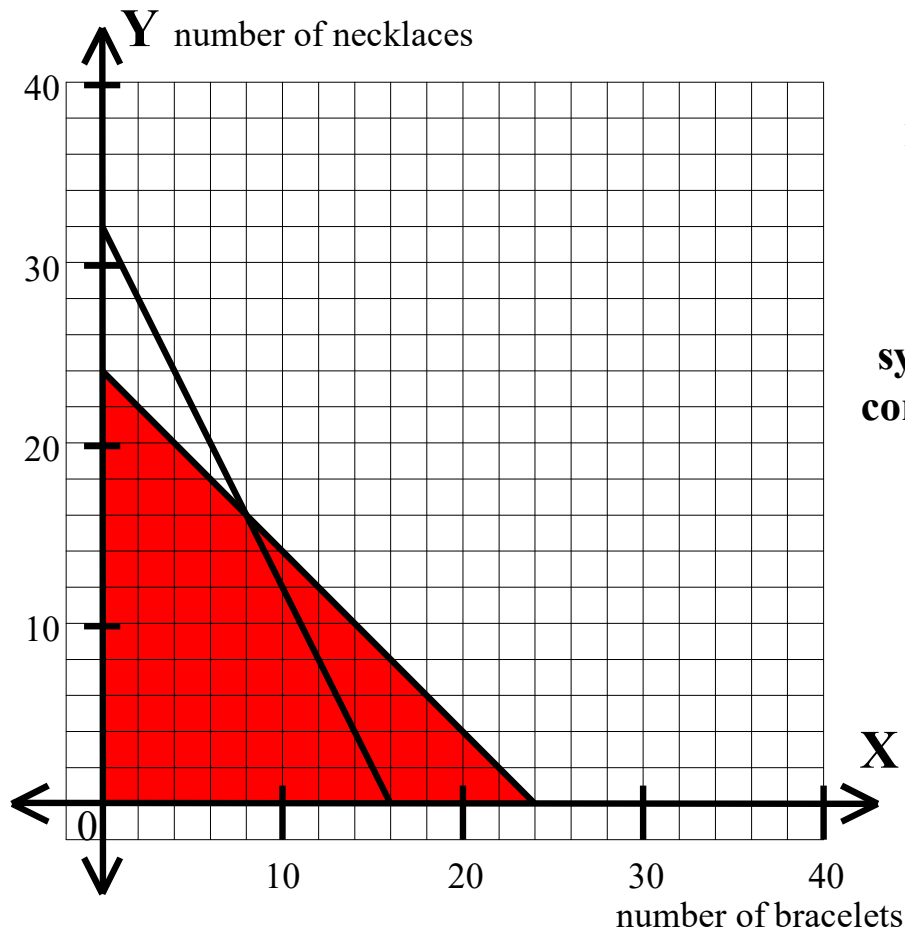
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system of constraints

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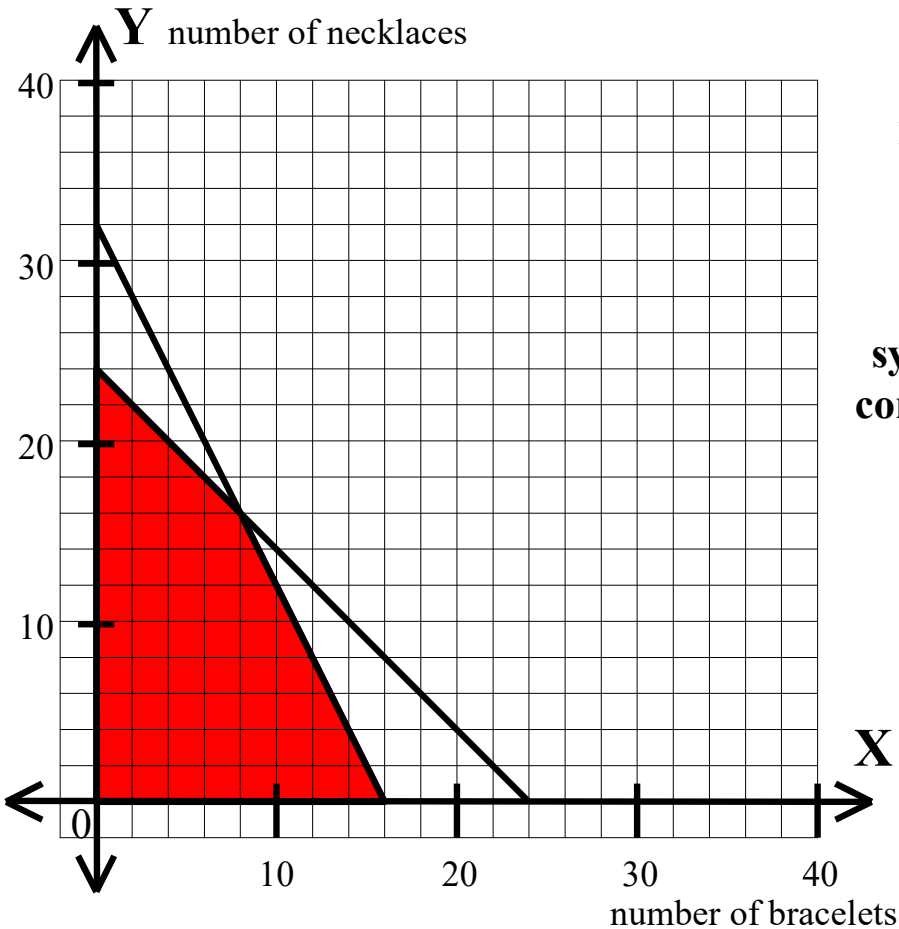
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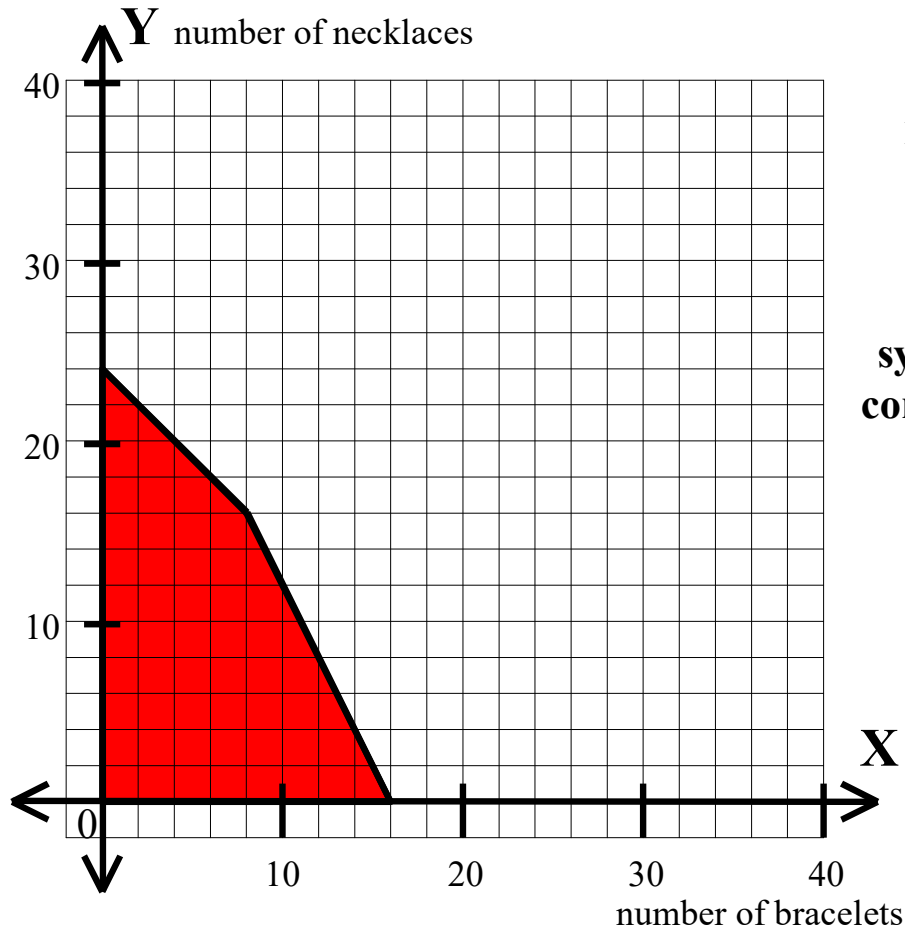
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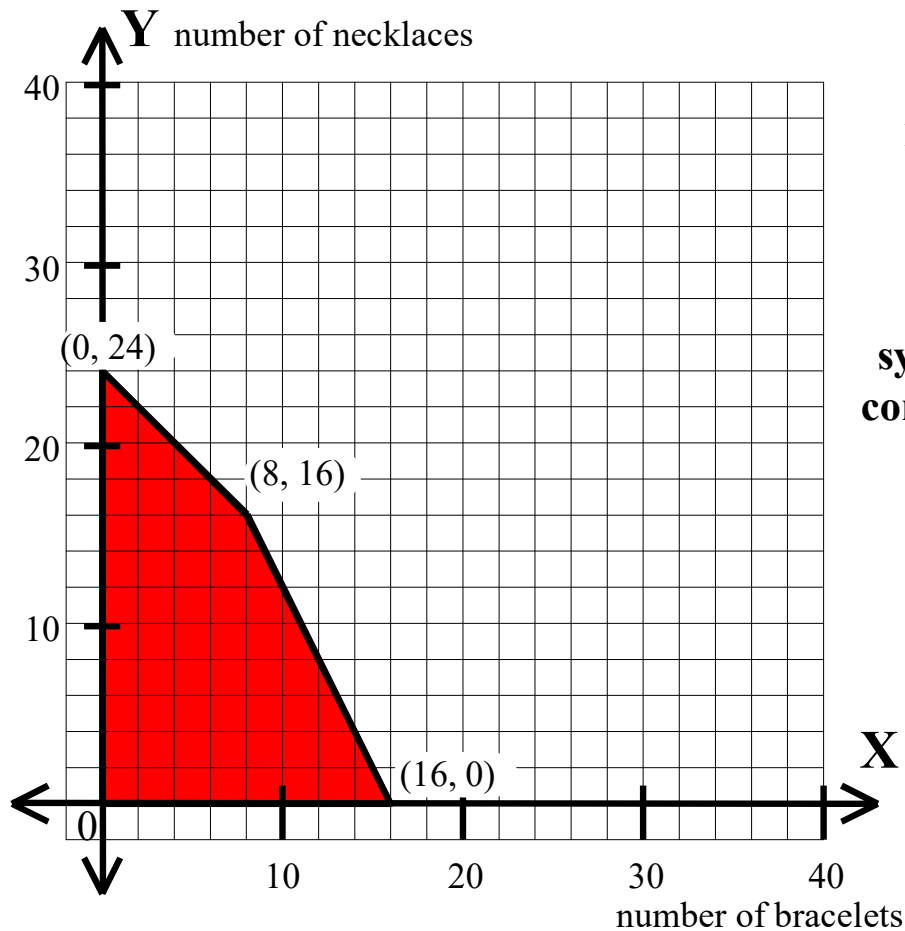
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necklaces	y	$.5y$
available		16

system of constraints

{

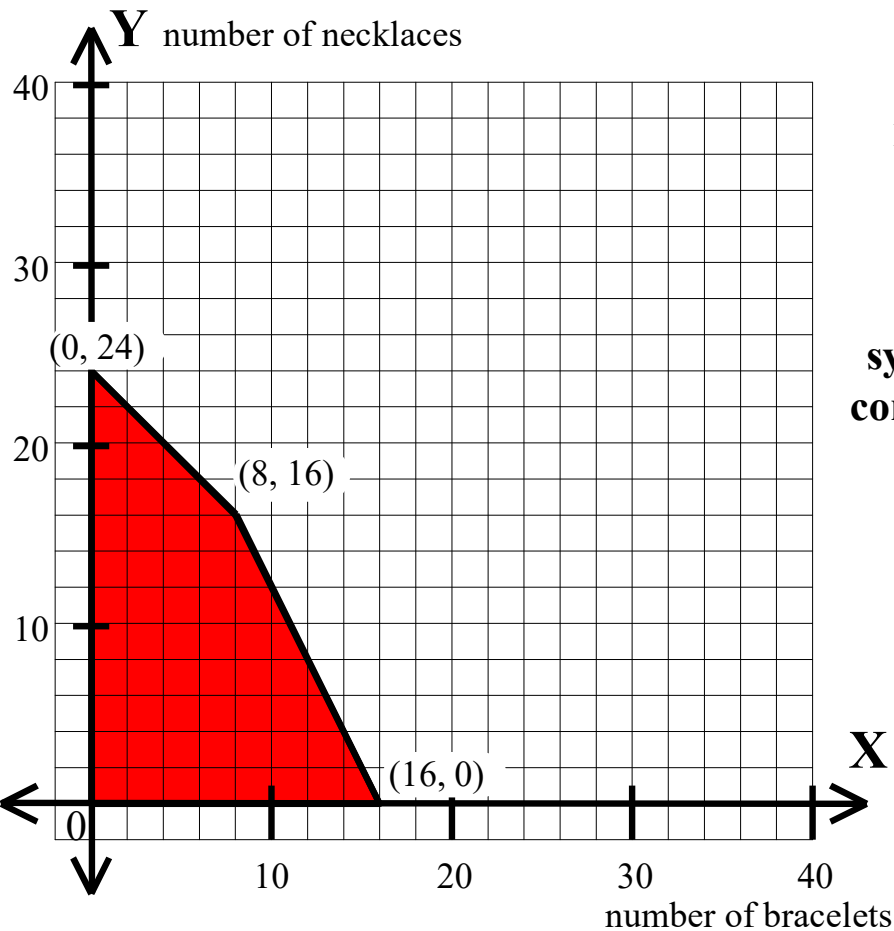
$x + y \leq 24$
 $x + .5y \leq 16$
 $x \geq 0$
 $y \geq 0$

\Rightarrow
 \Rightarrow

$y \leq -x + 24$
 $y \leq -2x + 32$

Algebra II Class Worksheet #5 Unit 4

A small firm manufactures bracelets and necklaces. The total number of necklaces and bracelets it can manufacture per day is 24. Each bracelet requires 1 hour of labor to make, and each necklace requires .5 hours of labor to make. The total number of hours of labor available per day is 16. **The profit on each bracelet is \$4, and the profit on each necklace is \$3.** How many bracelets and how many necklaces should the company make per day in order to maximize its profits.



	number	labor (hours)
bracelets	x	$1x$
necklaces	y	$.5y$
available		16

system of constraints

$x + y \leq 24 \implies y \leq -x + 24$

$x + .5y \leq 16 \implies y \leq -2x + 32$

$x \geq 0$
 $y \geq 0$

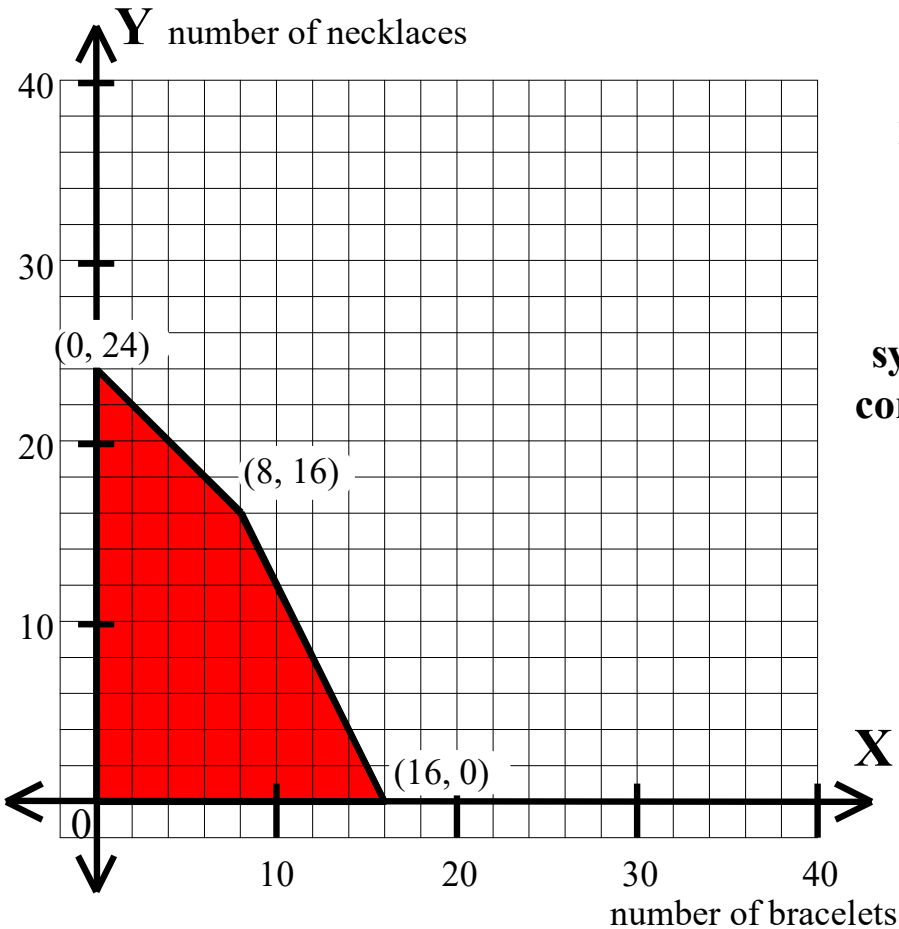
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available		16	

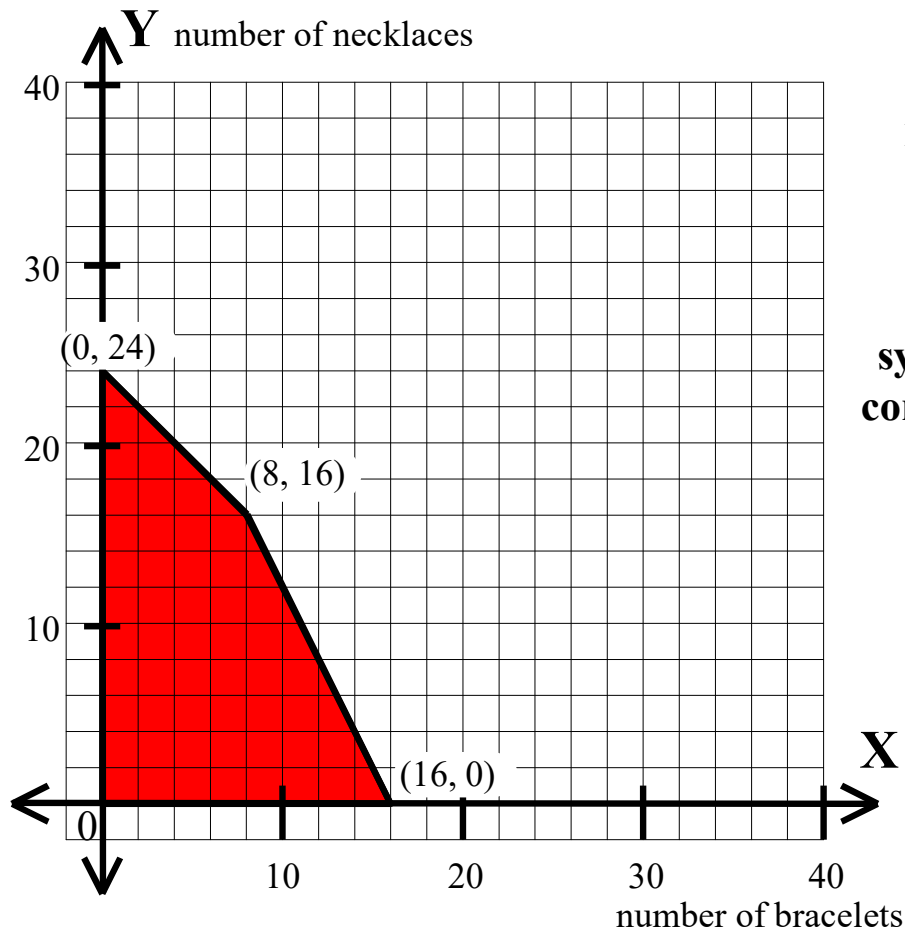
system of constraints

$$\begin{cases} x + y \leq 24 & \Rightarrow y \leq -x + 24 \\ x + .5y \leq 16 & \Rightarrow y \leq -2x + 32 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



Algebra II Class Worksheet #5 Unit 4

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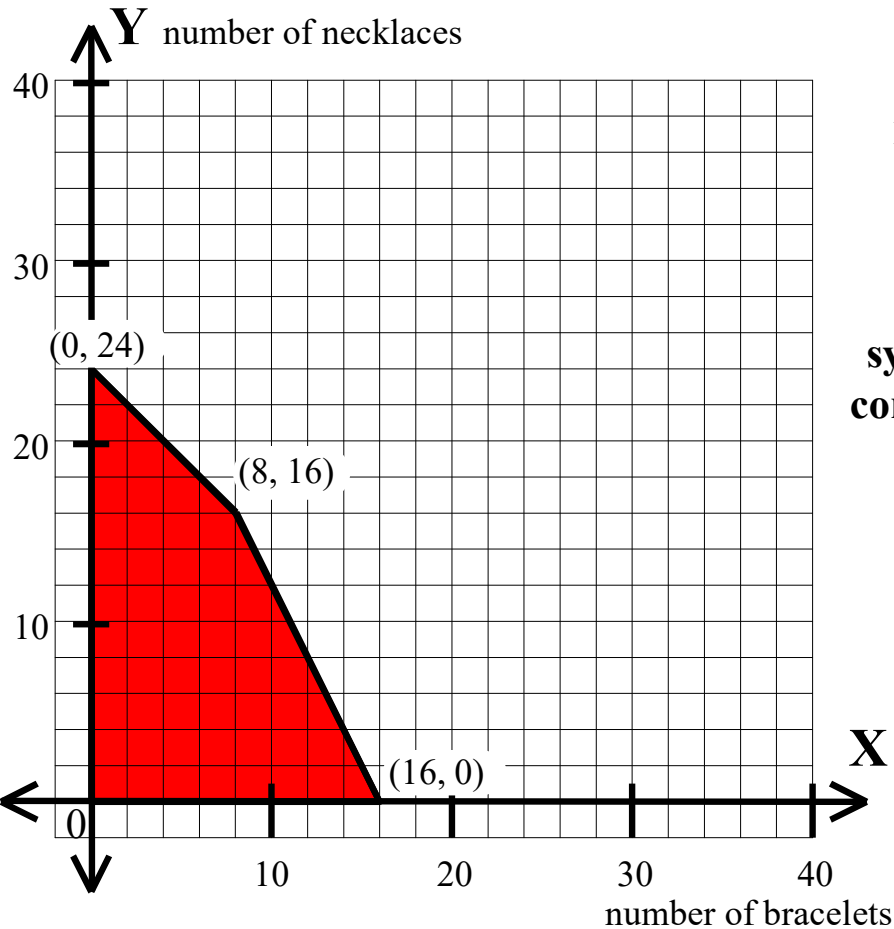


	number	labor (hours)	profit (dollars)
bracelets	x	$1x$	$4x$
necklaces	y	$.5y$	
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system of constraints	{	$x + y \leq 24$	\Rightarrow	$y \leq -x + 24$
		$x + .5y \leq 16$	\Rightarrow	$y \leq -2x + 32$
		$x \geq 0$		
		$y \geq 0$		

Algebra II Class Worksheet #5 Unit 4

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system of constraints

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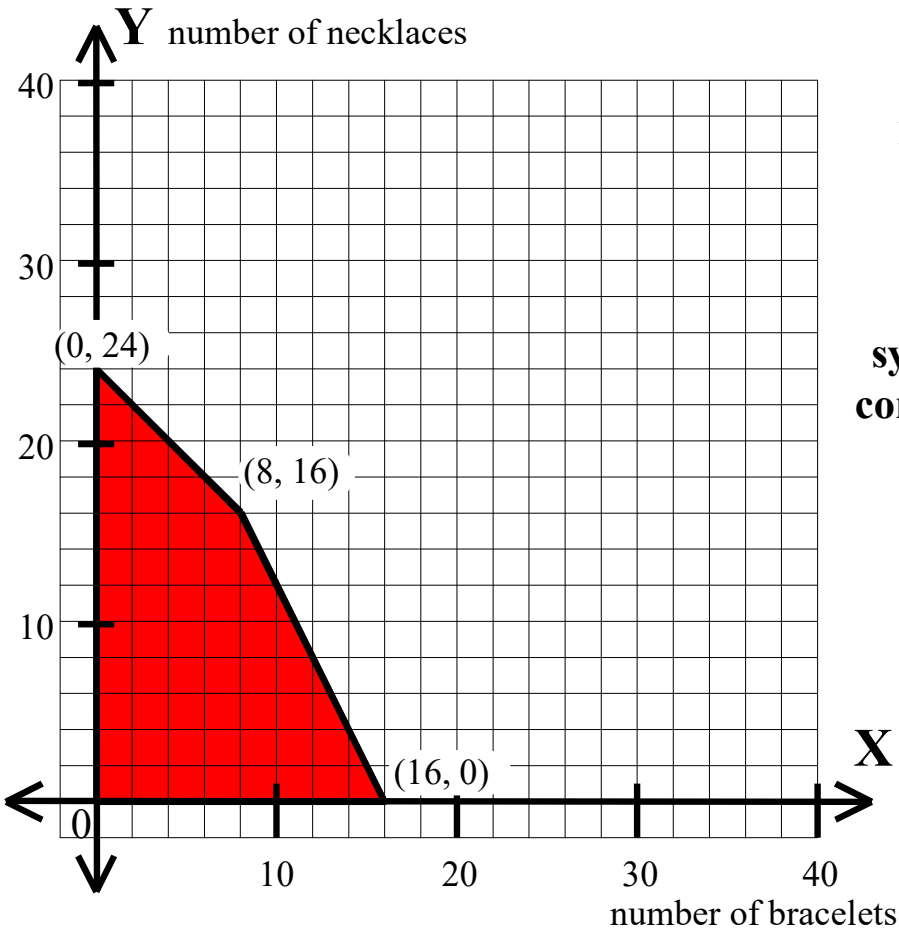
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Algebra II Class Worksheet #5 Unit 4

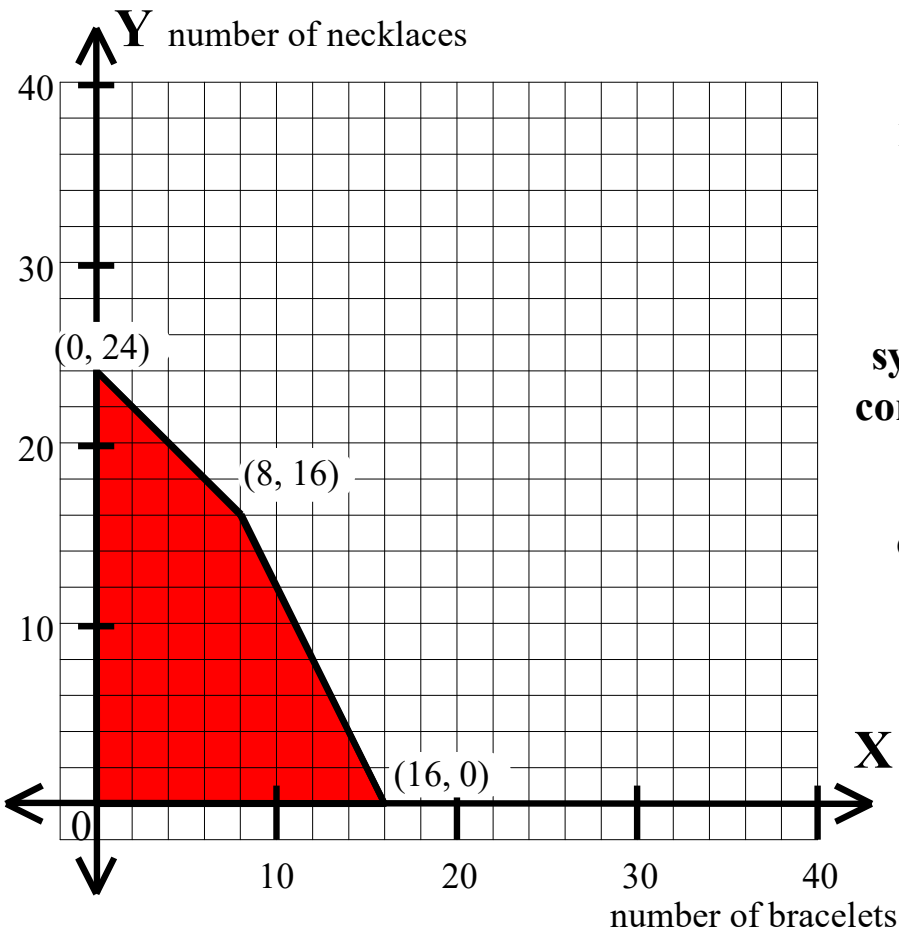
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objective function \Rightarrow



Algebra II Class Worksheet #5 Unit 4

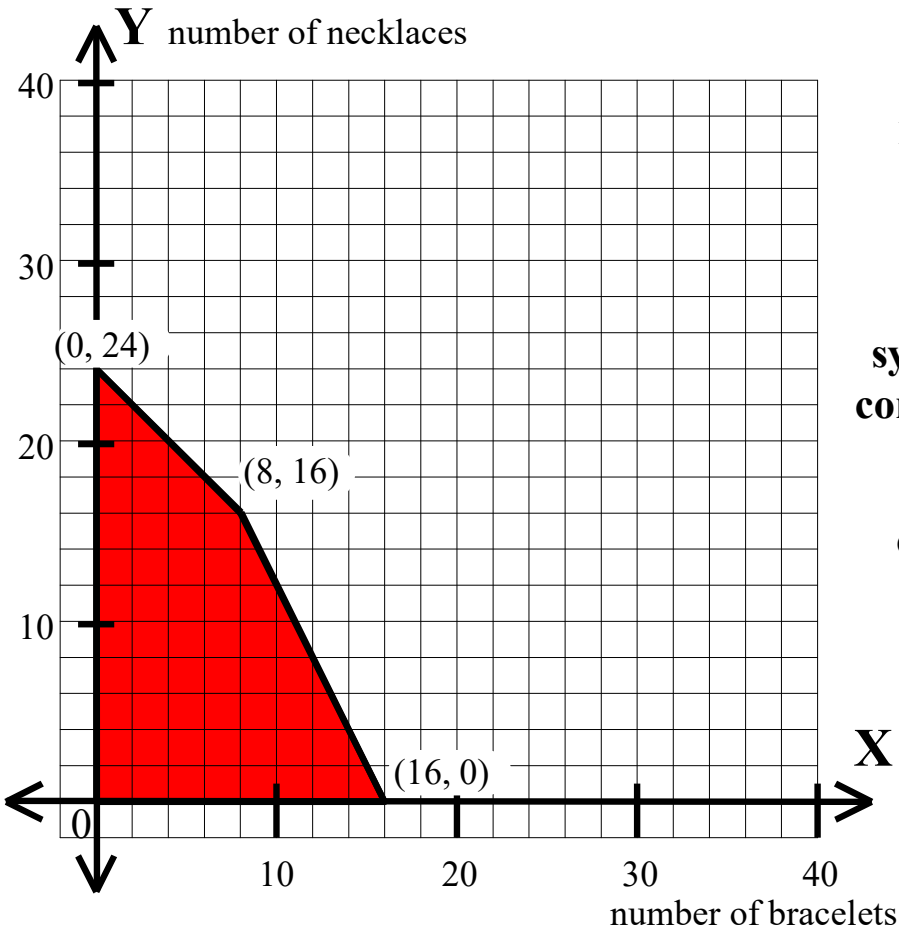
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system of constraints

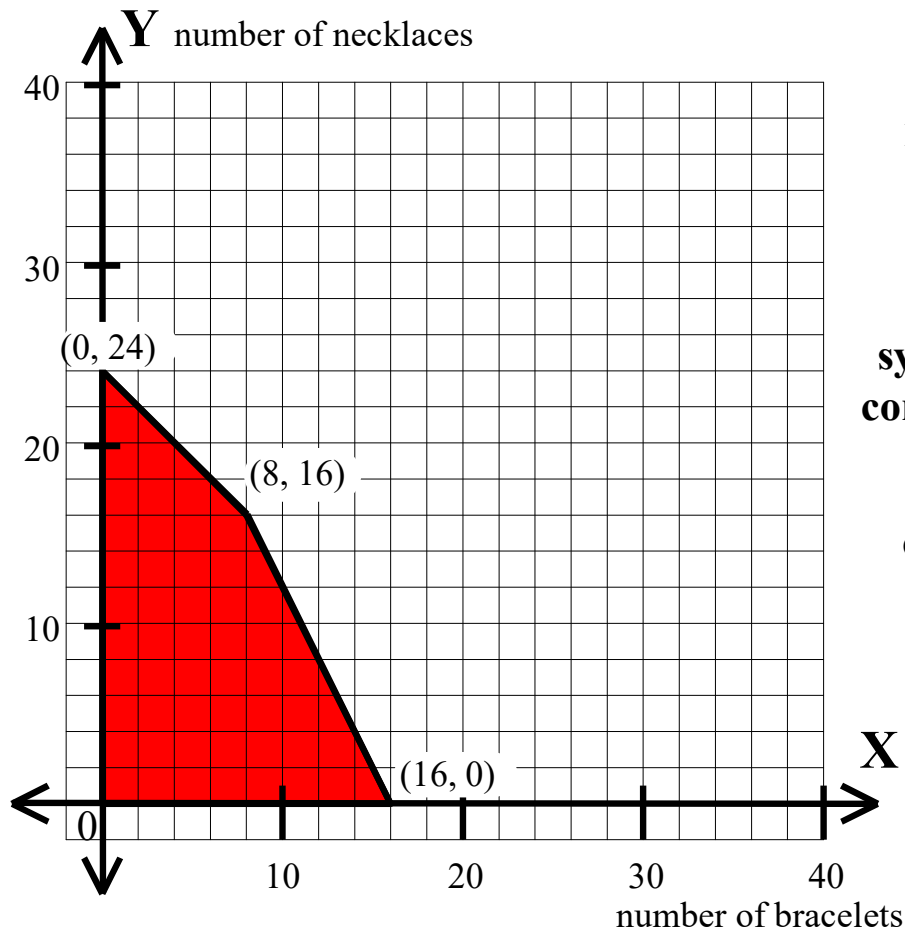
$$\begin{cases} x + y \leq 24 & \Rightarrow y \leq -x + 24 \\ x + .5y \leq 16 & \Rightarrow y \leq -2x + 32 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

objective function $\Rightarrow P =$



Algebra II Class Worksheet #5 Unit 4

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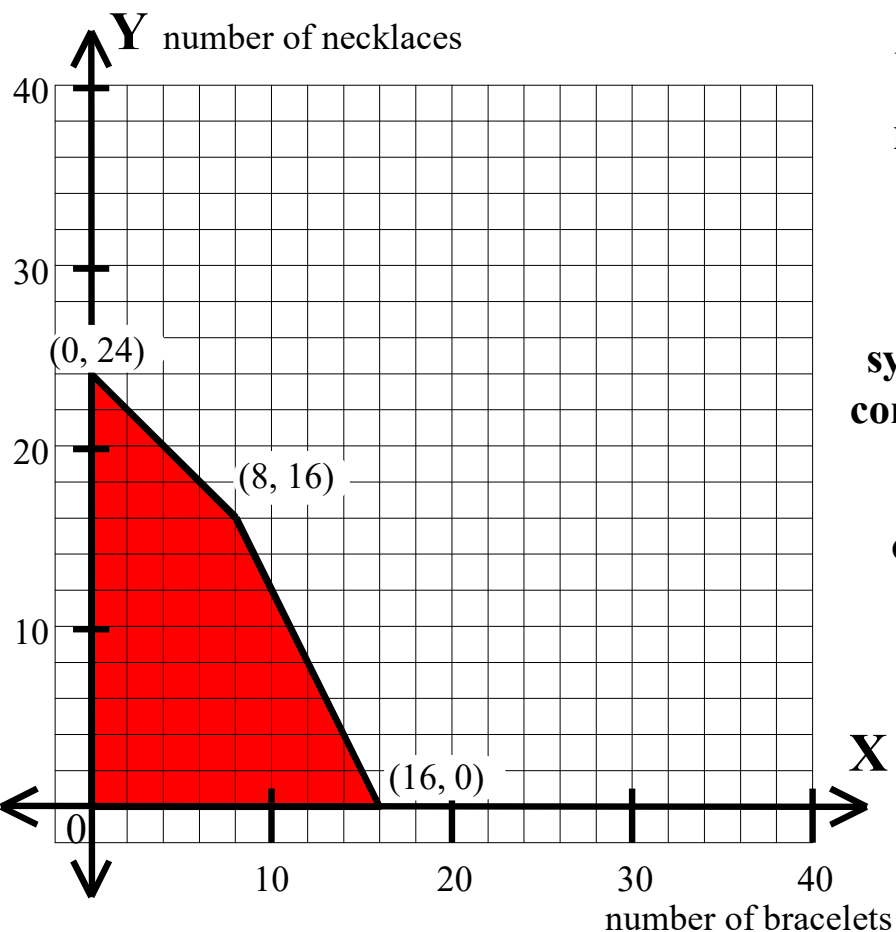
system of constraints

$$\begin{cases} x + y \leq 24 & \Rightarrow y \leq -x + 24 \\ x + .5y \leq 16 & \Rightarrow y \leq -2x + 32 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

objective function $\Rightarrow P = 4x$

Algebra II Class Worksheet #5 Unit 4

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	available	16	

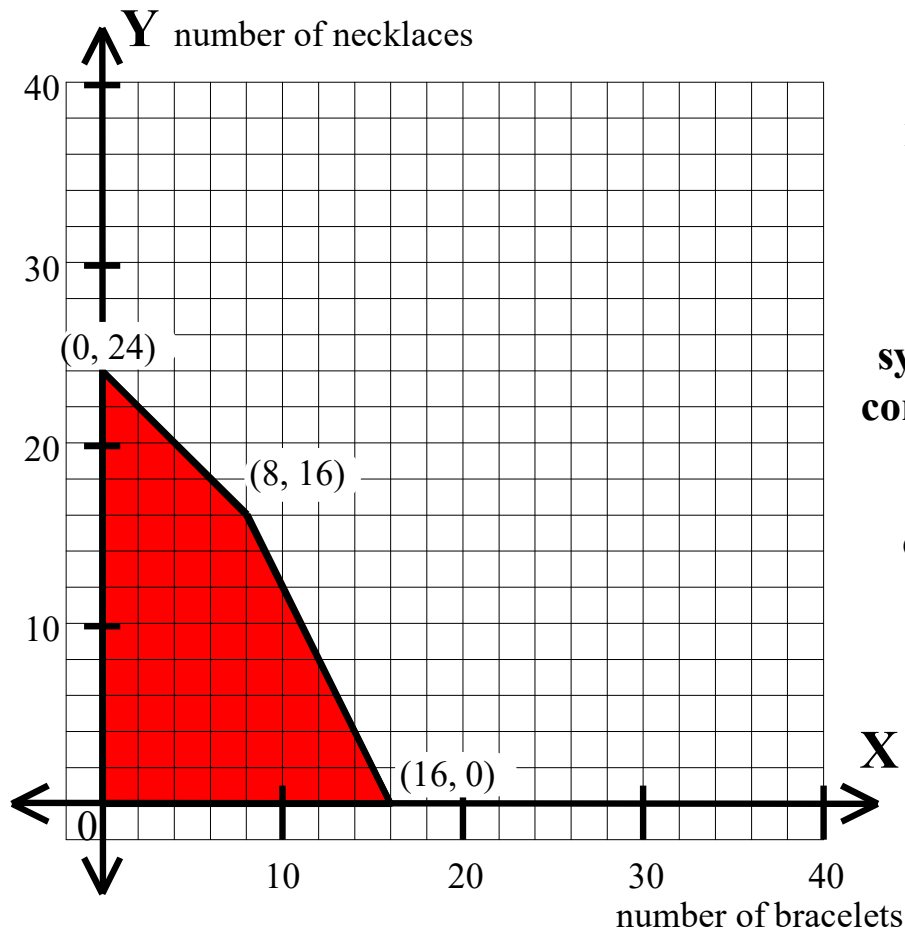
system of constraints

$$\begin{cases} x + y \leq 24 & \Rightarrow y \leq -x + 24 \\ x + .5y \leq 16 & \Rightarrow y \leq -2x + 32 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

objective function $\Rightarrow P = 4x + 3y$

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system of constraints

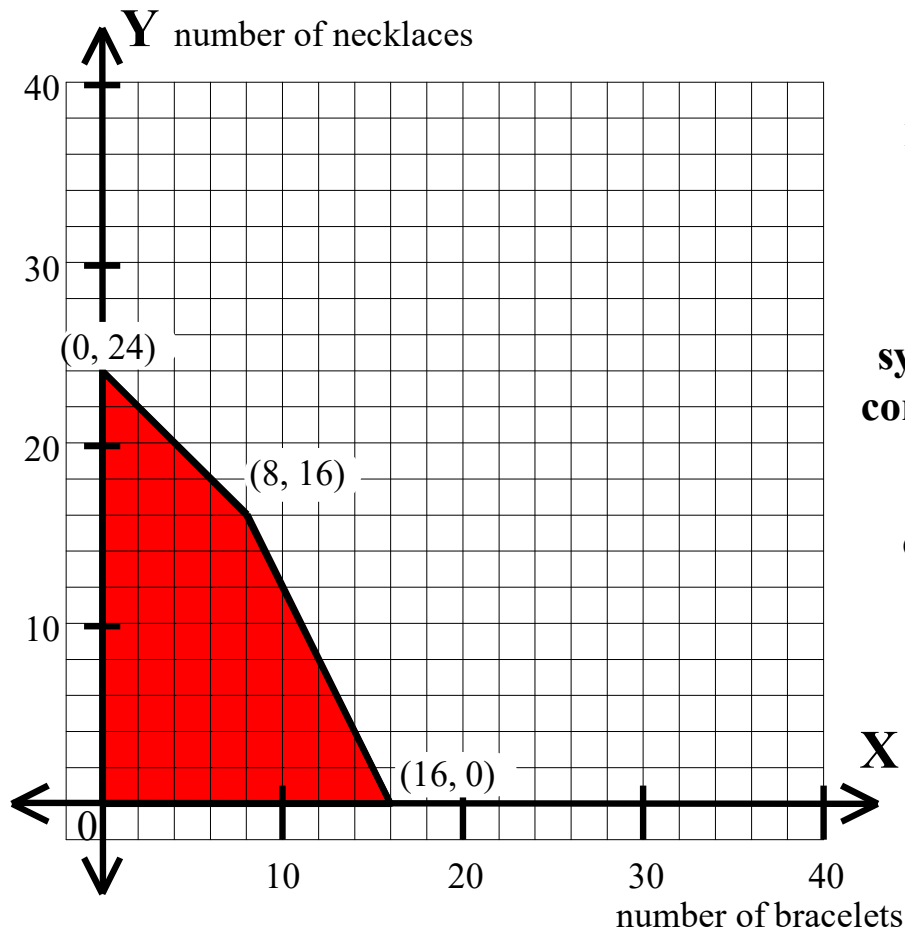
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objective function $\Rightarrow P = 4x + 3y$

The maximum value of P will occur at a vertex of the region.

Algebra II Class Worksheet #5 Unit 4

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objective function $\Rightarrow P = 4x + 3y$

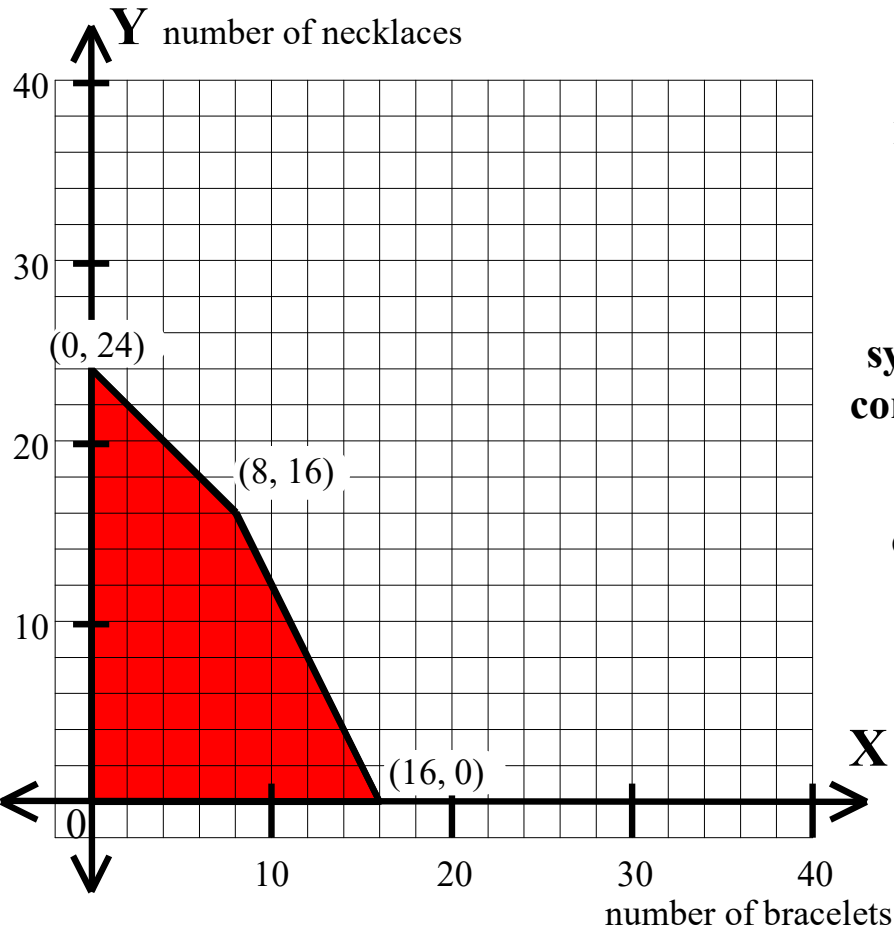
At $(0, 24)$

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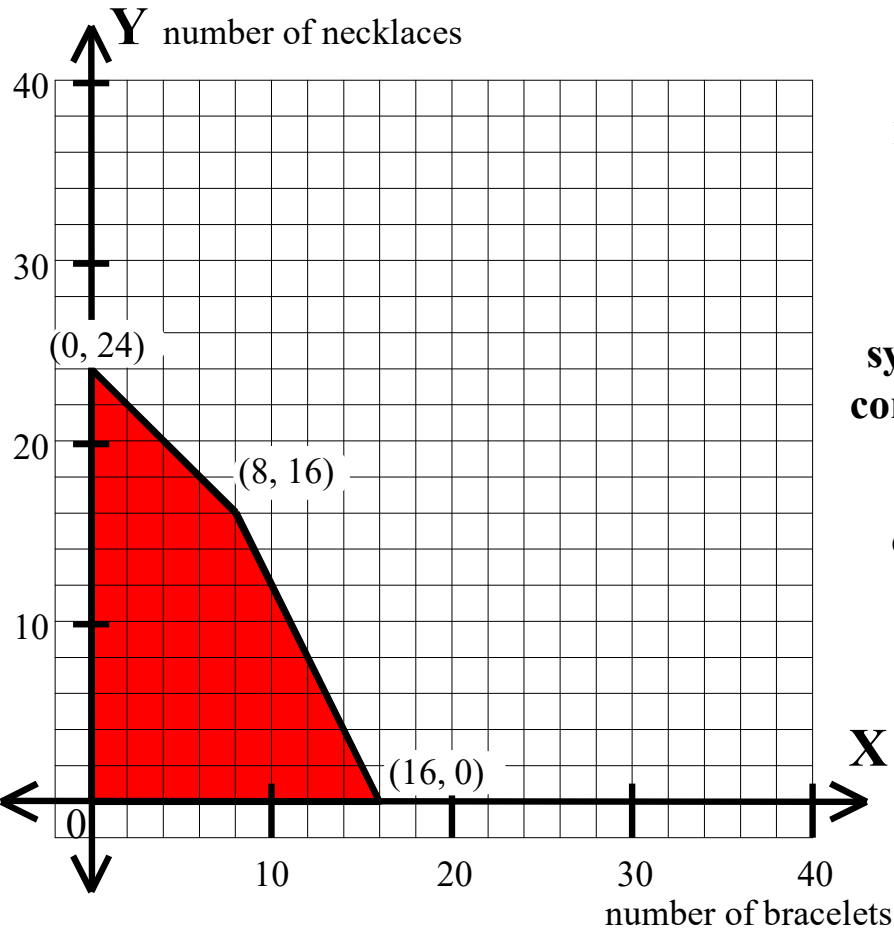
objective function $\Rightarrow P = 4x + 3y$

The maximum value of P will occur at a vertex of the region.

At $(0, 24) \Rightarrow P = 0 + 72 = 72$

Algebra II Class Worksheet #5 Unit 4

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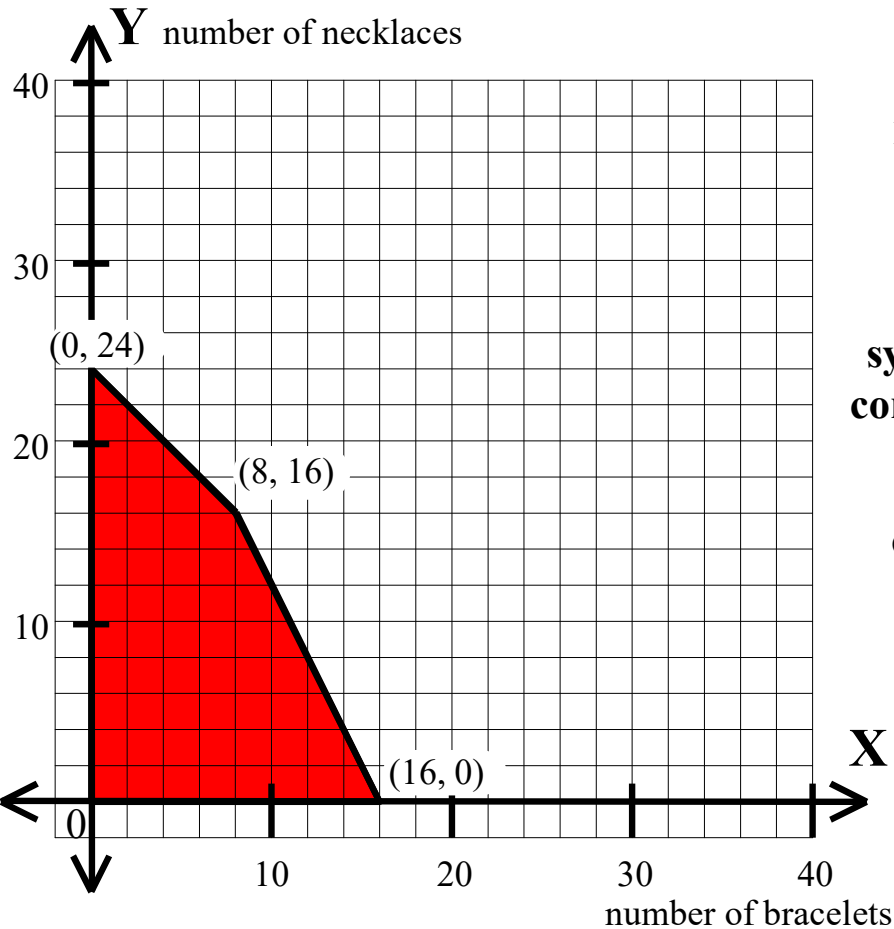
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At (0,24) $\Rightarrow P = 0 + 72 = 72$

At (8,16)

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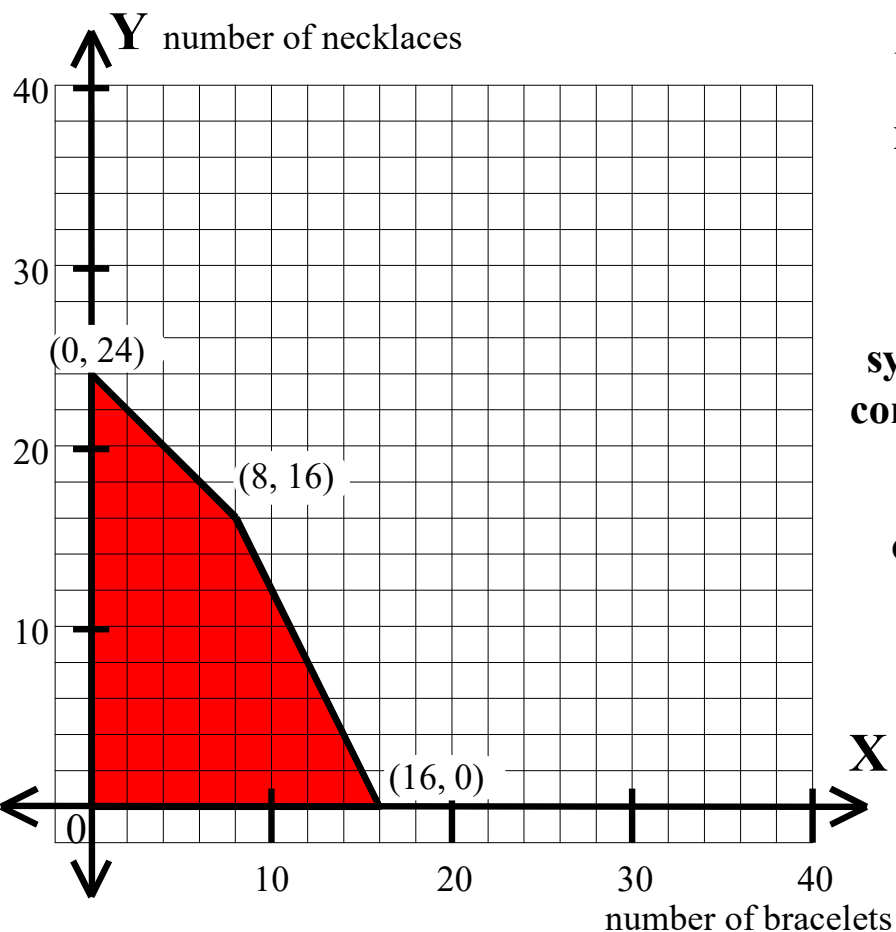
The maximum value of P will occur at a vertex of the region.

At (0,24) $\Rightarrow P = 0 + 72 = 72$

At (8,16) $\Rightarrow P = 32 + 48 = 80$

Algebra II Class Worksheet #5 Unit 4

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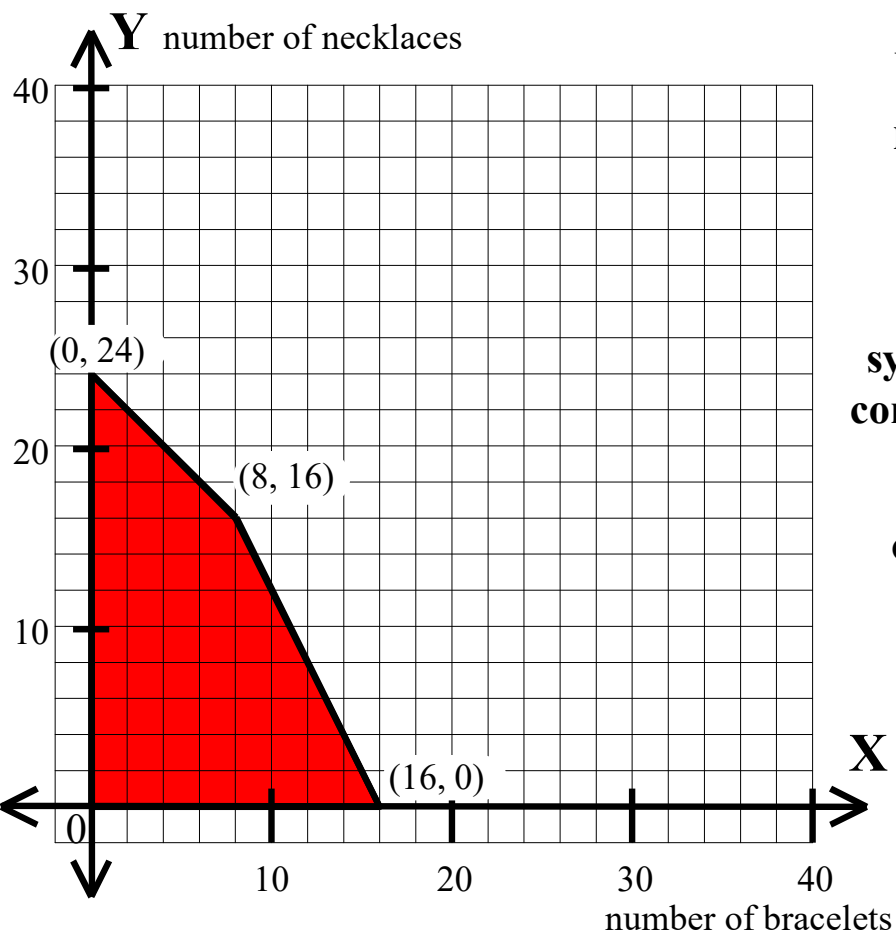
At (0,24) $\Rightarrow P = 0 + 72 = 72$

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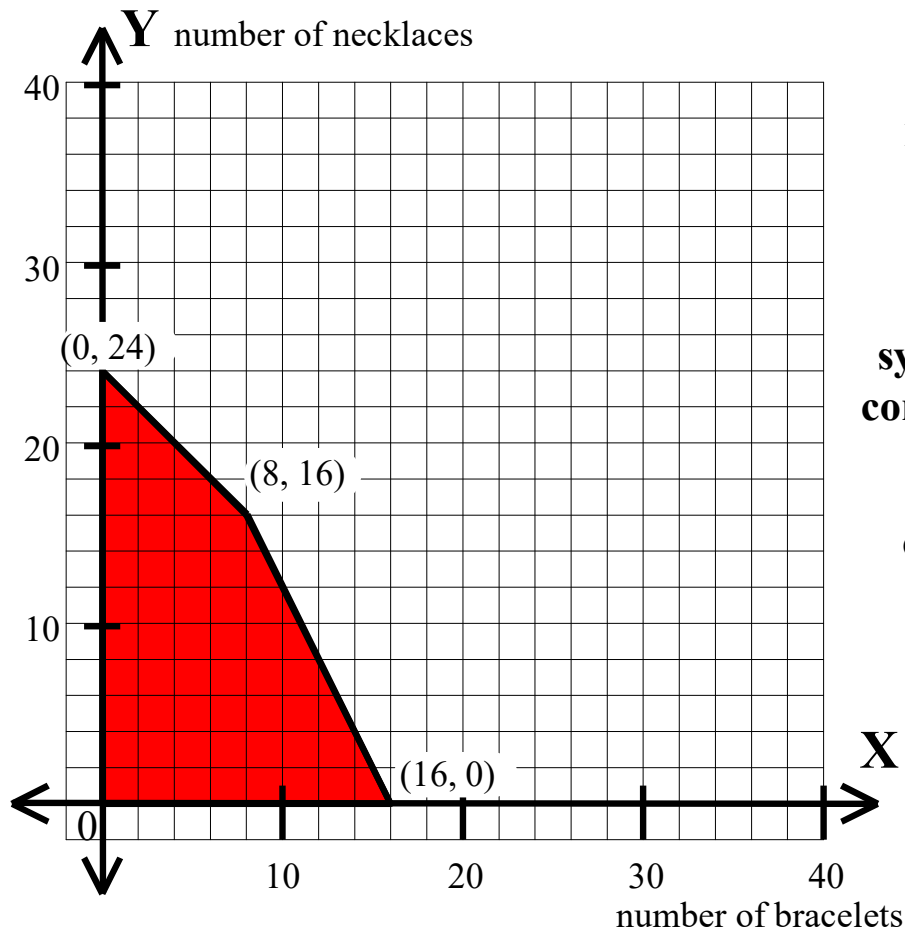
$$\text{At } (0, 24) \Rightarrow P = 0 + 72 = 72$$

$$\text{At } (8, 16) \Rightarrow P = 32 + 48 = 80$$

$$\text{At } (16, 0) \Rightarrow P = 64 + 0 = 64$$

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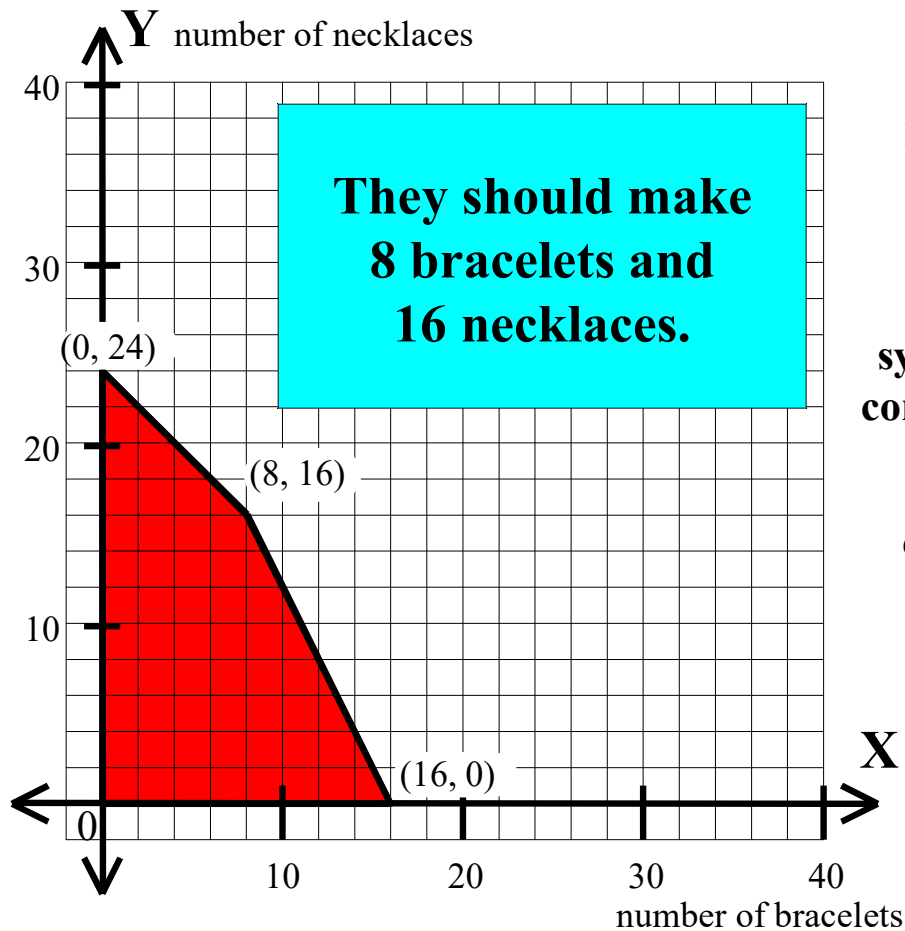
At (0,24) $\Rightarrow P = 0 + 72 = 72$

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The maximum value of P will occur at a vertex of the region.

At $(0, 24) \Rightarrow P = 0 + 72 = 72$

At $(8, 16) \Rightarrow P = 32 + 48 = 80$

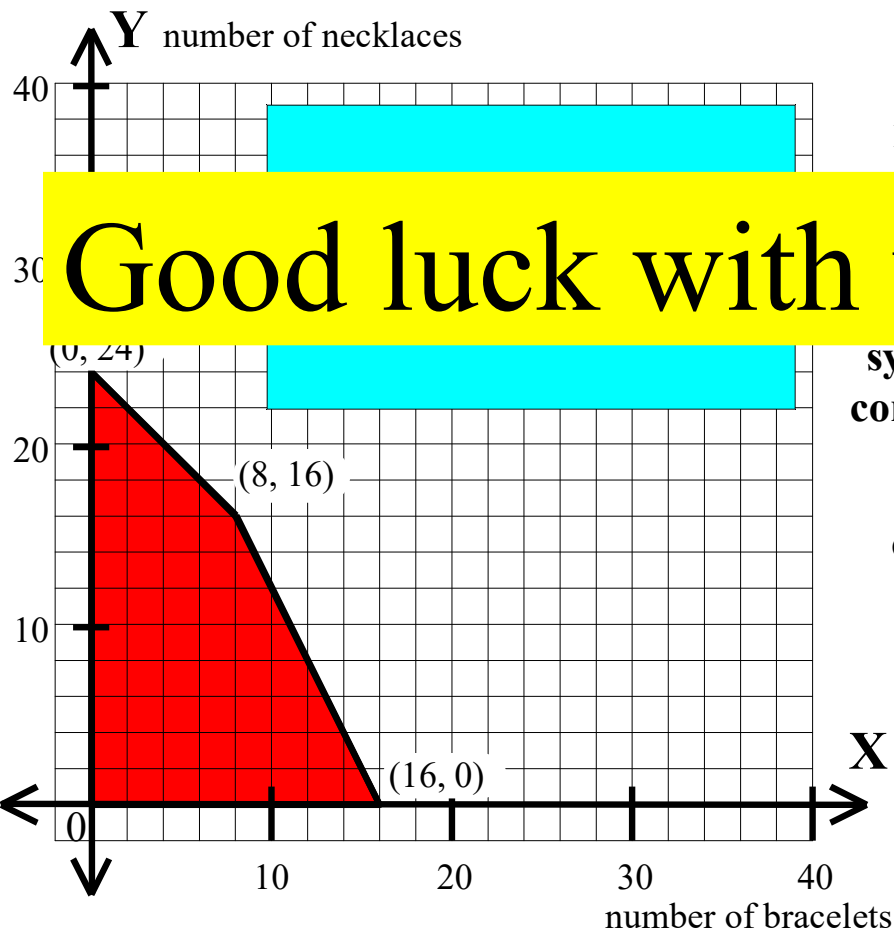
At $(16, 0) \Rightarrow P = 64 + 0 = 64$

Algebra II Class Worksheet #5 Unit 4

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Good luck with your homework !!



system of constraints

$$\begin{cases} x + .5y \leq 16 \\ x \geq 0 \\ y \geq 0 \end{cases} \quad \hookrightarrow \quad y \leq -2x + 32$$

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