



Rotate each shape. Answer as the new coordinates.

$\theta$  = Angle of Rotation

**Rotation Formula**

$$x1 = x \times \cos(\theta) - y \times \sin(\theta)$$

$$y1 = x \times \sin(\theta) + y \times \cos(\theta)$$

In the example to the right the shape is at coordinates (1,4). Lets find the coordinates if we rotated the shape  $60^\circ$ .

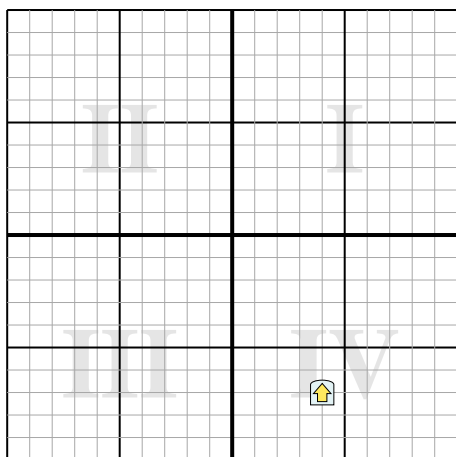


1.  $x1 = 1 \times \cos(60) - 4 \times \sin(60)$   
 $y1 = 1 \times \sin(60) + 4 \times \cos(60)$
2.  $x1 = 1 \times 0.5 - 4 \times 0.87$   
 $y1 = 1 \times 0.87 + 4 \times 0.5$
3.  $x1 = 0.5 - 3.48$   
 $y1 = 0.87 + 2$
4.  $x1 = -2.98$   
 $y1 = 2.87$
5. Looking at shape, we can see that rotated  $60^\circ$  it is at (-2.98 , 2.87).

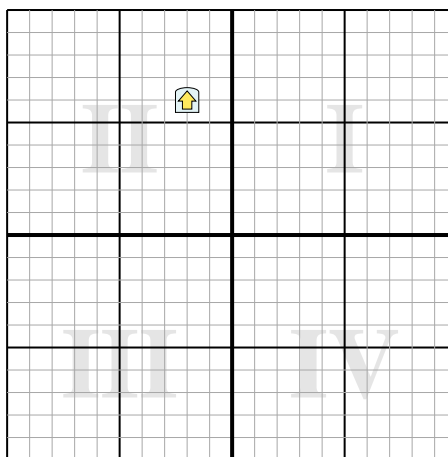
**Answers**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

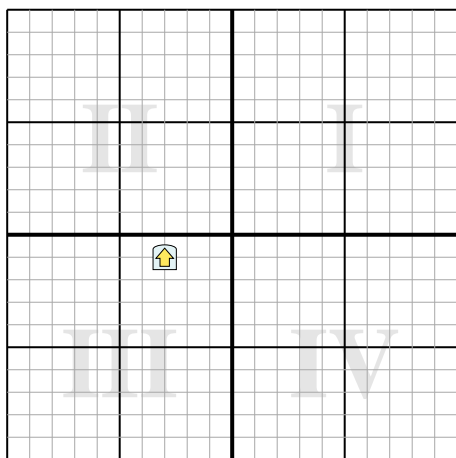
- 1) Rotate the shape  $-91^\circ$  around the point (0,0).



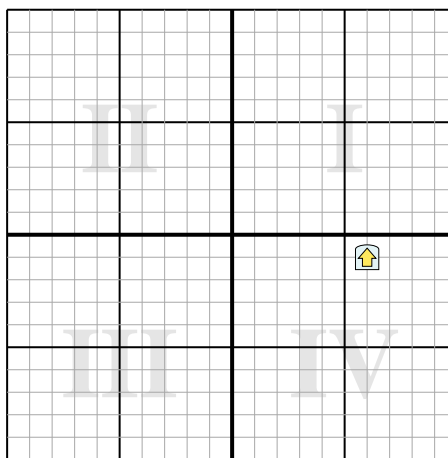
- 2) Rotate the shape  $-189^\circ$  around the point (0,0).



- 3) Rotate the shape  $-140^\circ$  around the point (0,0).



- 4) Rotate the shape  $202^\circ$  around the point (0,0).





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$$y1 = x \times \sin(\theta) + y \times \cos(\theta)$$

In the example to the right the shape is at coordinates (1,4). Lets find the coordinates if we rotated the shape 60°.



- $x1 = 1 \times \cos(60) - 4 \times \sin(60)$   
 $y1 = 1 \times \sin(60) + 4 \times \cos(60)$
- $x1 = 1 \times 0.5 - 4 \times 0.87$   
 $y1 = 1 \times 0.87 + 4 \times 0.5$
- $x1 = 0.5 - 3.48$   
 $y1 = 0.87 + 2$
- $x1 = -2.98$   
 $y1 = 2.87$
- Looking at shape, we can see that rotated 60° it is at (-2.98 , 2.87).

**Answers**

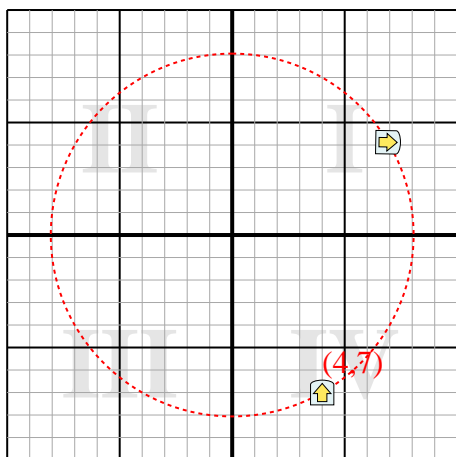
1. **(6.9,4.1)**

2. **(2.9,-5.6)**

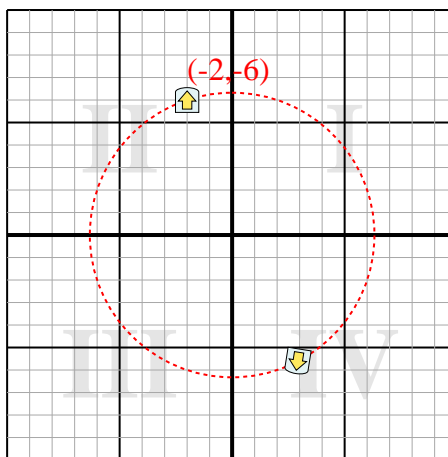
3. **(2.9,-1.2)**

4. **(-5.2,3.2)**

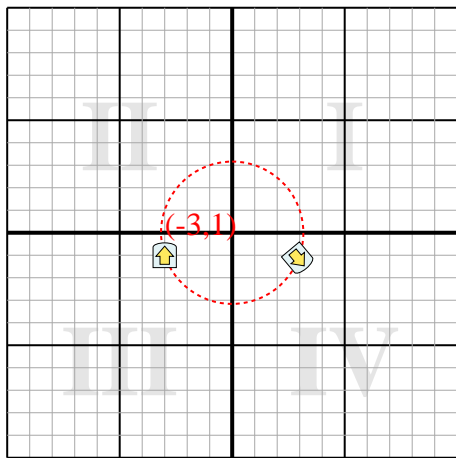
1) Rotate the shape -91° around the point (0,0).



2) Rotate the shape -189° around the point (0,0).



3) Rotate the shape -140° around the point (0,0).



4) Rotate the shape 202° around the point (0,0).

