



Rotate each shape. Answer as the new coordinates.

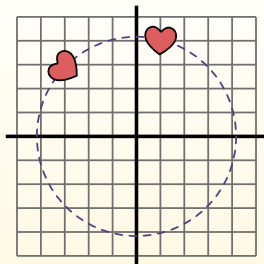
$\theta$  = Angle of Rotation

## 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  $60^\circ$ .



$$1. \quad \begin{aligned} x1 &= 1 \times \cos(60) - 4 \times \sin(60) \\ y1 &= 1 \times \sin(60) + 4 \times \cos(60) \end{aligned}$$

$$2. \quad \begin{aligned} x1 &= 1 \times 0.5 - 4 \times 0.87 \\ y1 &= 1 \times 0.87 + 4 \times 0.5 \end{aligned}$$

$$3. \quad \begin{aligned} x1 &= 0.5 - 3.48 \\ y1 &= 0.87 + 2 \end{aligned}$$

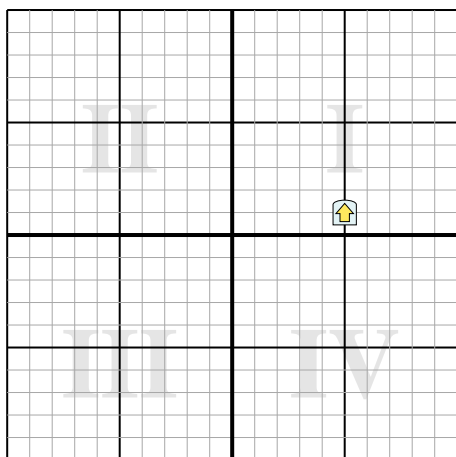
$$4. \quad \begin{aligned} x1 &= -2.98 \\ y1 &= 2.87 \end{aligned}$$

5. Looking at shape, we can see that rotated  $60^\circ$  it is at (-2.98 , 2.87).

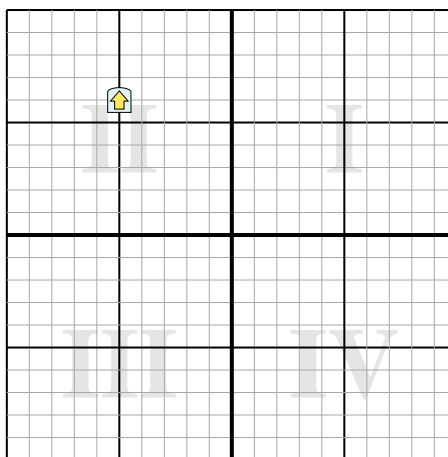
## Answers

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

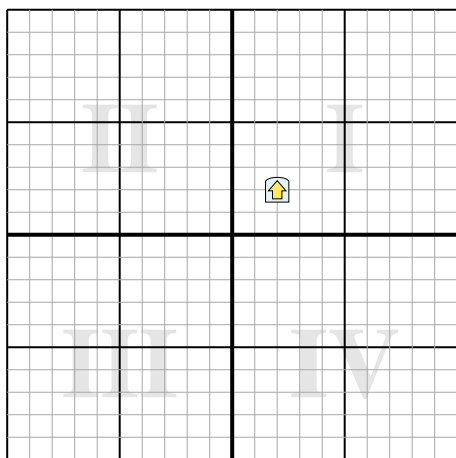
- 1) Rotate the shape  $203^\circ$  around the point (0,0).



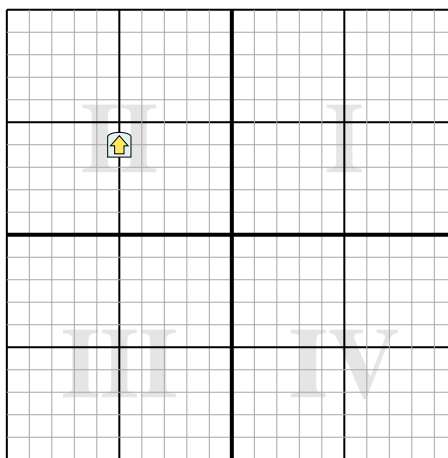
- 2) Rotate the shape  $-102^\circ$  around the point (0,0).



- 3) Rotate the shape  $228^\circ$  around the point (0,0).



- 4) Rotate the shape  $-168^\circ$  around the point (0,0).

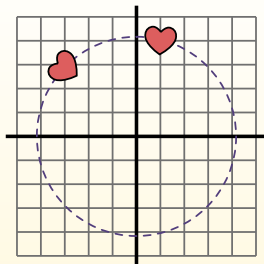


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$$x1 = x \times \cos(\theta) - y \times \sin(\theta)$$

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

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.  $x1 = 0.5 - 3.48$

$$y1 = 0.87 + 2$$

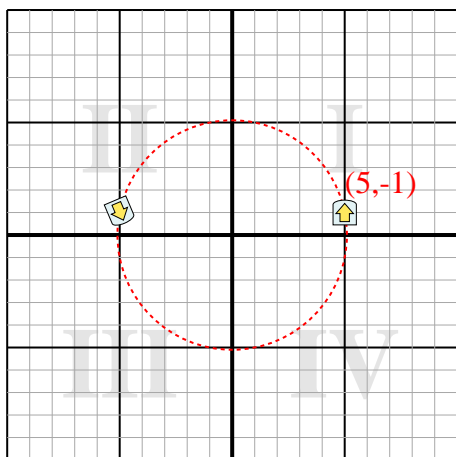
4.  $x1 = -2.98$

$$y1 = 2.87$$

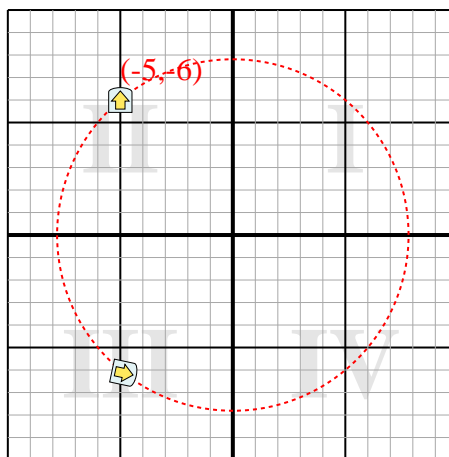
5. Looking at shape, we can see that rotated  $60^\circ$  it is at  $(-2.98, 2.87)$ .

**Answers**1.  **$(-5, 1)$** 2.  **$(-4.8, -6.1)$** 3.  **$(-2.8, 0.1)$** 4.  **$(4.1, -5)$** 

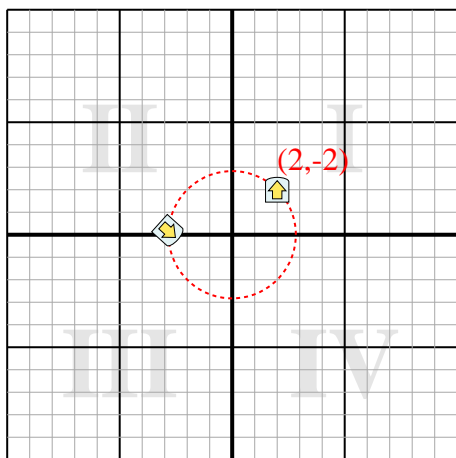
- 1) Rotate the shape  $203^\circ$  around the point (0,0).



- 2) Rotate the shape  $-102^\circ$  around the point (0,0).



- 3) Rotate the shape  $228^\circ$  around the point (0,0).



- 4) Rotate the shape  $-168^\circ$  around the point (0,0).

