

Worksheet 13.7 (2)
Rotations

$$\begin{aligned} 90^\circ (x,y) &\rightarrow (-y,x) \\ 180^\circ (x,y) &\rightarrow (-x,-y) \\ 270^\circ (x,y) &\rightarrow (y,-x) \end{aligned}$$

Name: key

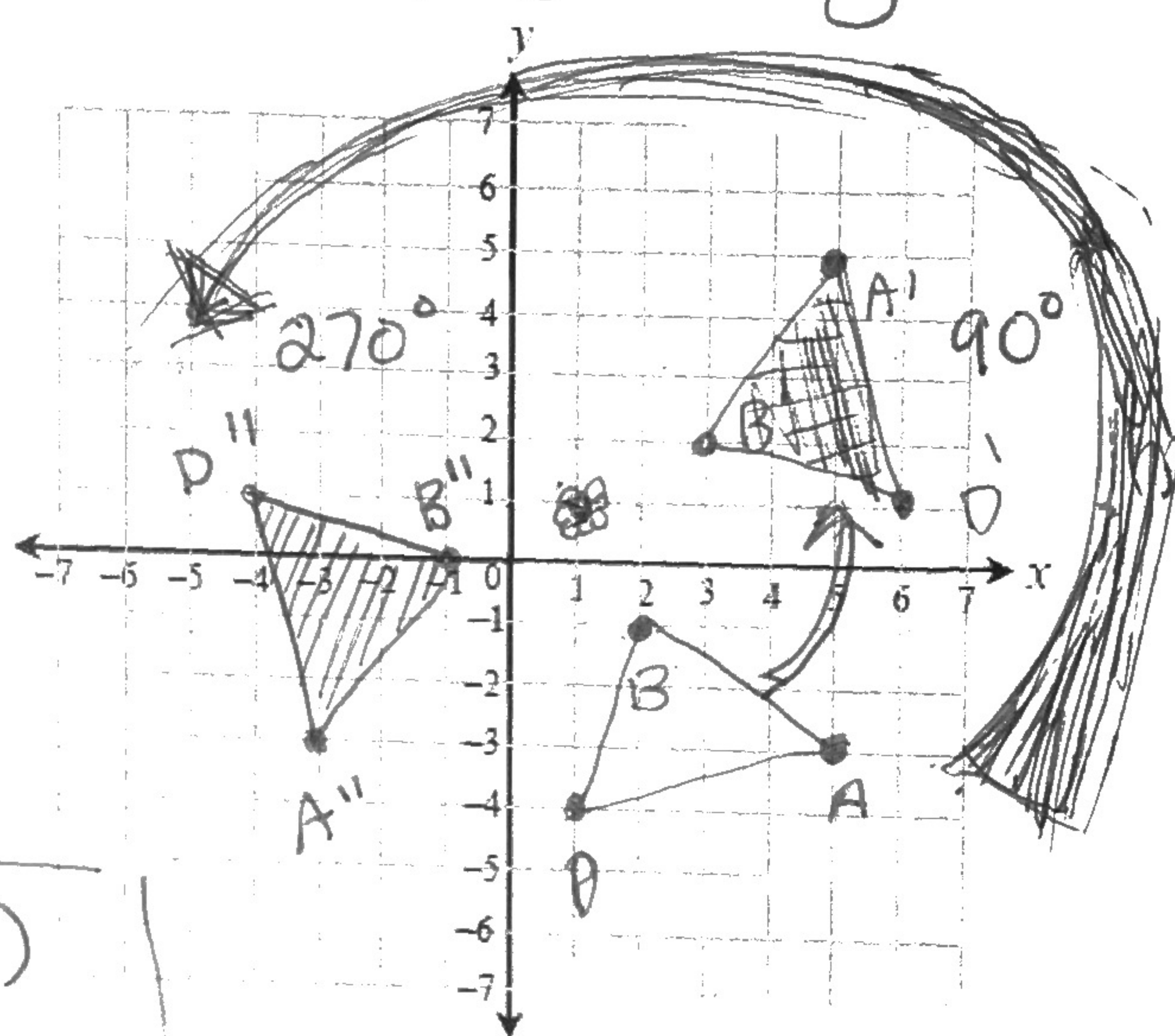
$$\begin{aligned} (x,y) &\rightarrow (x-1, y-1) \\ -(1,1) & \\ &\rightarrow -y+1, x-1 \\ &+ (1,1) \end{aligned}$$

Directions: Rotate each figure about point C, by the indicated degree measures. Make sure to list the first transformation as prime and second transformation as double prime.

1. Figure $B(2,-1), A(5,-3), D(1,-4)$ rotated 90° and 270° counter clockwise around the point $C(1,1)$.

90°

$B(2,-1)$	$A(5,-3)$	$D(1,-4)$
- point of R	- $(1,1)$	- $(1,1)$
$B(2,-1)$	$(4,-4)$	$(x,y) (0,-5)$
- $C(1,1)$	$(4,4)$	$(-y,x) (5,0)$
$(x,y) (1,-2)$	$+ (1,1)$	$+ P(1,1)$
$(-y,x) (2,1)$	$A'(5,5)$	$D'(6,1)$
$+ P(1,1)$		



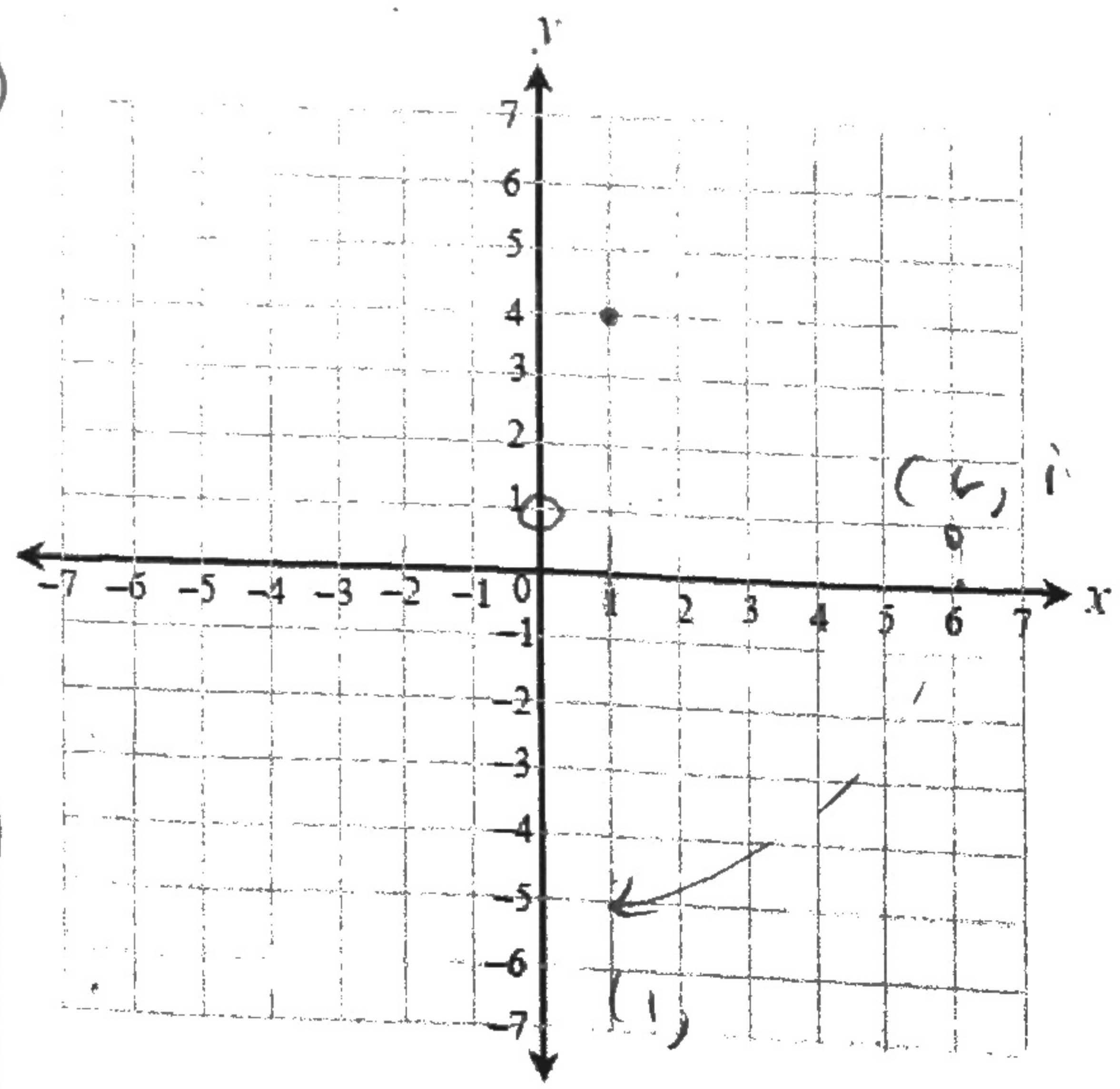
Do the MATH, not by graphing!

$B'(3,2)$

$90^\circ: B'(3,2) A'(5,5) D'(6,1)$
$270^\circ: B''(-1,0) A''(-3,-3) D''(-4,1)$

2. Figure $S(1,4), Q(3,2), U(6,5), A(4,7)$ rotated 180° and 270° counter clockwise around the point $C(0,1)$.

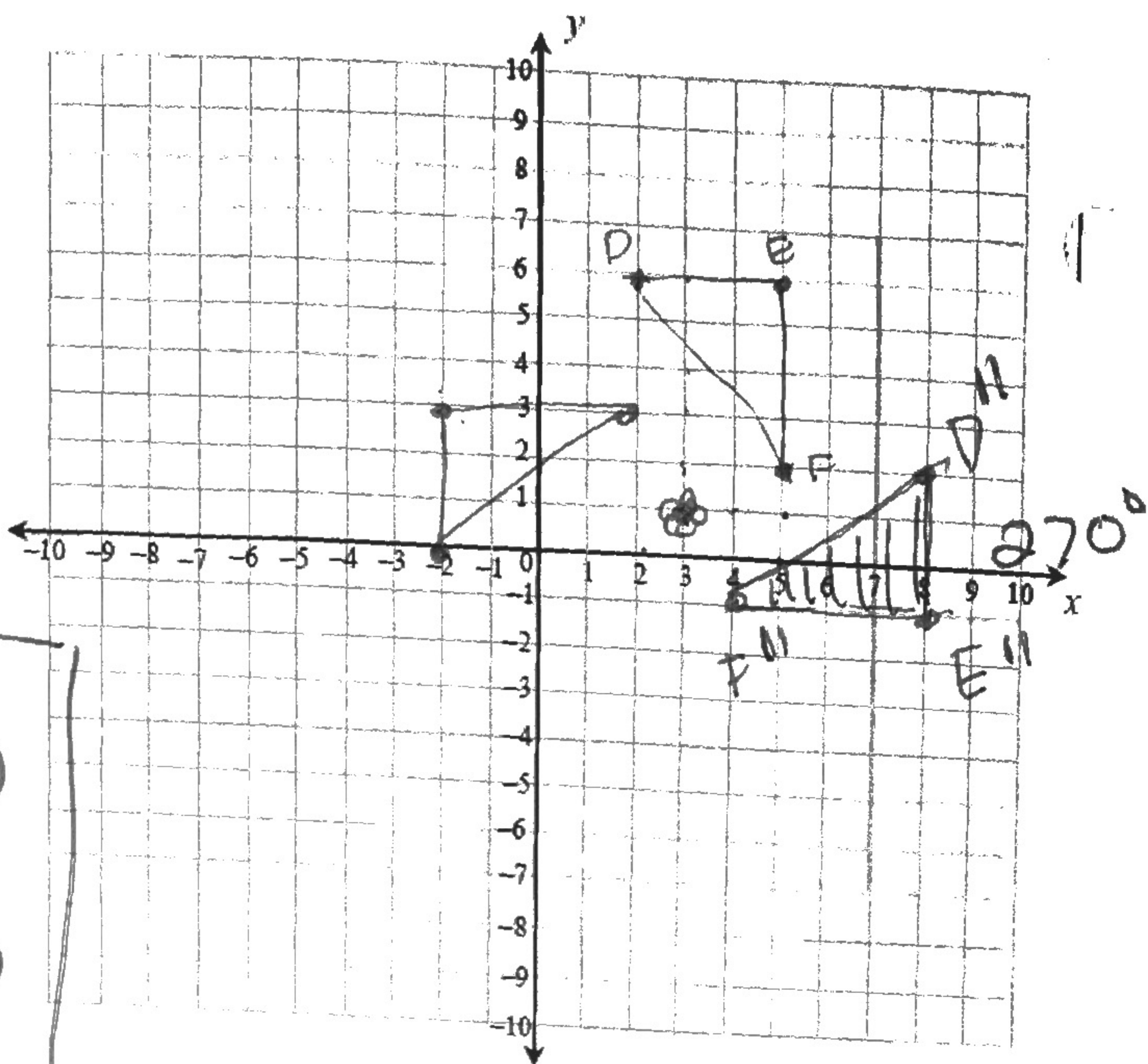
180° around $(0,1)$	}	270° around $(0,1)$
(x,y)		(x,y)
$- (0,1)$		$- (0,1)$
$(x, y-1)$		$(x, y-1)$
$(-x, -y+1)$		$(y-1, -x)$
$+ (0,1)$		$+ (0,1)$
$(-x, -y+2)$		$(y-1, -x+1)$
$S'(-1,-2)$	}	$S''(3,0)$
$Q'(-3,0)$		$Q''(1,-2)$
$U'(-6,-3)$		$U''(4,-5)$
$A'(-4,-5)$		$A''(6,-3)$



3. Figure $D(2,6), E(5,6), F(5,2)$ rotated 90° and 270° counter clockwise around the point $C(3,1)$.

$$90^\circ: \begin{pmatrix} (x,y) \\ -(3,1) \\ (x-3, y-1) \\ (-y+1, x-3) \\ + (3, 1) \\ (-y+4, x-2) \end{pmatrix}$$

$$270^\circ: \begin{pmatrix} (x,y) \\ -(3,1) \\ (x-3, y-1) \\ (y-1, -x+3) \\ + (3, 1) \\ (y+2, -x+4) \end{pmatrix}$$



$90^\circ: D'(8,2) E'(8,-1) F'(4,-1)$
 $270^\circ: D''(-2,0) E''(-2,3) F''(2,3)$

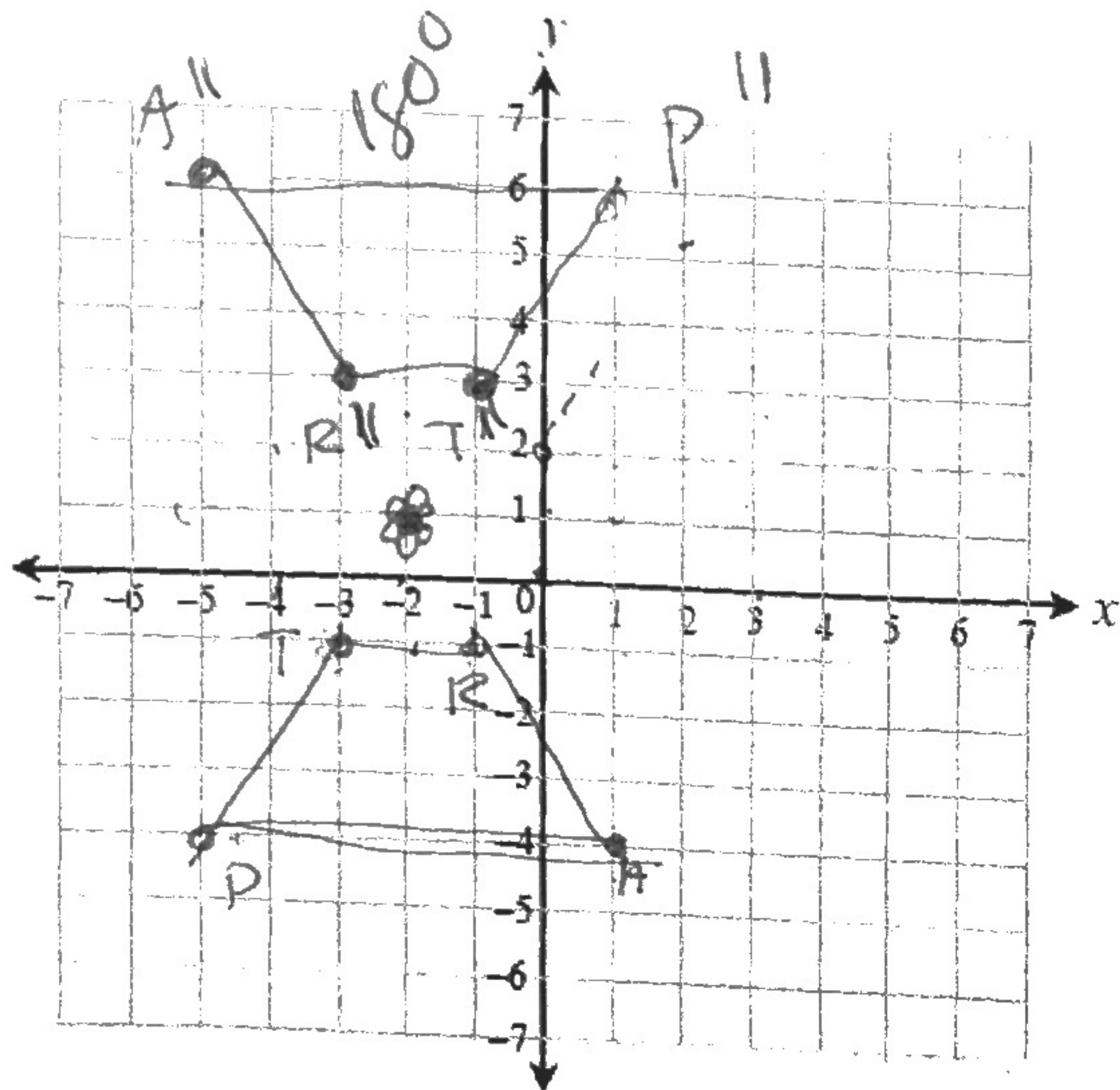
4. Figure $T(-3,-1), R(-1,-1), A(1,-4), P(-5,-4)$ rotated 90° and 180° counter clockwise around the point $C(-2,1)$.

$$\begin{matrix} T(-3,-1) & R(-1,-1) \\ + (+2,1) & + (+2,1) \\ (x,y) \begin{pmatrix} -1, 2 \\ (-x,y) \end{pmatrix} & \begin{pmatrix} 1, -2 \\ (-x,y) \end{pmatrix} \\ + (-2,1) & + (-2,1) \end{matrix}$$

$T'(-1,3)$

$$90^\circ: \begin{pmatrix} (x,y) \\ -(-2,1) \\ (x+2, y-1) \\ (-y+1, x+2) \\ + (-2, 1) \\ (-y-1, x+3) \end{pmatrix}$$

$$180^\circ: \begin{pmatrix} (x+2, y-1) \\ -(-x-2, -y+1) \\ + (-2, 1) \\ (-x-4, -y+2) \end{pmatrix}$$



$90^\circ: T'(0,0) R'(0,2) A'(3,4) P'(3,-2)$
 $180^\circ: T''(-1,3) R''(-3,3) A''(-5,6) P''(1,6)$