Name ______________________________ Period ____________ Date ______________

Intermediate II
Chapter 6 Review

6.1 (Translations)

Remember: Translations are just SLIDING the image around the coordinate plane
Pre-image: original image (A, B, C)
Image: new image AFTER transformation of any kind (A', B', C')
IF you're moving LEFT OR RIGHT, this affects your X-COORDINATE.
IF you're moving UP OR DOWN, this affects your Y-COORDINATE.
TRANSLATION NOTATION: (change in all x-coordinates, change in all y-coordinates)
Example: Shift the pre-image left 3 and up 4: (x – 3, y + 4)

Sample Problems:
Write the following transformations in translation notation.

1. Shift 3 down and 4 to the right.
2. Shift 2 up and 6 to the left
3. Shift 4 down ?

5 to the right.

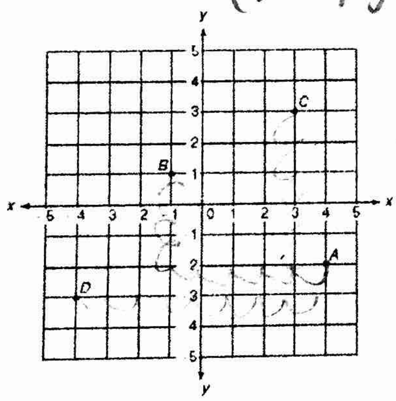
(x+4, y−3)   (x−6, y+2)   (x, y−4)

4. $A(3,-4) \rightarrow A'(5,0)$

(x+2, y+4)

5. $B(-4,-2) \rightarrow B'(-6,2)$

(x−2, y+4)



6. Translation notation from point D to point A:

(x+8, y+1)

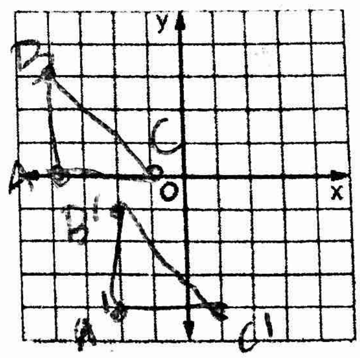
7. Translation notation from point A to point B:

(x−5, y+3)

8. Translation notation from point C to point A:

(x+1, y−5)

9. Graph triangle A(-4, 0), B(-4, 3), and C(-1, 0) and its image after a translation of (x+2,y-4).



10. Give the vertices of W(-1, -3), X(-1, 2), Y(2, -3), Z(2, 2) after a translation of 5 units up and 3 units to the right.

(x+3, y+5)

W'(2, 2) X'(2, 7) Y'(5, 2) Z'(5, 7)

6.2 Reflections

REFLECTION: a mirror image that is CONGRUENT to the pre-image

Two lines of symmetry (this year ☺):

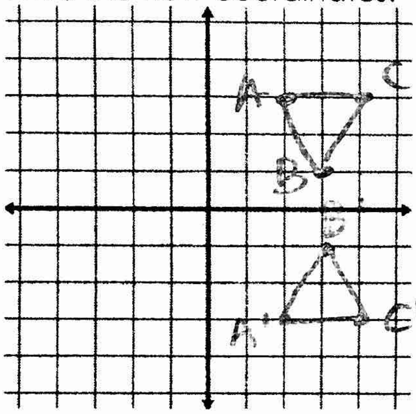
Reflection over the X-AXIS: x-coordinate stays the same; y-coordinate changes signs (same, –)

Reflection over the Y-AXIS: x-coordinate changes signs; y-coordinate stays the same (– , same)

Sample Problems:

1. Graph the following triangle on both coordinate planes below.
Triangle ABC has coordinates $A(2,3)$ $B(3,1)$ and $C(4,3)$.

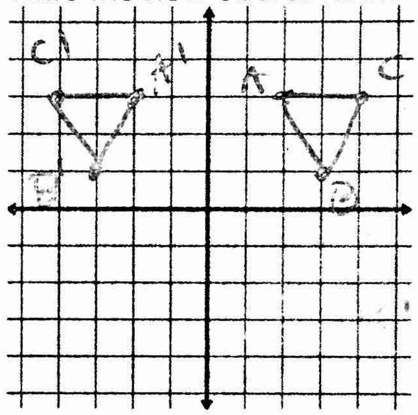
Graph triangle ABC's reflection over the x-axis. Write the new coordinates.



New coordinates:

A'(2,-3)
B'(3,-1)
C'(4,-3)

Graph triangle ABC's reflection over the y-axis. Write the new coordinates.

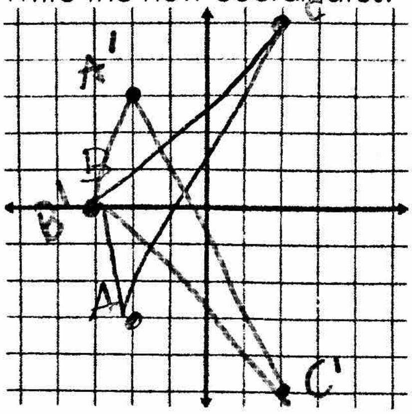


New coordinates:

A'(-2,3)
B'(-3,1)
C'(-4,3)

2. Graph the following triangle on both coordinate planes below.
Triangle DEF has coordinates $A(-2,-3)$ $B(-3,0)and$ $C(2,5)$.

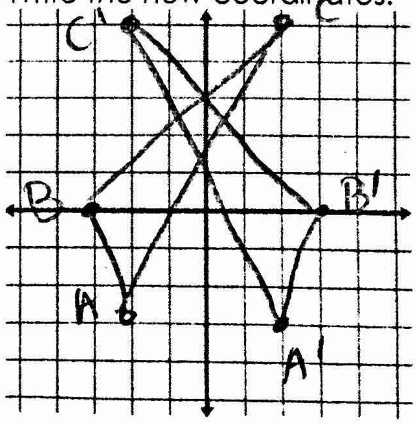
Graph triangle ~~DEF's~~ ABC reflection over the x-axis. Write the new coordinates.



New coordinates:

A'(-2,3)
B'(-3,0)
C'(2,-5)

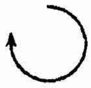
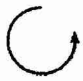
Graph triangle ~~DEF's~~ ABC reflection over the y-axis. Write the new coordinates.



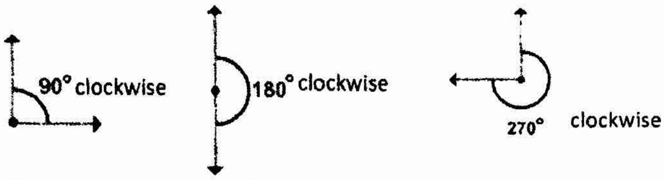
New coordinates:

A'(2,-3)
B'(3,0)
C'(2,-5)

6.3 Rotations

Rotations are clockwise (to the  right) or counter-clockwise  (to the left)

Degrees we use (this year ☺) are 90°, 180°, *and* 270°



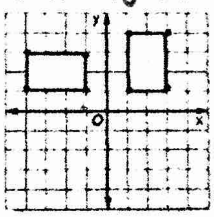
*90° *clockwise is* 270° *counterclockwise,*
180° *clockwise is* 180° *counterclockwise,* 270° *clockwise is* 90° *counterclockwise*

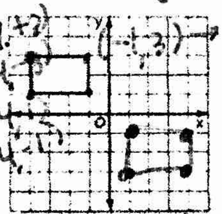
There are two kinds of rotations:

* Rotation about the origin
* Rotation about a fixed point (not the origin)

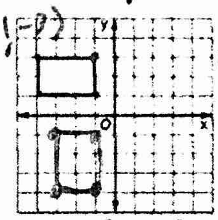
Rotations about the ORIGIN

90°	180°	270°
Clock-wise: (x, y) → (y, -x)	Clock-wise: (x, y) → (-x, -y)	Clock-wise: (x, y) → (-y, x)
Counter Clock-wise: (x, y) → (-y, x)	Counter Clock-wise: (x, y) → (-x, -y)	Counter Clock-wise: (x, y) → (y, -x)



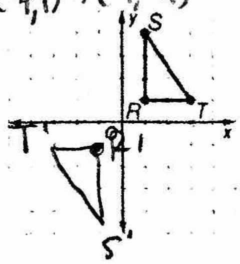


(-4, +2) (-1, 3) → (1, -2)
(-4, 1) (-1, 1)
(-1, 1) → (1, -1)



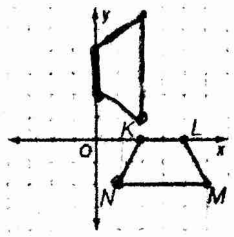
(-1, 3) → (-3, -1)
(-4, 1) → (-1, -4)

Triangle *RST* has vertices *R*(1, 1), *S*(1, 4), and *T*(3, 1). Graph the figure and its rotated image after a clockwise rotation of 180° about the origin. Then give the coordinates of the vertices for triangle *R'S'T'*.



R'(-1, -1) T'(-3, -1)
S'(-1, -4)

Quadrilateral *KLMN* has vertices *K*(2, 0), *L*(4, 0), *M*(5, −2), and *N*(1, −2). Graph the figure and its rotated image after a counterclockwise rotation of 90° about the origin. Then give the coordinates of the vertices for quadrilateral *K'L'M'N'*.

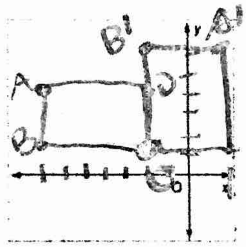


K'(0, 2) L'(0, 4)
M(2, 5) N(2, 1)

(+1, -2)
+2, +1 (5, -2)
(2, 5)

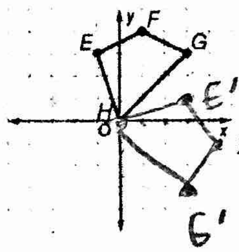
Rotations about a Fixed Point

Rectangle *ABCD* with vertices *A*(−7, 4), *B*(−7, 1), *C*(−2, 1), and *D*(−2, 4) represents the bed in Jackson's room. Graph the figure and its image after a clockwise rotation of 90° about vertex *C*. Then give the coordinates of the vertices for rectangle *A'B'C'D'*.



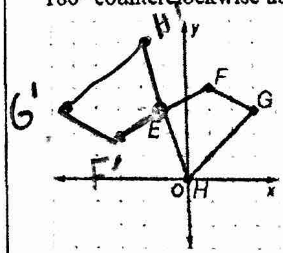
A'(1, 6) B'(-2, 6) C'(-2, 1) D'(1, 1)

90° clockwise about vertex *H*



$\overline{HG}$ → 3 ↑ 3
↓ 3 → 3
$\overline{HE}$ ← 1 ↑ 3
↑ 1 → 3

180° counterclockwise about vertex *E*



$\overline{HF}$ → 1 ↑ 4
↓ 1 → 4

$\overline{EF}$ ↑ 1 → 2
↓ 1 ← 2

$\overline{EH}$ → 1 ↓ 3
← 1 ↑ 3

$\overline{EG}$ → 4
← 4

6.4 Dilations

Multiply each x value and each y value by the scale factor (k)

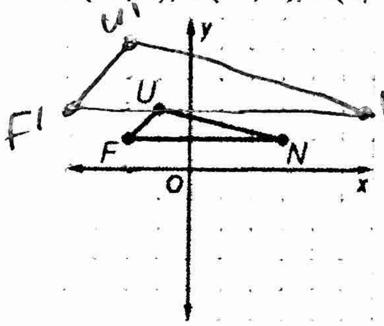
$k > 1$, then the dilation is an enlargement (get's bigger)

$0 < k < 1$, then the dilation is a reduction (get's smaller)

$k = 1$, then the figure stays the same size

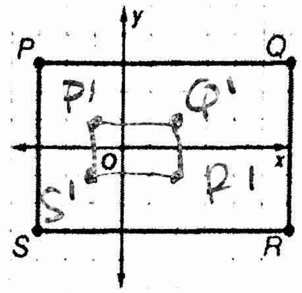
Sample Problems:

$F(-2, 1)$, $U(-1, 2)$, $N(3, 1)$; $k = 2$



$F'(-4, 2)$
$U'(-2, 4)$
$N'(6, 2)$

$P(-3, 3)$, $Q(6, 3)$, $R(6, -3)$, $S(-3, -3)$; $k = \frac{1}{3}$



$P'(-1, 1)$
$Q'(2, 1)$
$R'(2, -1)$
$S'(-1, -1)$

David built a model of a regulation basketball court. His model measured approximately 3.75 feet long by 2 feet wide. The dimensions of a regulation court are 94 feet long by 50 feet wide. What is the scale factor David used to build his model?

$k = 25$

94 ft
actual 50 ft

3.75 ft
model 2 ft

$\frac{94}{3.75} \approx 25$

$\frac{50}{2} \approx 25$

Review of Solving Equations

$-3x - 4 = 4x + 10$

$+3x \quad +3x$

$-4 = 7x + 10$

$-10 \quad -10$

$\frac{-14}{7} = \frac{7x}{7}$ $\quad x = -2$

$2(m + 3) - 5 = 5 + 2m$

$2m + 6 - 5 = 5 + 2m$

$2m + 1 = 5 + 2m$

$-2m \quad -2m$

$1 \neq 5$

NO solution

$5(z + 1) + 14 = 19 - 2z + 7z$

$5z + 5 + 14 = 19 + 5z$

$5z + 19 = 5z + 19$

$-5z \quad -5z$

$19 = 19$ All real numbers