$r_{x\text{-axis}}(\triangle ABC)$

$T_{\langle 6,1\rangle}(\triangle A'B'C')$

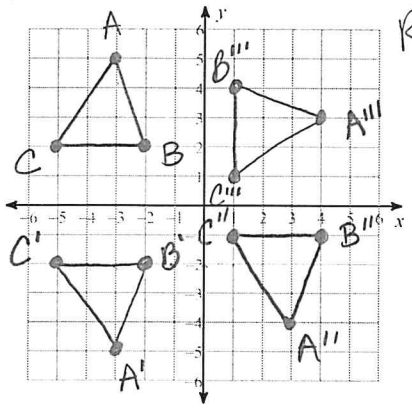
$R_{90°}(A''B''C'')$

$270°\ (x,y) \Rightarrow (y,-x)$

$A''(3,-1) \Rightarrow -1,-3$

$B''(6,0) \Rightarrow 0,-6$

$C''(6,-2) \Rightarrow -2,-6$

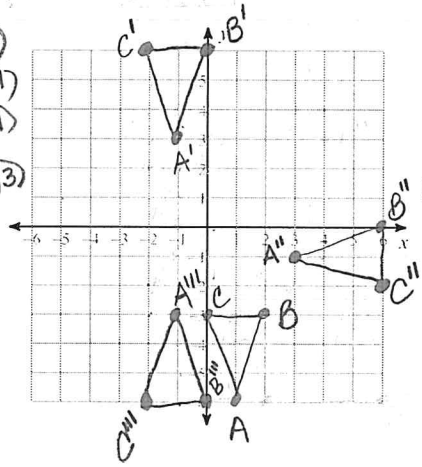


$R_{90°}(x,y) = (-y,x)$

$C''(1,-1) = C'''(1,1)$

$B''(4,-1) = B'''(1,4)$

$A''(3,-4) = A'''(4,3)$



$T_{\langle -2,9\rangle}(\triangle ABC)$

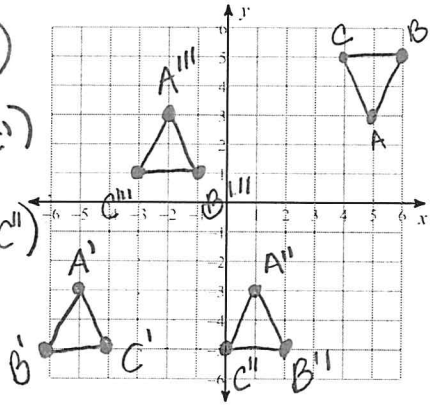
$r_{y=x}(\triangle A'B'C')$

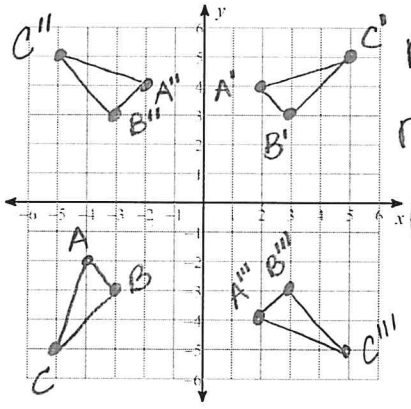
$R_{270°}(\triangle A''B''C'')$

$R_{180°}(\triangle ABC)$

$r_{x=-2}(\triangle A'B'C')$

$T_{\langle -3,6\rangle}(\triangle A''B''C'')$





$r_{y=-x}(\triangle ABC)$

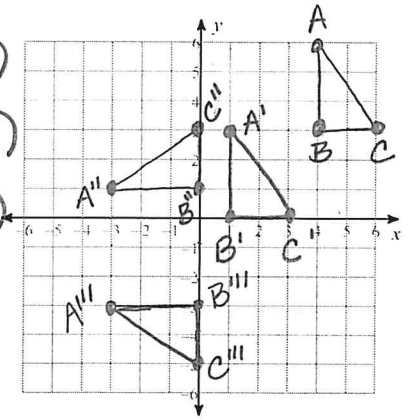
$r_{y\text{-axis}}(\triangle A'B'C')$

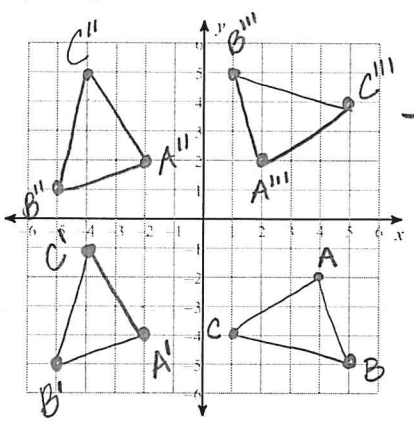
$R_{180°}(\triangle A''B''C'')$

$T_{\langle -3,-3\rangle}(\triangle ABC)$

$R_{90°}(\triangle A'B'C')$

$r_{y=-1}(\triangle A''B''C'')$





$R_{270°}(\triangle ABC)$

$T_{\langle 0,6\rangle}(\triangle A'B'C')$

$R_{270°}(\triangle A''B''C'')$

$270\ (x,y) \Rightarrow (y,-x)$

$A''(-2,2) \rightarrow (2,2)$

$B''(-5,1) \rightarrow (1,5)$

$C''(-4,5) \rightarrow (5,4)$

College Prep Math 2 Homework Name Key

Composition Transformation

Directions: Fill in the chart with the coordinates of the image. Use graph paper.

1. Pre-image: A(0,0), B(8,1), C(5,5)

Rotate the figure counterclockwise 90° ***Rule:*** $R_{90°}(x,y) = (-y,x)$	A'(0,0) B'(-1,8) C'(-5,5)
Reflect the figure over the x-axis ***Rule:*** $R_{x\text{-axis}}(x,y) = (x,-y)$	A''(0,0) B''(-1,-8) C''(-5,-5)
Translate the figure according to (x,y)→(x+6,y-1) right 6, down 1	A'''(6,-1) B'''(5,-9) C'''(1,-6)

2. Pre-image: D(-12,6), E(-4,6), F(-6,9), G(-10,9)

Translate the figure according to (x,y)→(x+1,y-6) right 1, down 6	D'(-11,0) E'(-3,0) F'(-5,3) G'(-9,3)
Reflect the figure over the x=0 line Same as y-axis ***Rule:*** $R_{y\text{-axis}}(x,y) = (-x,y)$	D''(11,0) E''(3,0) F''(5,3) G''(9,3)
Dilate it by a scale factor of 2 ***Rule:*** $D_2(x,y) = (2x,2y)$	D'''(22,0) E'''(6,0) F'''(10,6) G'''(18,6)

3. Pre-image: H(2,2), I(-2,2), J(-2,-2), K(2,-2)

Rotate the figure clockwise 180° ***Rule:*** $R_{180°}(x,y) = (-x,-y)$	H'(-2,-2) I'(2,-2) J'(2,2) K'(-2,2)
Translate the figure according to (x,y)→(x+2,y+2) right 2, up 2	H''(0,0) I''(4,0) J''(4,4) K''(0,4)
Reflect the figure over the line $y = x$ ***Rule:*** $R_{y=x}(x,y) = (y,x)$	H'''(0,0) I'''(0,4) J'''(4,4) K'''(4,0)

4. Pre-image: L(7,2), M(0,9), N(-6,-5), P(1,-12)

Reflect the figure over the y=-3	L'(7,-8) M'(0,-15) N'(-6,-1) P'(1,6)
Reflect the figure over the y=0 line Same as x-axis ***Rule:*** $R_{x\text{-axis}}(x,y) = (x,-y)$	L''(7,8) M''(0,15) N''(-6,1) P''(1,-6)
Rotate the figure 90° clockwise about the origin ***Rule:*** $R_{270°}(x,y) = (y,-x)$	L'''(8,-7) M'''(15,0) N'''(1,6) P'''(-6,-1)

5. Pre-image: Q(0,0), R(-13,0), S(0,12)

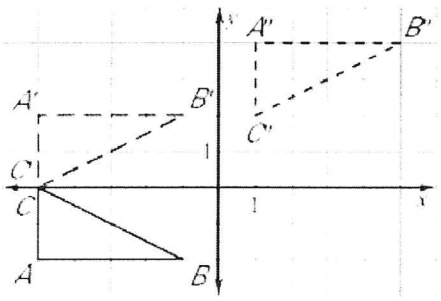
Rotate the figure 270° clockwise about the origin ***Rule:*** $R_{90°}(x,y) = (-y, x)$	$Q'(0,0)\ R'(0,-13)\ S'(-12,0)$
Translate the figure according to (x,y)→(x+5,y+5) right 5, up 5	$Q''(5,5)\ R''(5,-8)\ S''(-7,5)$
Dilated it by a scale factor of $\frac{1}{2}$ ***Rule:*** $D_{\frac{1}{2}}(x,y) = (\frac{1}{2}x, \frac{1}{2}y)$	$Q'''(\frac{5}{2},\frac{5}{2})\ R'''(\frac{5}{2},-4)\ S'''(\frac{-7}{2},\frac{5}{2})$

6. Pre-image: T(6,-3), U(8,-5), V(7,-7), W(5,-7), X(4,-5)

Translate the figure according to (x,y)→(x-4,y+3) left 4, up 3	$T'(2,0)\ U'(4,-2)\ V'(3,-4)\ W'(1,-4)\ X'(0,-2)$
Reflect the figure over the line $y = x$ ***Rule:*** $R_{y=x}(x,y) = (y,x)$	$T''(0,2)\ U''(-2,4)\ V''(-4,3)\ W''(-4,1)\ X''(-2,0)$
Rotate the figure 180° ***Rule:*** $R_{180°}(x,y) = (-x,-y)$	$T'''(0,-2)\ U'''(2,-4)\ V'''(4,-3)\ W'''(4,-1)\ X'''(2,0)$

Describe the composition of transformation occurring in each figure.

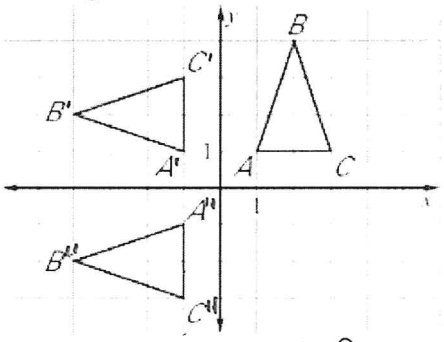
7.



$R_{x\text{axis}}(\Delta ABC)$

$T\langle 6,2\rangle(\Delta A'B'C')$

8.

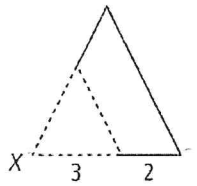


$R_{90°}(\Delta ABC)$

$R_{x\text{-axis}}(\Delta A'B'C')$

The solid-line figure is image of the dashed-line figure. The labeled point is the center of dilation. Tell whether the dilation is an enlargement or a reduction. Then find the scale factor of the dilation.

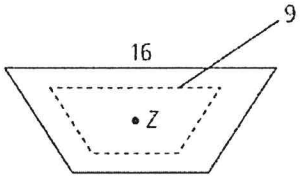
9.



Enlargement

$K = \frac{5}{3}$

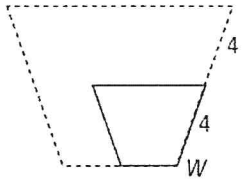
10.



Enlargement

$K = \frac{16}{9}$

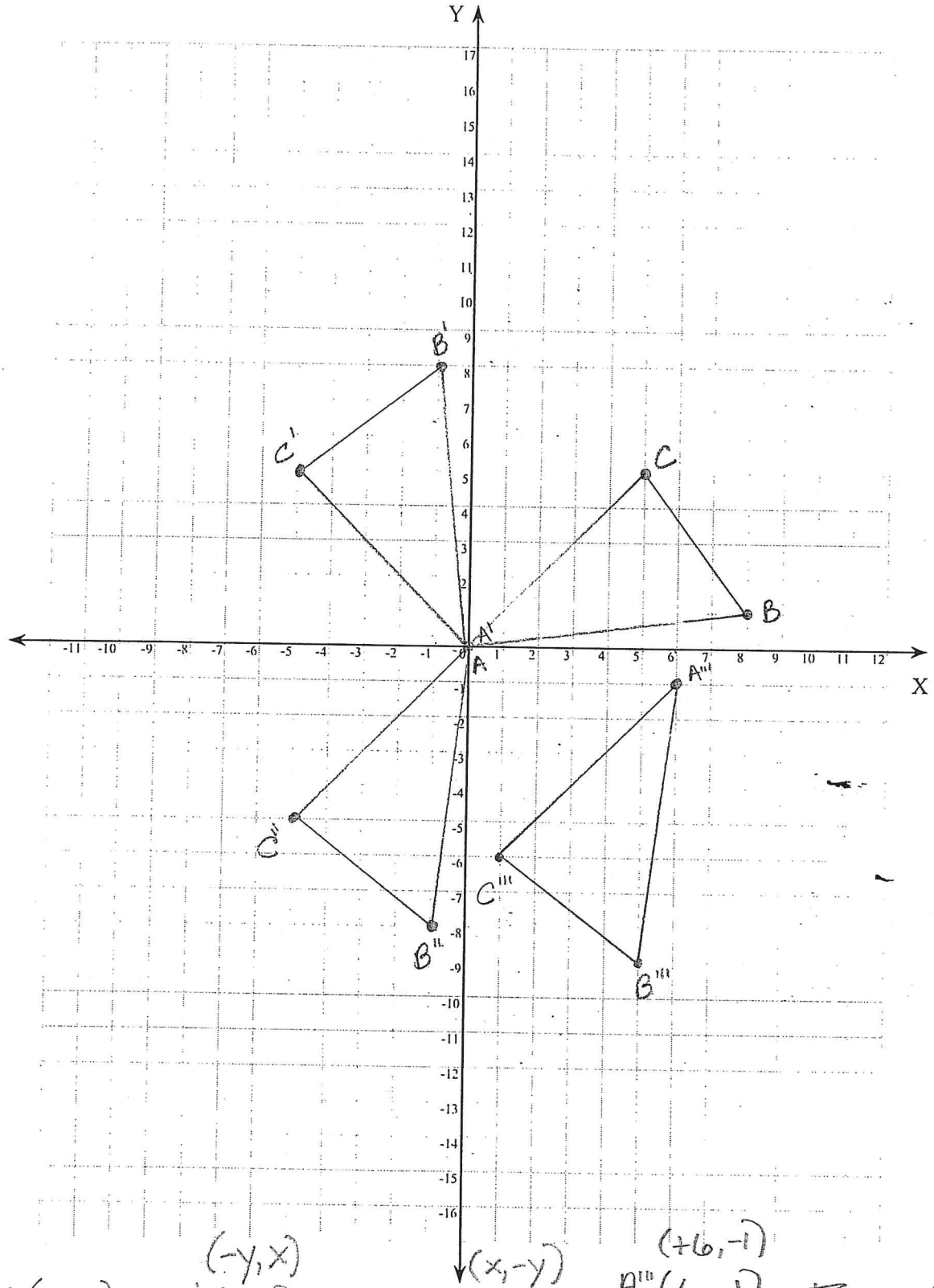
11.



Reduction

$K = \frac{4}{8} = \frac{1}{2}$

#1



$(-y, x)$ $(x, -y)$ $(+6, -1)$

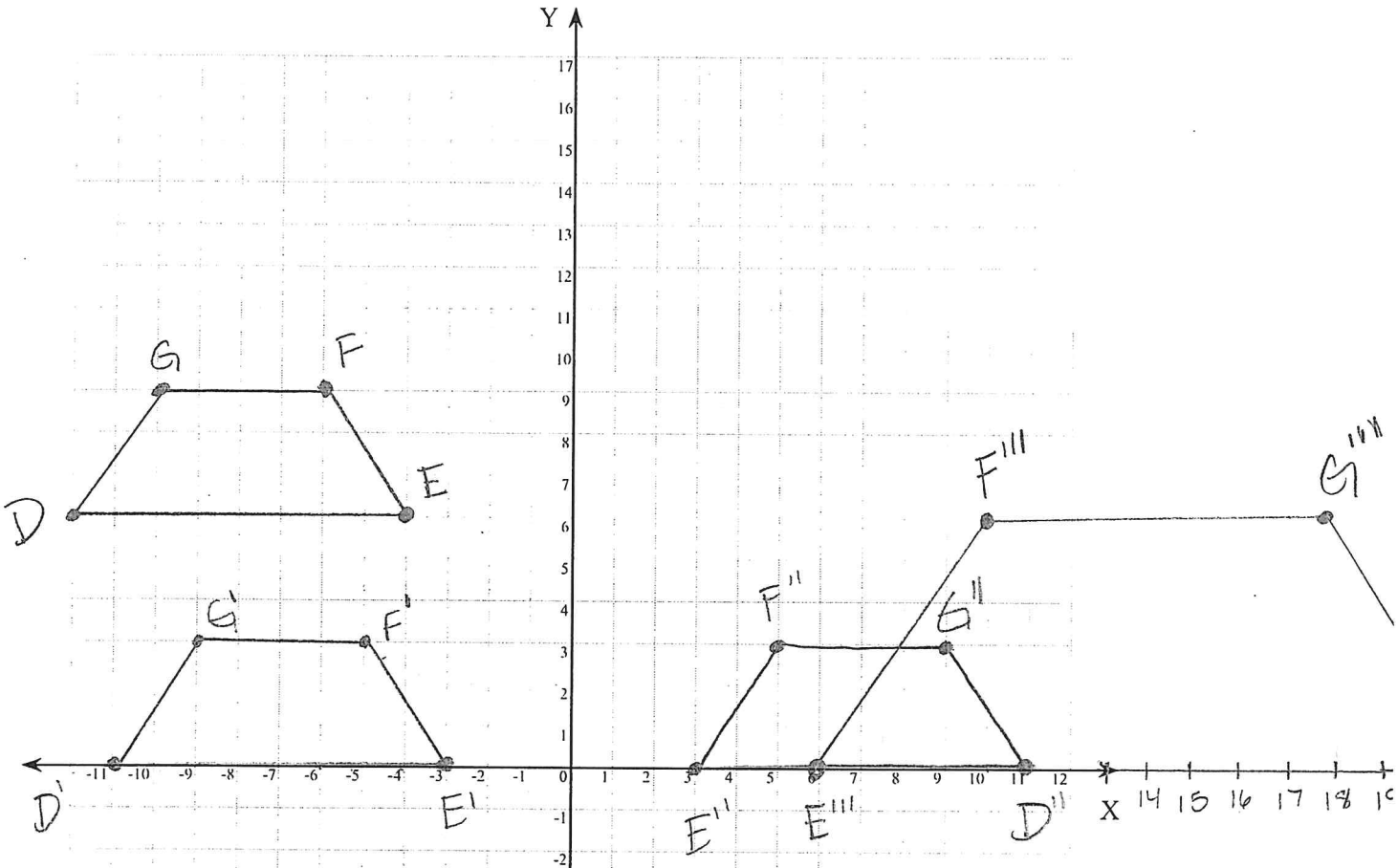
$A(0,0)$	$A'(0,0)$	$A''(0,0)$	$A'''(6,-1)$
$B(8,1)$	$B'(-1,8)$	$B''(-1,-8)$	$B'''(5,-9)$
$C(5,5)$	$C'(-5,5)$	$C''(-5,-5)$	$C'''(1,-6)$

$r_{90°}(\Delta ABC) = (\Delta A'B'C')$

$R_{x\text{-axis}}(\Delta A'B'C') = (\Delta A''B''C'')$

$T_{\langle 6,-1 \rangle}(\Delta A''B''C'') = (\Delta A'''B'''C''')$

#2



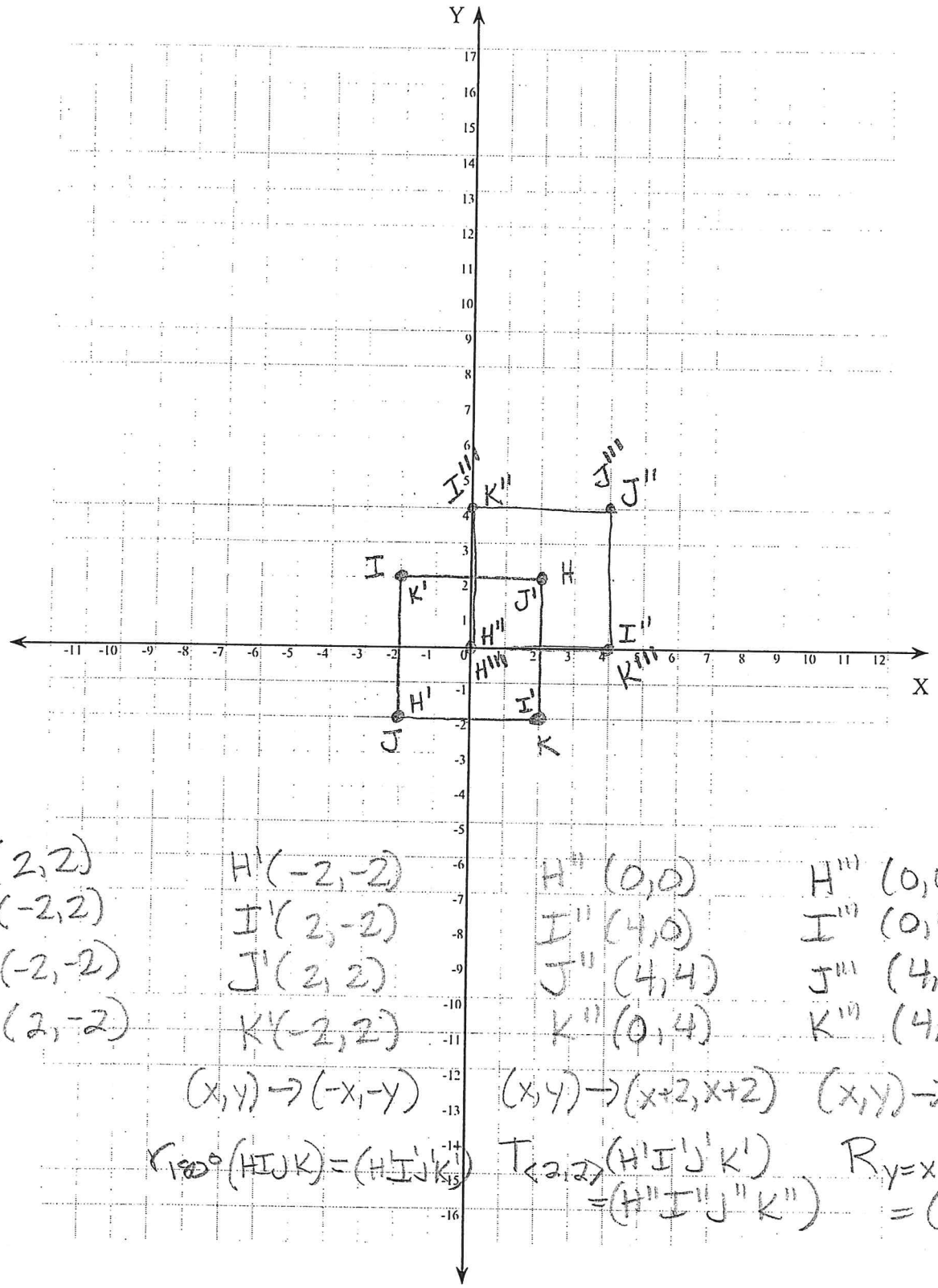
D(-12,6)	D'(-11,0)	D'' (11,0)	D''' (22,0)
E(-4,6)	E'(-3,0)	E'' (3,0)	E''' (6,0)
F(-6,9)	F'(-5,3)	F'' (5,3)	F''' (10,6)
G(-10,9)	G'(-9,3)	G'' (9,3)	G''' (18,6)

What happened?

$(x,y) \longrightarrow (x+1, x-6)$ $\quad (x,y) \to (-x,y)$ $\quad (x,y) \to (2x,2y)$

Transformation?

$T_{\langle 1,-6\rangle}(DEFG) = (D'E'F'G')$ $\quad R_{y\text{-axis}}(D'E'F'G') = (D''E''F''G'')$ $\quad D_2(D''E''F''G'') = (D'''E'''F'''G''')$



H(2,2) H'(-2,-2) H'' (0,0) H''' (0,0)

I(-2,2) I'(2,-2) I'' (4,0) I''' (0,4)

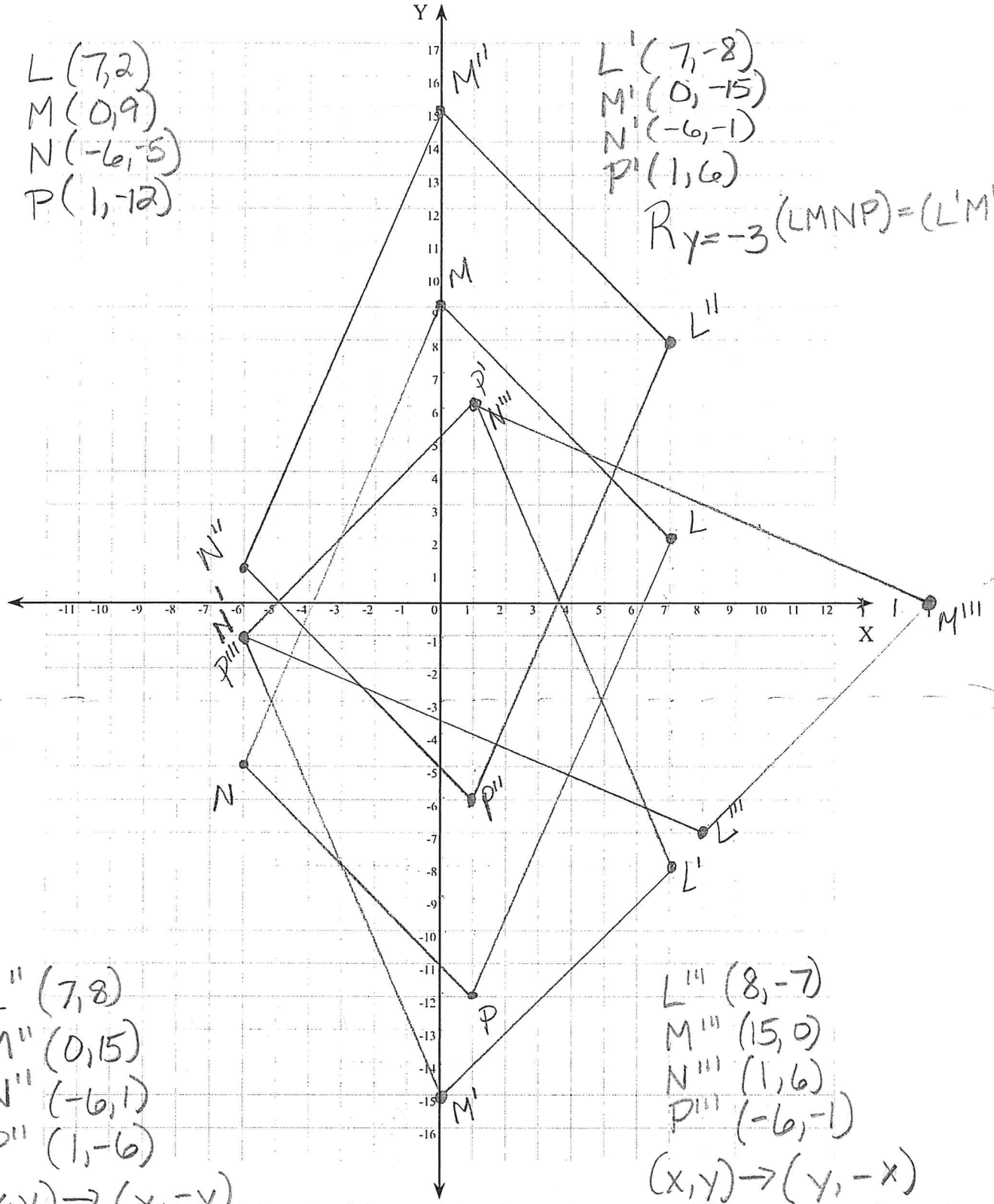
J(-2,-2) J'(2,2) J'' (4,4) J''' (4,4)

K(2,-2) K'(-2,2) K'' (0,4) K''' (4,0)

$(x,y) \to (-x,-y)$ $(x,y) \to (x+2, x+2)$ $(x,y) \to (y,x)$

$R_{180°}(HIJK) = (H'I'J'K')$ $T_{\langle 2,2 \rangle}(H'I'J'K') = (H''I''J''K'')$ $R_{y=x}(H''I''J''K'') = (H'''I'''J'''K''')$

#4



L (7,2)
M (0,9)
N (-6,-5)
P (1,-12)

L' (7,-8)
M' (0,-15)
N' (-6,-1)
P' (1,6)

$R_{y=-3}(LMNP)=(L'M'N'P')$

L'' (7,8)
M'' (0,15)
N'' (-6,1)
P'' (1,-6)

$(x,y)\rightarrow(x,-y)$

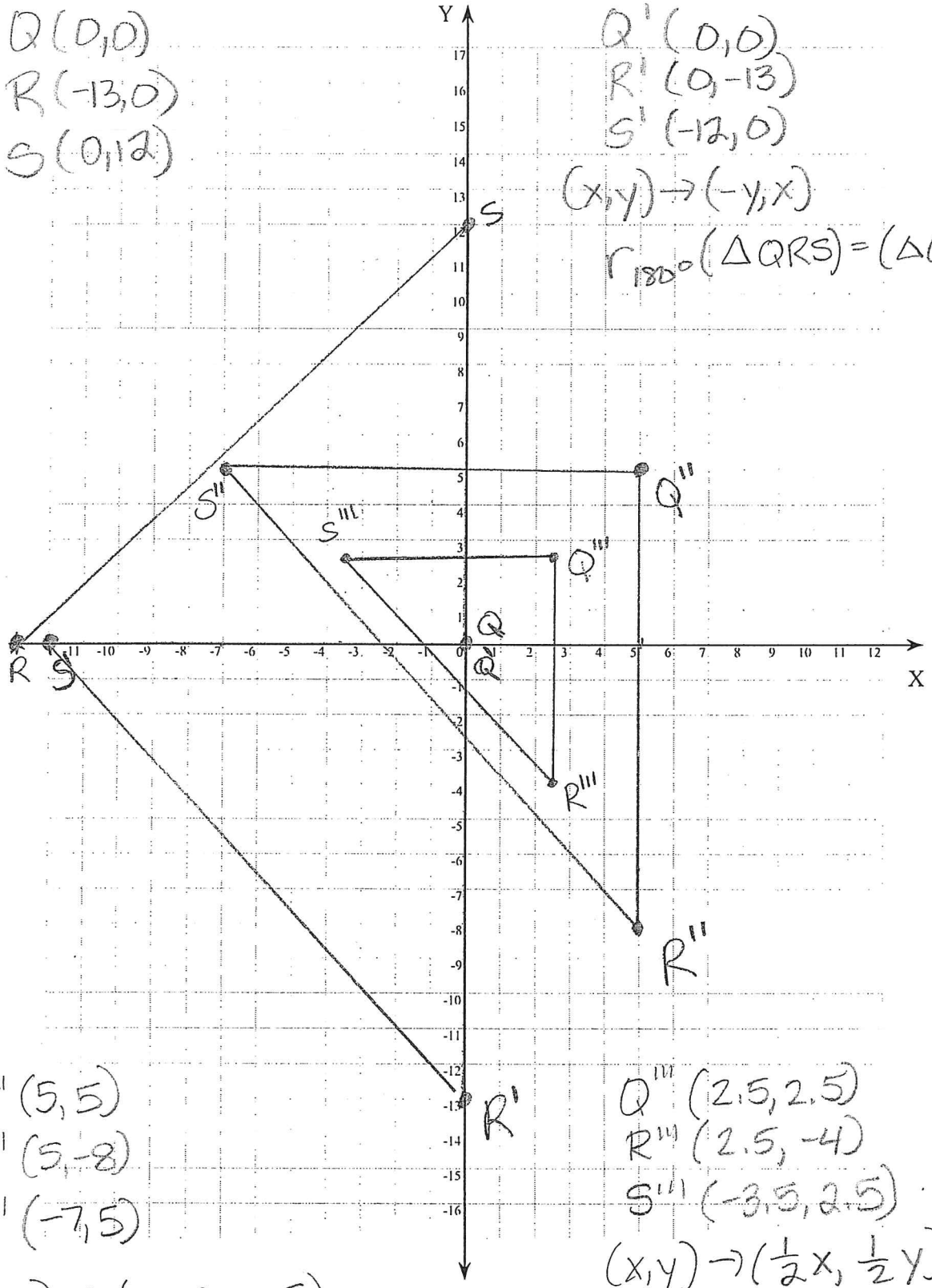
$R_{x\text{-axis}}(L'M'N'P')=(L''M''N''P'')$

L''' (8,-7)
M''' (15,0)
N''' (1,6)
P''' (-6,-1)

$(x,y)\rightarrow(y,-x)$

$r_{270°}(L''M''N''P'')=(L'''M'''N'''P''')$

#5



$Q(0,0)$
$R(-13,0)$
$S(0,12)$

$Q'(0,0)$
$R'(0,-13)$
$S'(-12,0)$
$(x,y) \rightarrow (-y,x)$
$r_{180°}(\triangle QRS) = (\triangle Q'R'S')$

$Q''(5,5)$
$R''(5,-8)$
$S''(-7,5)$
$(x,y) \rightarrow (x+5, y+5)$
$T_{\langle 5,5 \rangle}(\triangle Q'R'S') = (\triangle Q''R''S'')$

$Q'''(2.5,2.5)$
$R'''(2.5,-4)$
$S'''(-3.5,2.5)$
$(x,y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$
$D_{\frac{1}{2}}(\triangle Q''R''S'') = (\triangle Q'''R'''S''')$