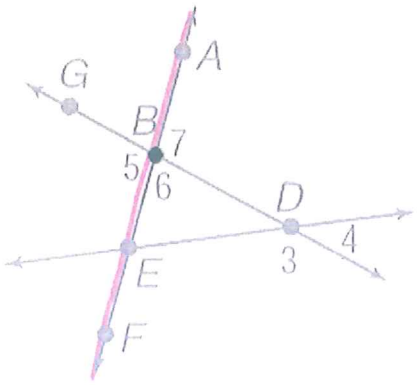
Geometry Unit 1 – Segments and Transformations Review

Name Key

Hour _____

Directions: All work must be shown to receive full credit.

Use the figure to answer questions 1-4.



1) Name all angles that have B as a vertex.

∠7, ∠6, ∠5, ∠ABG, ∠ABD, ∠DBE, etc.
(Straight ∠s ∠ABE and ∠GBD)

2) Name a pair of supplementary angles. Answers will Vary

∠3 + ∠4 = 180°
∠5 + ∠6 = 180° etc...

3) Name a pair of vertical angles. Answers will vary

Ex.) ∠ABD and ∠GBE are vertical
or ∠5 & ∠7, etc.

4) Name a linear pair.

∠5 and ∠6 ∠3 and ∠4
∠6 and ∠7 etc...

5) Name all the different ways to name line $\overleftrightarrow{AB}$.

$\overleftrightarrow{AE}, \overleftrightarrow{AF}, \overleftrightarrow{EA}, \overleftrightarrow{FA}, \overleftrightarrow{BA}, \overleftrightarrow{BE}, \overleftrightarrow{EB}, \overleftrightarrow{BF}, \overleftrightarrow{FB}, \overleftrightarrow{EF}, \overleftrightarrow{FE}$

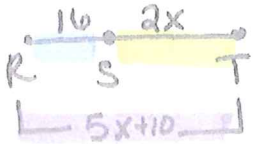
6) Simplify the radical: $\sqrt{192}$

$\sqrt{64}\sqrt{3}$
$8\sqrt{3}$
$= 8\sqrt{3}$

$\sqrt{192}$
$2\sqrt{48}$
$2\sqrt{4}\sqrt{12}$
$2\sqrt{4}\sqrt{3}$
$= 2 \cdot 2 \cdot 2\sqrt{3}$
$= 8\sqrt{3}$

7) Find the value of the variable and ST if S is between R and T. Let RS= 16, ST = 2x, RT = 5x + 10. You must start this problem with a geometry step. Draw a diagram, show all of your work, and justify each step.

1)



RS + ST = RT Segment Addition

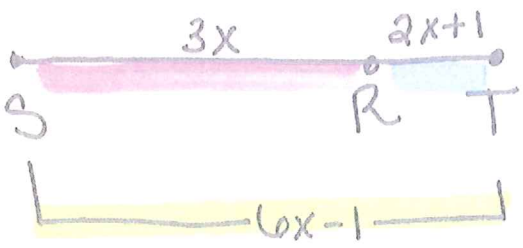
16 + 2x = 5x + 10
−2x −2x
16 = 3x + 10
−10 −10
6 = 3x
3 3
2 = x

x = 2

ST = 2(2)

ST = 4

8) Find the value of x and SR if R is between S and T. $SR = 3x$, $RT = 2x + 1$, $ST = 6x - 1$. You must start this problem with a geometry step. Draw a diagram, show all of your work, and justify each step.



SR + RT = ST Segment addition

$3x+2x+1 = 6x-1$

$5x+1 = 6x-1$

$-5x \quad -5x$

$1 = x-1$

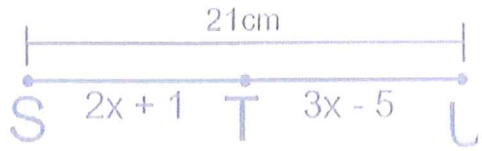
$+1 \quad +1$

$2 = x$

$x = 2$

$SR = 6$

9) Find the value of x and $\overline{ST}$ using the figure to the right. You must start the problem with a geometry step, show all of your work, and justify each step.



$2x+1+3x-5 = 21$ Seg. Add.

$5x-4 = 21$

$+4 \quad +4$

$5x = 25$

$x = 5$

$ST = 2(5)+1$

$ST = 10+1$

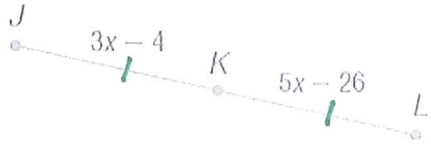
$ST = 11$

$x = 5$

$ST = 11$

10) Find x and the measure of $\overline{JK}$ if K is the midpoint of $\overline{JL}$. You must start the problem with a geometry step, show all of your work, and justify each step.

$JK \cong KL$ def of midpoint



$3x-4 = 5x-26$

$-3x \quad -3x$

$-4 = 2x-26$

$+26 \quad +26$

$\frac{22}{2} = \frac{2x}{2}$

$11 = x$

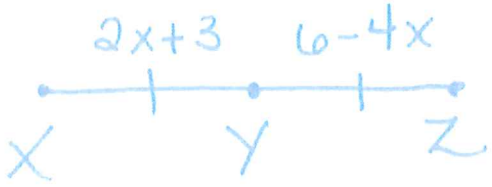
$JK = 3(11)-4$

$JK = 33-4$

$x = 11$

$JK = 29$

8) Find XY if Y is the midpoint of $\overline{XZ}$, $XY = 2x + 3$ and $YZ = 6 - 4x$. Draw a diagram to help you. You must start the problem with a geometry step, show all of your work, and justify each step.



$XY \cong YZ$ def of midpoint

$2x+3 = 6-4x$

$+4x \quad +4x$

$6x+3 = 6$

$-3 \quad -3$

$6x = 3$

$\boxed{x = \frac{1}{2}}$

$XY = 2(\frac{1}{2}) + 3$

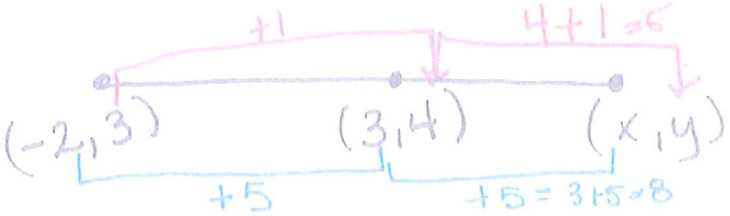
$XY = 1 + 3$

$\boxed{XY = 4}$

9) Find the coordinates of the endpoint S if T is the midpoint of RS and T(3, 4) and R(-2, 3). You must show work.

$R(-2,3)\ S(x,y)$ midpoint T: $(3,4)$

$\left(\frac{-2+x}{2}, \frac{3+y}{2}\right) = (3,4)$



$\frac{-2+x}{2} = \frac{3}{1}$

$-2+x = 6$

$\boxed{x = 8}$

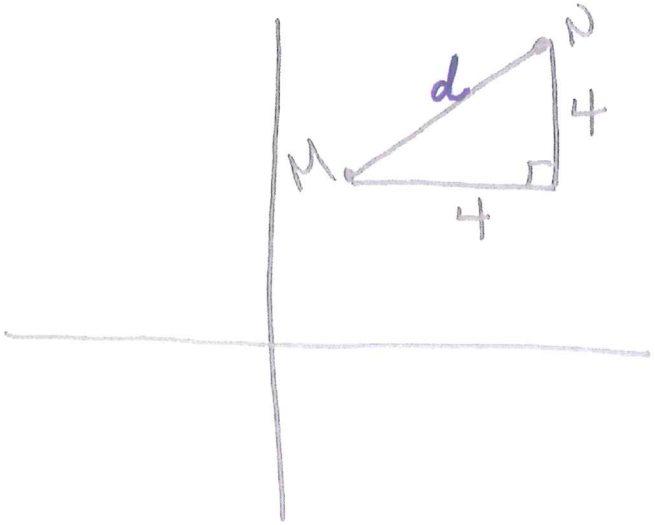
$\frac{3+y}{2} = \frac{4}{1}$

$3+y = 8$

$\boxed{y = 5}$

$S(8,5)$

10) Find the exact distance between M(3, 5) and N(7, 9). Write your answer as a simplified radical.



$4^2 + 4^2 = d^2$

$16 + 16 = d^2$

$32 = d^2$

$\sqrt{32} = \sqrt{d^2}$

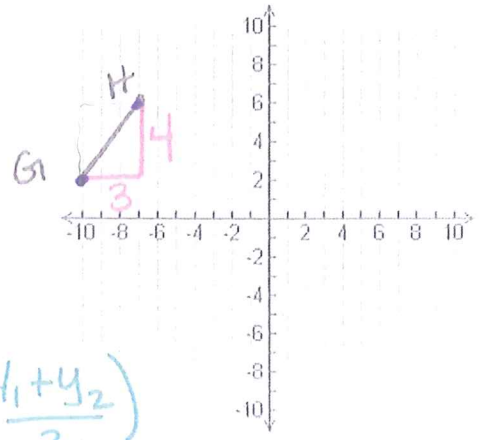
$\sqrt{16} \cdot \sqrt{2}$

4

$d = 4\sqrt{2}$

Find the distance, midpoint, and slope of each segment. You must show work, simplify all radicals and fractions!

11) G(-10, 2), H(-7, 6)



distance

$3^2+4^2=d^2$

$9+16=d^2$

$\sqrt{25}=d$

$5=d$

Distance: 5 units

midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

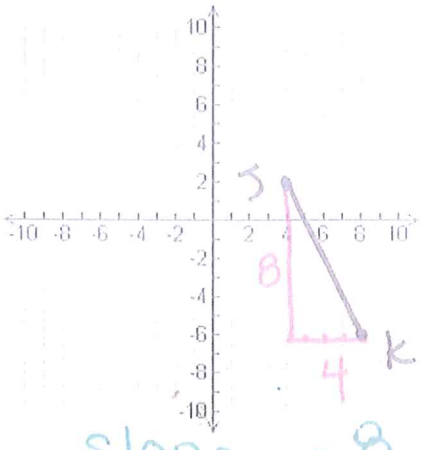
$\left(\frac{-10+(-7)}{2}, \frac{2+6}{2}\right)$

$\left(\frac{-17}{2}, \frac{8}{2}\right)=\left(\frac{-17}{2}, 4\right)$

Midpoint: $\left(\frac{-17}{2}, 4\right)$

Slope: $4/3$

12) J(4, 2), K(8, -6)



distance

$8^2+4^2=d^2$

$64+16=d^2$

$\sqrt{80}=d$

$\sqrt{16}\cdot\sqrt{5}$

$4\sqrt{5}$

Distance: $4\sqrt{5}$ units

midpoint

$\left(\frac{4+8}{2}, \frac{2+(-6)}{2}\right)$

$\left(\frac{12}{2}, \frac{-4}{2}\right)=(6,-2)$

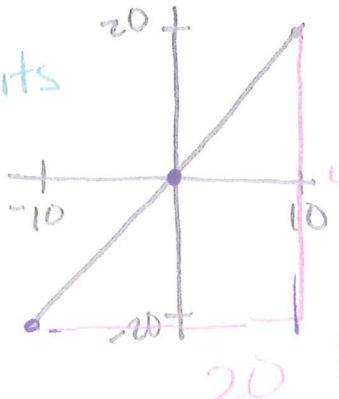
Midpoint: $(6,-2)$

Slope $=\frac{-8}{4}$

Slope: -2

Slope $=-2$

13) D(10, 20), E(-10, -20)



distance

$40^2+20^2=d^2$

$\sqrt{2000}=d$

$\sqrt{400}\cdot\sqrt{5}$

$20\sqrt{5}$

Distance: $20\sqrt{5}$ units

midpoint

$\left(\frac{10+(-10)}{2}, \frac{20+(-20)}{2}\right)$

$\left(\frac{0}{2}, \frac{0}{2}\right)$ simplify

$=(0,0)$

Midpoint: $(0,0)$

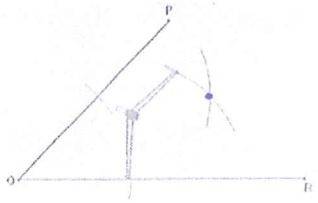
Slope $=\frac{40}{20}=2$

Slope: 2

not $\frac{2}{1}$!!

11) A student is completing the following construction. What construction are they making and what is true about the figure?

They are constructing an angle bisector. It cuts the ∠ into 2 ≅ angles.

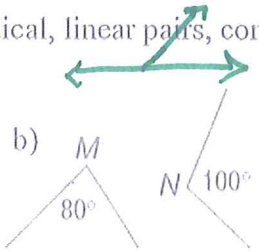


12) Classify all that apply: adjacent, vertical, linear pairs, complementary, supplementary, right angle and/or congruent.

a)

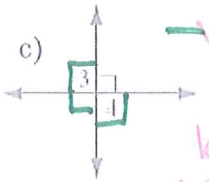
adjacent
complementary
right angle

b)



Suppl.

c)

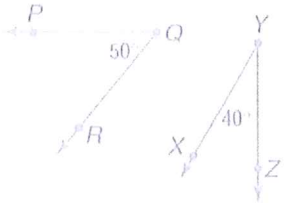


- vertical ∠s (not always but b/c ∠3 + ∠4 = 90° - They are suppl.)
- right angle
- congruent

d)

linear pairs
suppl.
adjacent.

e)

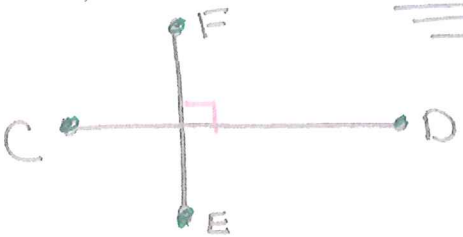


Compl.

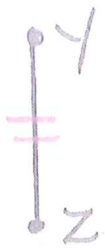
f)

linear pairs
adjacent
Suppl.

13) Draw $\overline{FE} \perp \overline{DC}$ NO ≅ marks!

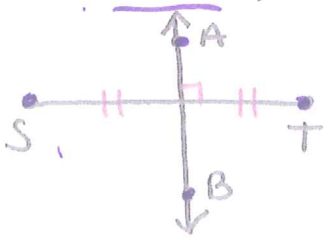


14) Draw $\overline{WX} \cong \overline{YZ}$



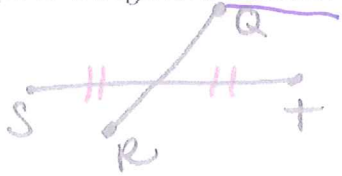
15) Draw ∠QRS and ∠QRT are a linear pair

16) Draw $\overleftrightarrow{AB}$ is a ⊥ bisector of $\overline{ST}$



17) Draw $\overrightarrow{ET}$ is an angle bisector of ∠REO

18) Draw $\overline{QR}$ is a segment bisector of $\overline{ST}$



NO 90°

CONSTRUCTIONS OF TRANSFORMATIONS –

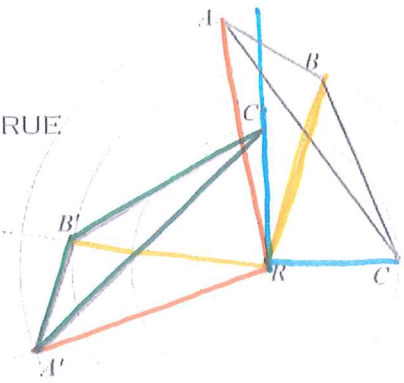
YOU WILL NEED TO CONSTRUCT TRANSFORMATIONS!!!!!!!!!!

19. FINISH THE CONSTRUCTION, THEN USE THE FIGURE TO THE RIGHT

A. NAME THE TYPE OF TRANSFORMATION

Rotation

B. NAME ALL PROPERTIES OF THE CONSTRUCTION THAT ARE TRUE



$\angle ARA' \cong \angle BRB' \cong \angle CRC'$

$CR \cong C'R$

$BR \cong B'R$

$AR \cong A'R$

$\triangle ABC \cong \triangle A'B'C'$

$AB \cong A'B'$

$BC \cong B'C'$

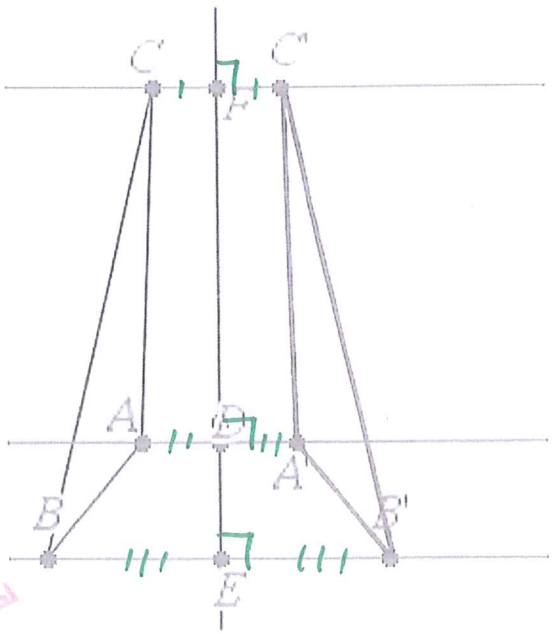
$CA = C'A'$

20. FINISH THE CONSTRUCTION, THEN USE THE FIGURE TO THE RIGHT

A. NAME THE TYPE OF TRANSFORMATION

Reflection

B. NAME ALL PROPERTIES OF THE CONSTRUCTION



$\triangle ABC \cong \triangle A'B'C'$

$AD \cong A'D$

$BE \cong B'E$

$CF \cong C'F$

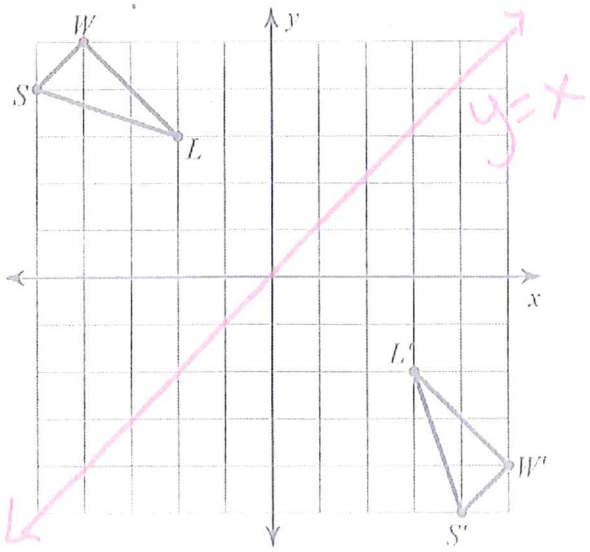
$AA' \perp \overleftrightarrow{FE}$

$BB' \perp \overleftrightarrow{FE}$

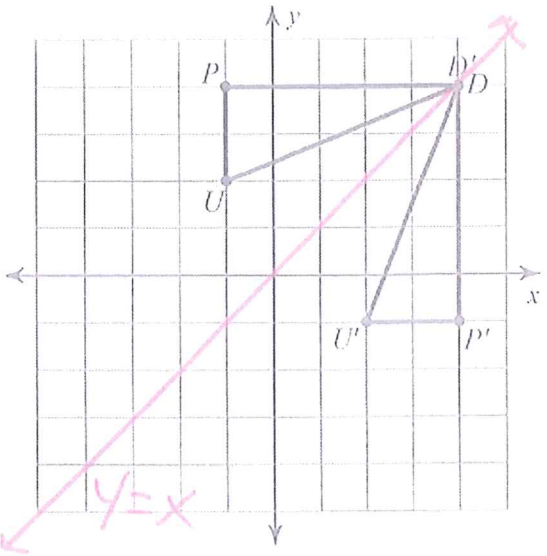
$CC' \perp \overleftrightarrow{FE}$

Draw in the line of reflection for 21 through 26.

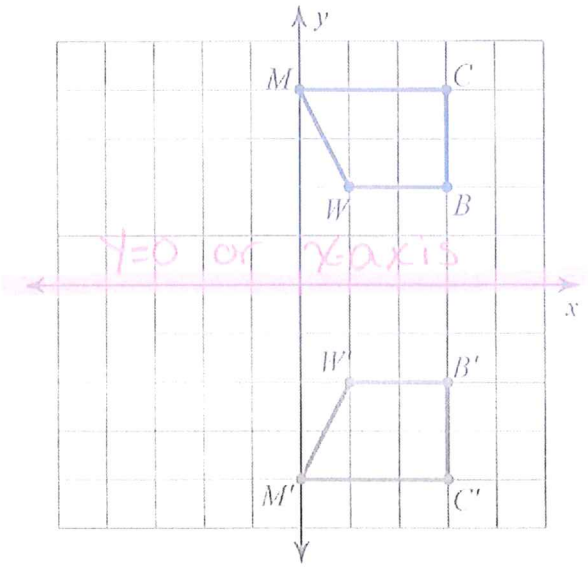
21.



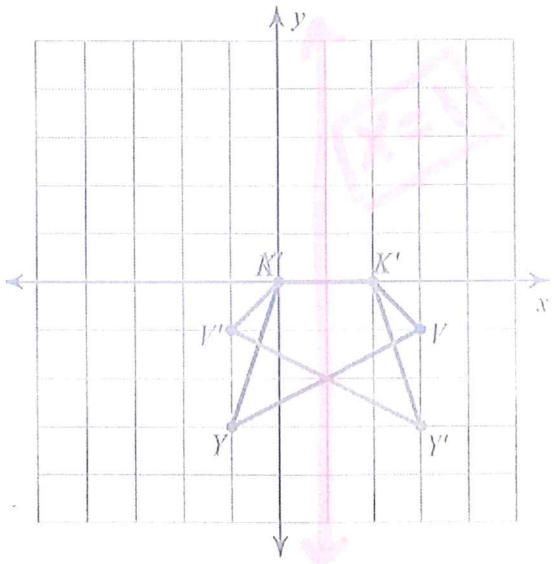
22.



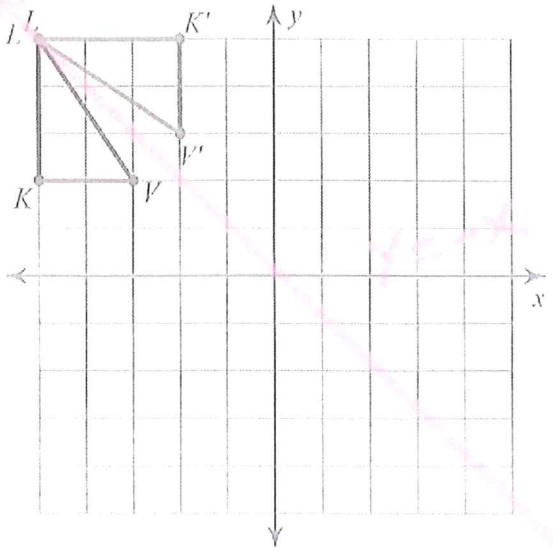
23.



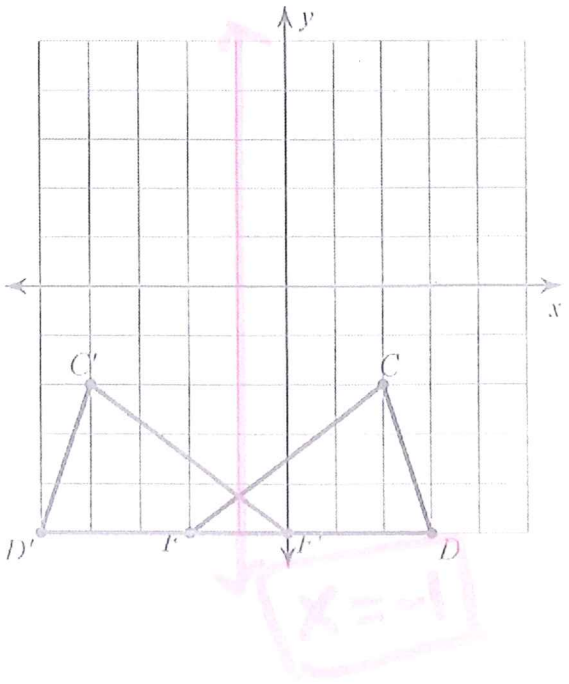
24.



25.



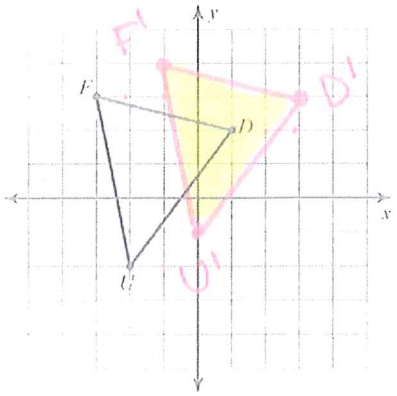
26.



Graph the transformation for 27 through 34. If it is a translation, write the rule for the translation.

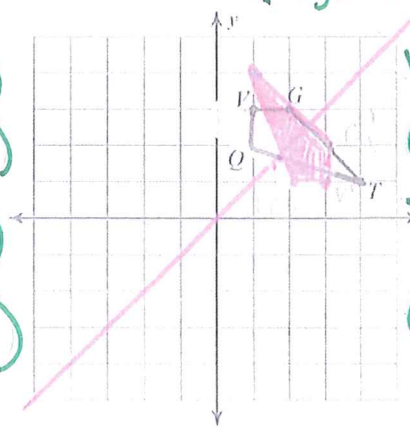
$y = -x$ $(-y, -x)$

27. $(x, y) \rightarrow (x + 2, y + 1)$



28. reflection across $y = x$ (y, x)

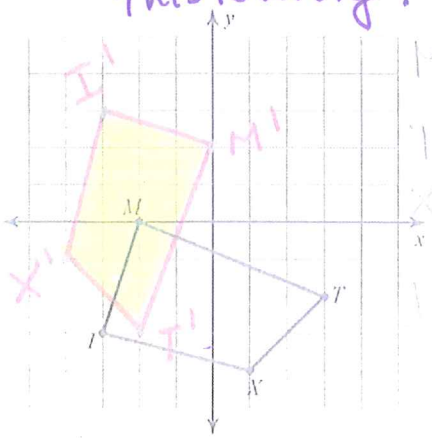
$V(1, 3)$
$G(2, 3)$
$T(4, 1)$
$Q(1, 2)$



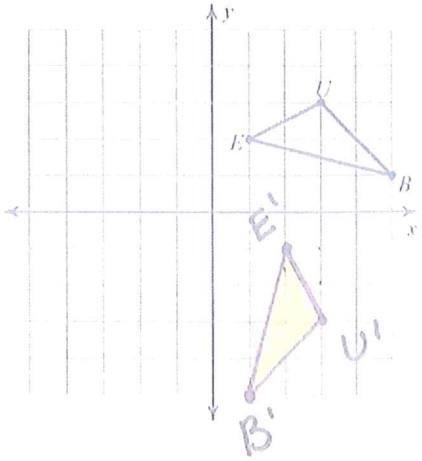
$V'(3, 1)$
$G'(3, 2)$
$T'(1, 4)$
$Q'(2, 1)$

29. rotation 90° counterclockwise about the origin

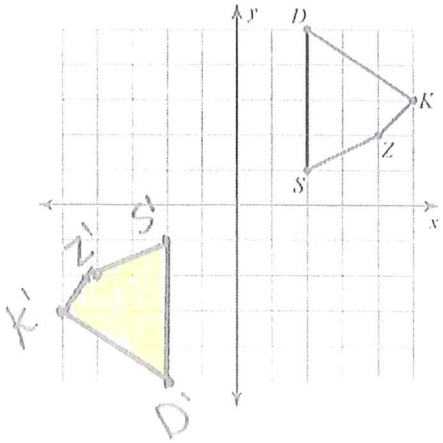
This is wrong!



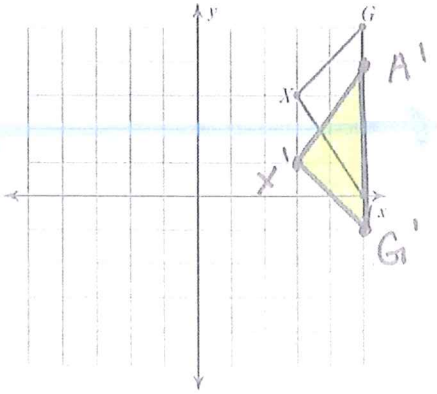
30. rotation 90° clockwise about the origin



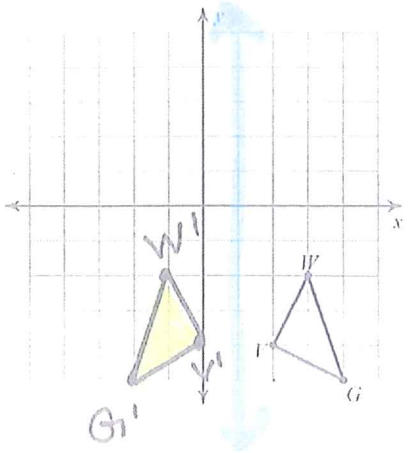
31. rotation 180° about the origin



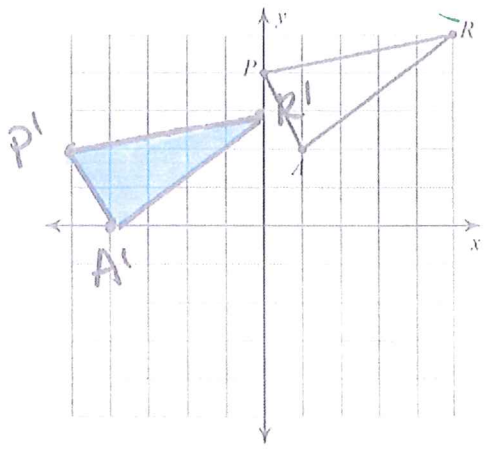
32. reflection across $y = 2$



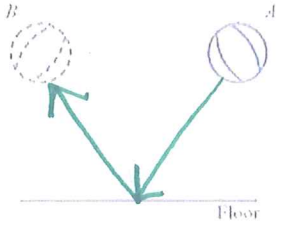
33. reflection across $x = 1$



34. $(x, y) \rightarrow (x - 5, y - 2)$



35. In a basketball game, Roger is standing at position A and he bounces the ball to Edwin standing at position B. Copy the diagram and sketch the path the ball must travel after being bounced to Edwin by Roger.



36. Find the slopes of lines. Simplify all fractions, if possible.

$x_1\ y_1$ $x_2\ y_2$ $x_1\ y_1$ $x_2\ y_2$

S(6, 5), T(-4, 3) X(-4,2), Y(-3,-3)

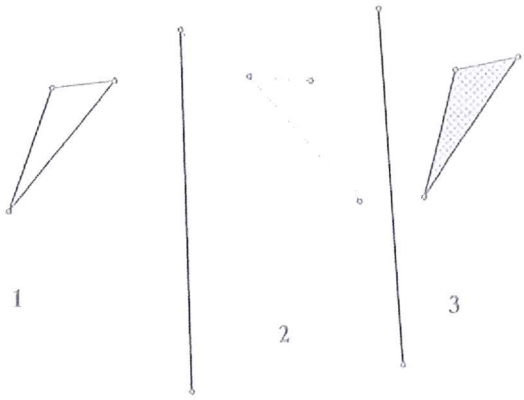
$m = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{3-5}{-4-6} = \frac{-2}{-10} = \frac{1}{5}$ $\qquad$ $\frac{-3-2}{-3-4} = \frac{-5}{1}$

Slope of ST: $\frac{1}{5}$

Slope of XY: -5

37. The composite of reflections over two parallel lines results in a Translation.



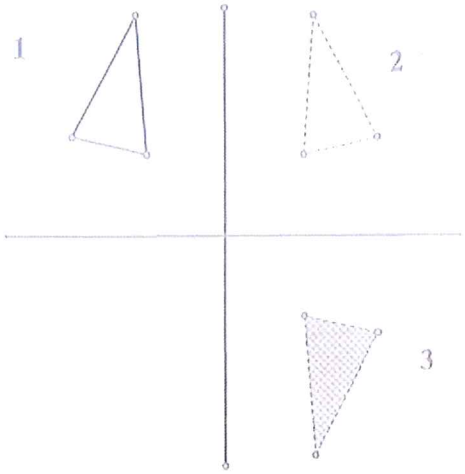
From 1 to 2 the transformation performed is : Reflection

From 2 to 3 the transformation performed is : Reflection

From 1 to 3 the transformation performed is : Translation

38. The composite of reflections over two intersecting lines results in a rotation.

This is a composite of transformations.

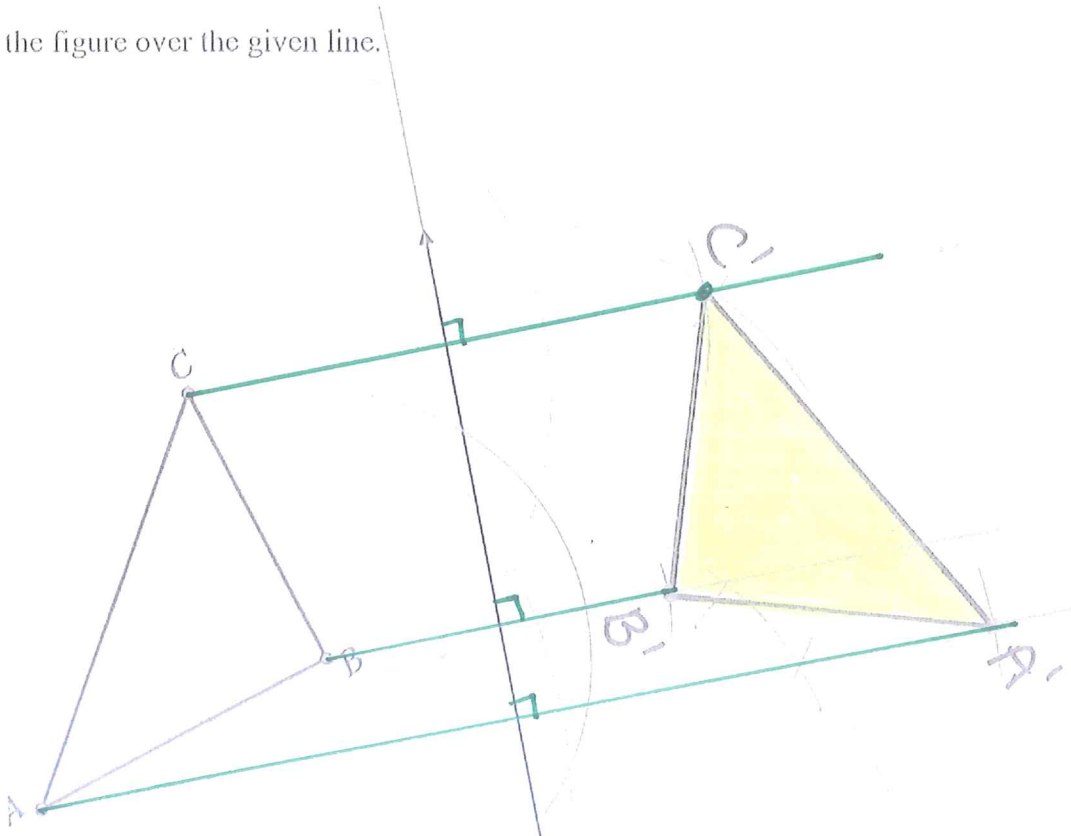


From 1 to 2 the transformation performed is : reflection

From 2 to 3 the transformation performed is : reflection

From 1 to 3 the transformation performed is : rotation

39. Reflect the figure over the given line.



40. Rotate the figure 110 degrees counterclockwise around point R