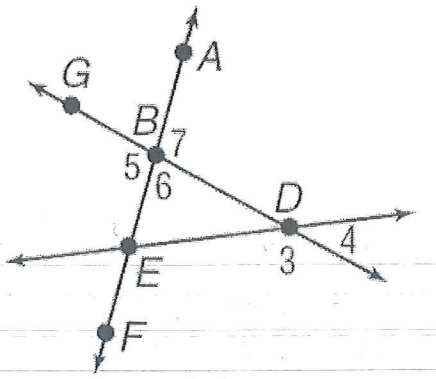
Geometry Unit 1 – Segments and Transformations Review

Name Key 2014

Hour _____

Directions: Use the figure to answer questions 1-4.



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

∠7, ∠6, ∠5, ∠ABG and straight angles ∠ABE and ∠GBD

2) Name a pair of supplementary angles.

Many answers: ALL should be linear pairs.
example answer: ∠3 + ∠4 = 180°

3) Name a pair of vertical angles. Many Answers

Example Answer:
∠ABD and ∠GBE are vertical angles.

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

4, 9, 16, 25, 36, 49, 64, 81

① $\sqrt{192}$ = $2 \cdot 2 \cdot 2\sqrt{3}$ = $8\sqrt{3}$

② $\sqrt{4}$ $\sqrt{48}$

② $\sqrt{4}$ $\sqrt{12}$

② $\sqrt{4}$ $\sqrt{3}$

OR

② $\sqrt{192}$

$\sqrt{64}$ $\sqrt{3}$

8

$\sqrt{192} = 8\sqrt{3}$

5) 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 show all of your work, justify, and show geometry.

① draw a picture!

R — 16 — S — 2x — T

5x + 10

② Geometry + Justify (You Must have this step!)

RS + ST = RT	Segment addition
16 + 2x = 5x + 10	substitution
16 = 3x + 10	subtraction
6 = 3x	subtraction
2 = x	division
ST = 2(2)	substitution
ST = 4	

6) Find the value of x and *SR* if *R* is between *S* and *T*. *SR* = 3x, *RT* = 2x + 1, *ST* = 6x – 1. You must show all of your work, justify, and show geometry.

①

S — 3x — R — 2x+1 — T

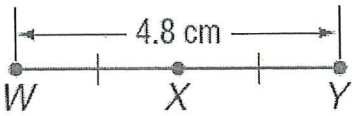
6x – 1

Watch order!

② (Geometry / Justification)

SR + RT = ST	Segment addition
3x + 2x + 1 = 6x – 1	substitution
5x + 1 = 6x – 1	CLT
1 = x – 1	subtraction
2 = x	addition
SR = 3(2)	substitution
SR = 6	

7) Using the picture to the right, find the length of $\overline{XY}$. You must show all of your work, justify, and show geometry.



$WX + XY = WY$ Segment addition
$WX = XY$ def of midpoint
$XY + XY = WY$ substitution
$2XY = WY$ CLT
$2XY = 4.8$ substitution
$\boxed{XY = 2.4\text{cm}}$ division

8) Find the coordinate of the endpoint S if T is the midpoint of RS and T(3, 4) and R(-2, 3).

R(-2, 3) S(x, y) T(3, 4)

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

S(8, 5)

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

If you use formula:

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$d = \sqrt{(7-3)^2 + (9-5)^2}$

$d = \sqrt{(4)^2 + (4)^2}$

$d = \sqrt{16+16}$

$d = \sqrt{32}$

$\boxed{d = 4\sqrt{2}\text{ units}}$

$\sqrt{32}$ → $\sqrt{16}$ (4), $\sqrt{2}$

Directions: for 10-12, find the distance, midpoint, and slope of each segment. You must simplify radicals and fractions!

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

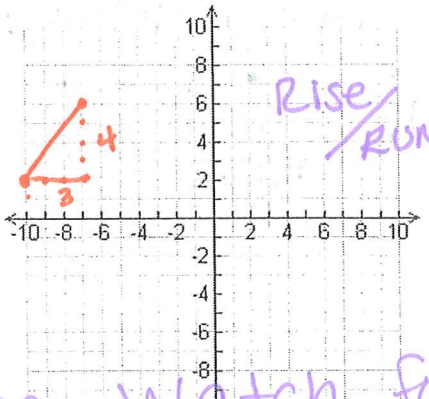
distance

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

$9 + 16 = d^2$

$25 = d^2$

$5 = d$



Distance: 5 units

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

Slope: 4/3

midpt

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

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

Slope

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

$\frac{6-2}{-7-(-10)} = \frac{4}{3}$ ✓

Watch formula if you use it!!

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

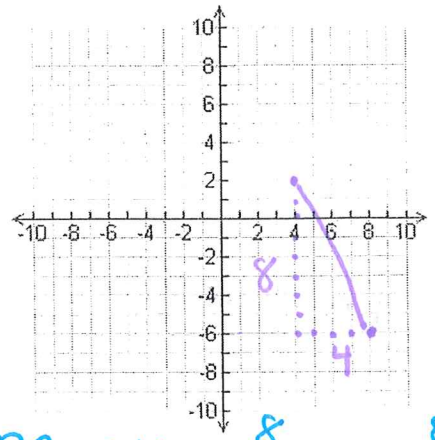
distance

$8^2+4^2=JK^2$

$\sqrt{80}=\sqrt{JK^2}$

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

4



Distance: $4\sqrt{5}$ units

Midpoint: (6, -2)

Slope: -2

midpt

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

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

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

must simplify

AND NOT to $-\frac{2}{1}$

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

NOT 0

0 is not on the grid as a point!

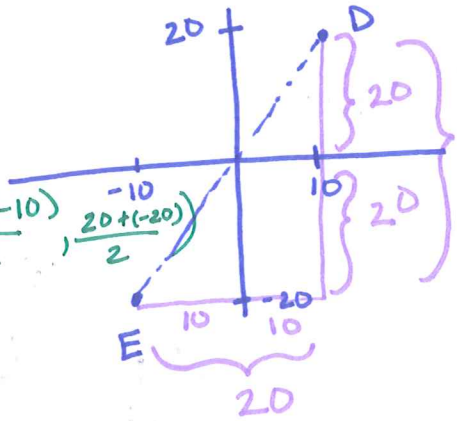
Distance: $20\sqrt{5}$ units

Midpoint: (0, 0)

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

Slope: $\frac{40}{20}=\frac{2}{1}=2$

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



distance

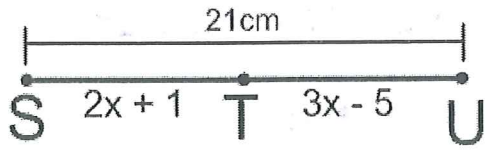
$20^2+40^2=DE^2$

$\sqrt{2000}=DE$

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

20

13) Find the value of x and $\overline{ST}$ using the figure to the right. You must show all of your work, justify, and show geometry.



ST + TU = SU Segment addition

$2x+1+3x-5=21$ substitution

$5x-4=21$ CLT

$5x=25$ addition

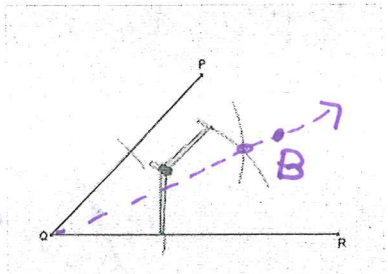
$\boxed{x=5}$ division

ST = 2(5)+1 Substitution

$x=5$

ST = 11cm ← If I give you units, you give units. Angle units are always degrees!

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



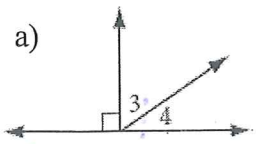
They are constructing an angle bisector.

$\overrightarrow{QB}$ is an angle bisector.

$\angle PQB \cong \angle RQB$ ($\cong$ angles)

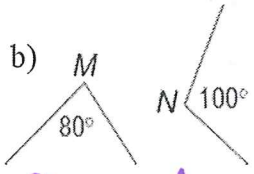
15) Classify all that apply: adjacent, vertical, linear pairs, complementary, supplementary, right angle and/or congruent.

a)



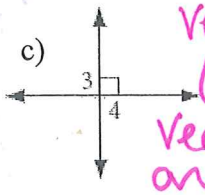
adjacent
complementary

b)



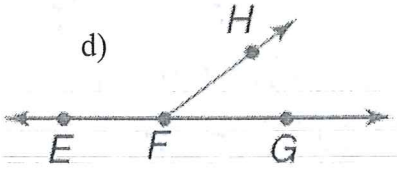
Suppl.

c)



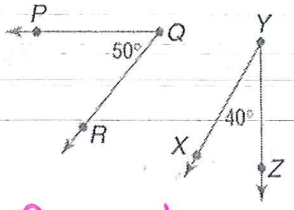
Vertical <s (suppl.)
Vertical <s are ≅ ONLY Suppl. when both <s are 90°.

d)



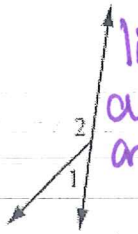
Linear Pairs are adjacent and suppl.

e)



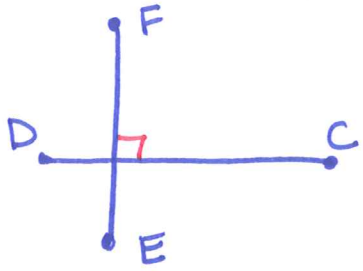
Compl.

f)

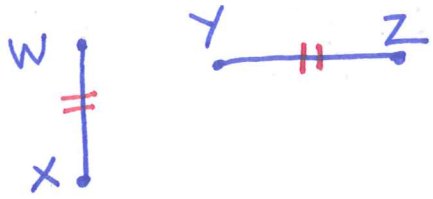


linear pairs are adjacent and suppl.

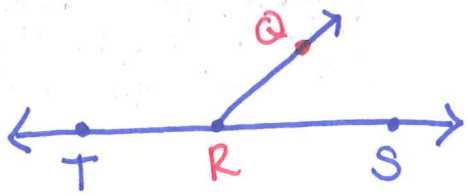
16) Draw $\overline{FE} \perp \overline{DC}$



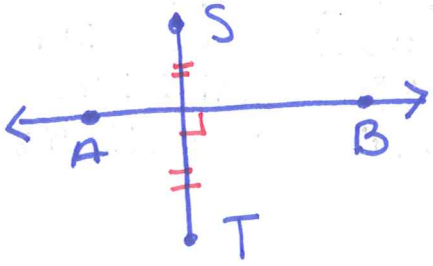
17) Draw $\overline{WX} \cong \overline{YZ}$



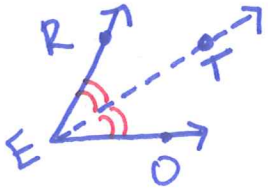
18) Draw $< QRS$ *and* $< QRT$ *are a linear pair*



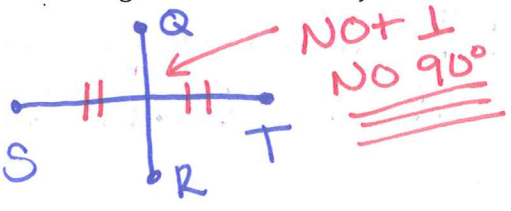
19) Draw $\overleftrightarrow{AB}$ *is a* $\perp$ *bisector of* $\overline{ST}$



20) Draw $\overrightarrow{ET}$ *is an angle bisector of* $\angle REO$



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



NOT ⊥
NO 90°

CONSTRUCTIONS OF TRANSFORMATIONS –

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

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

A. NAME THE TYPE OF TRANSFORMATION

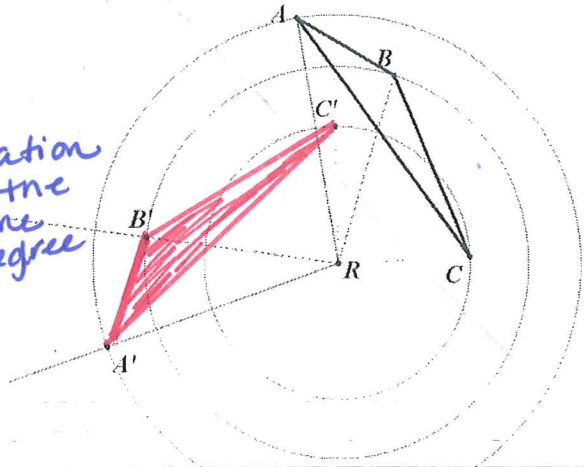
Rotation

B. NAME ALL PROPERTIES OF THE CONSTRUCTION

$\angle ARA' \cong \angle BRB' \cong \angle CRC'$ → Rotation of the same degree

$CR \cong C'R$
$BR \cong B'R$
$AR \cong A'R$
} Radii of the same circle are $\cong$

$\triangle ABC \cong \triangle A'B'C'$ ← Rotation preserves congruence ⇒ isometry



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

A. NAME THE TYPE OF TRANSFORMATION

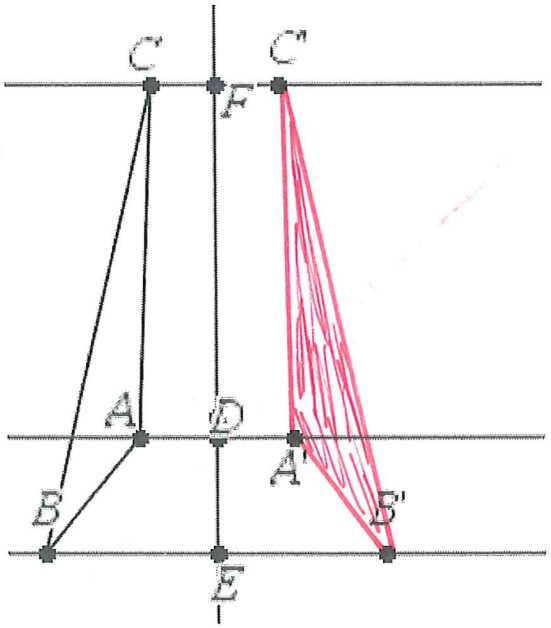
Reflection

B. NAME ALL PROPERTIES OF THE CONSTRUCTION

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

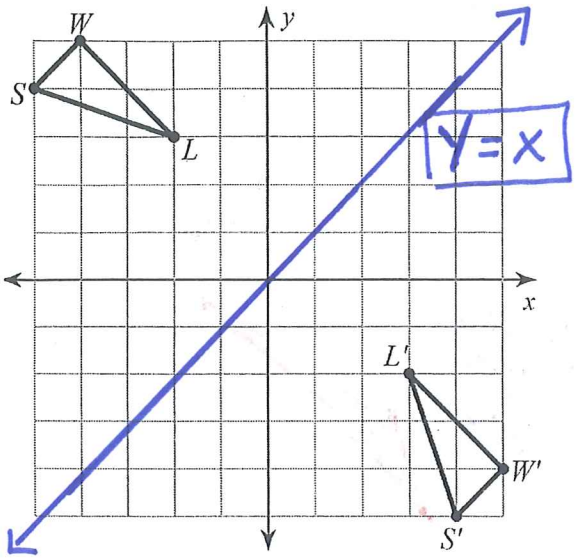
$AD \cong A'D$
$BE \cong B'E$
$CF \cong C'F$
} equidistant to line of reflection

$AA' \perp \overleftrightarrow{FE}$
$BB' \perp \overleftrightarrow{FE}$
$CC' \perp \overleftrightarrow{FE}$

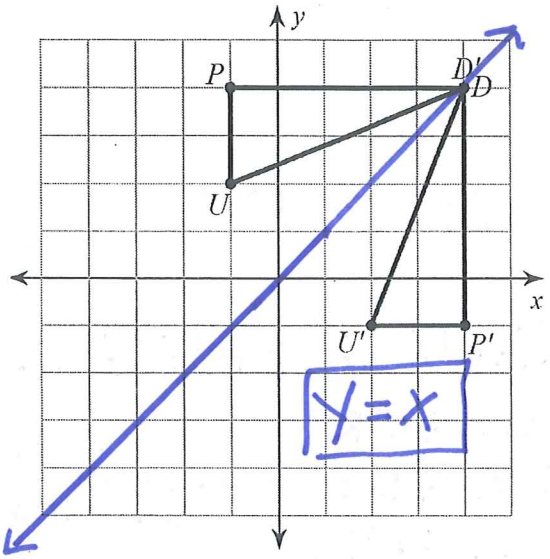


Draw in the line of reflection for 24 through 29.

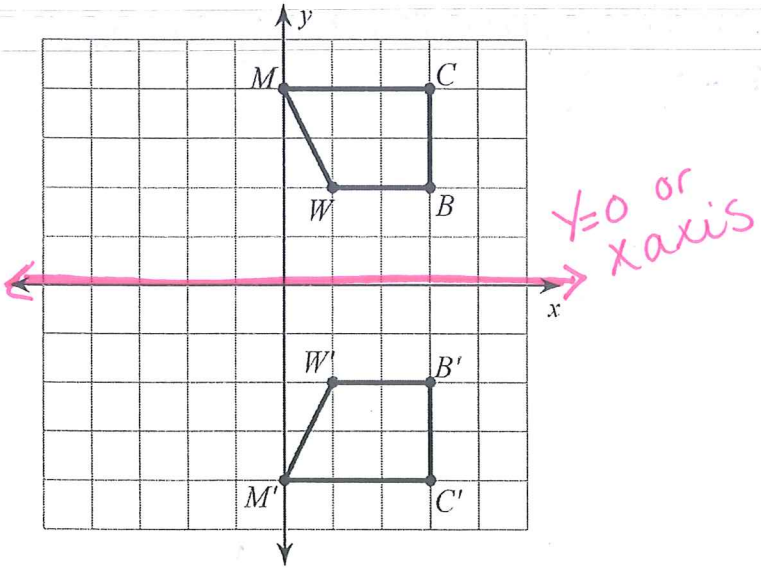
24.



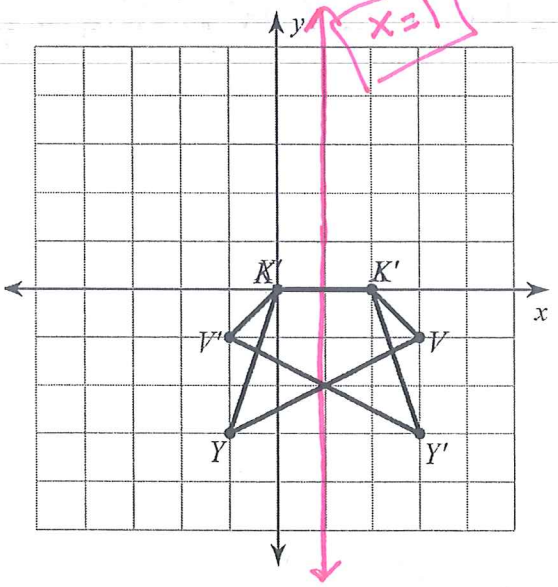
25.



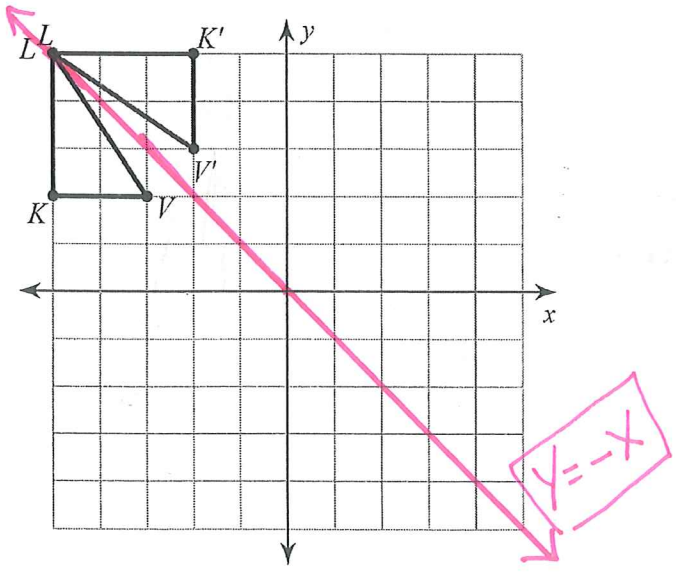
26.



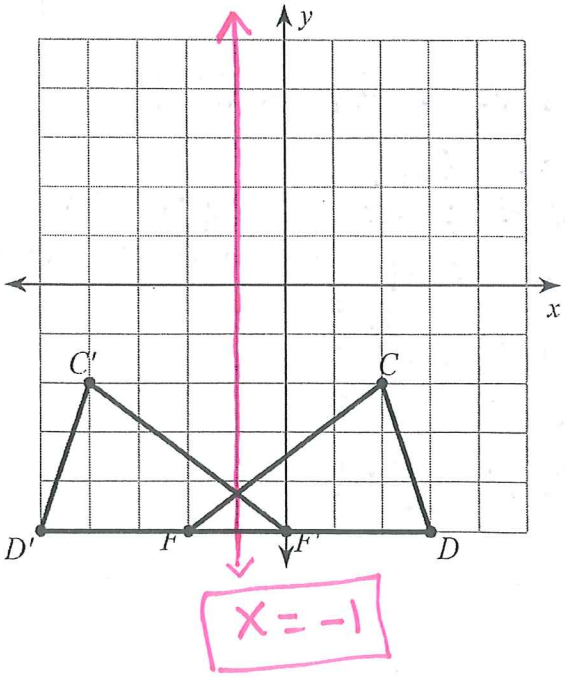
27.



28.

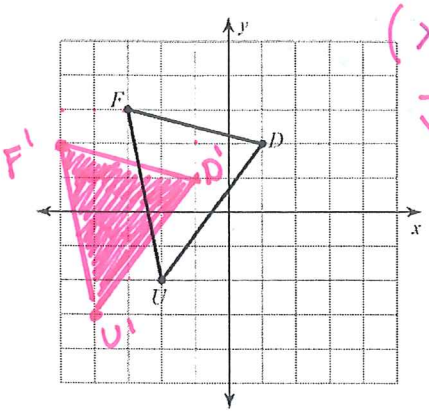


29.



Graph the transformation for 30 through 37. If it is a translation, write the rule for the translation.

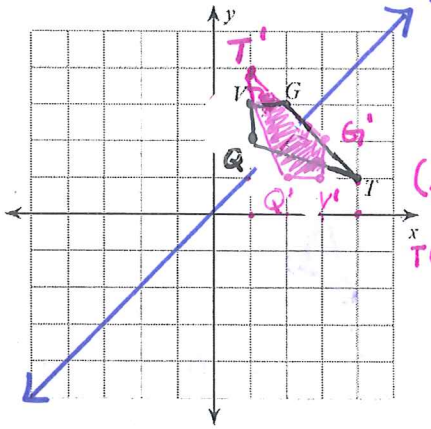
30. translation: 2 units left and 1 unit down



$(x,y) \rightarrow (x-2, y-1)$

$\vec{v} = \langle -2, -1 \rangle$

31. reflection across $y = x$



$y = x$ must be graphed 1st!

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

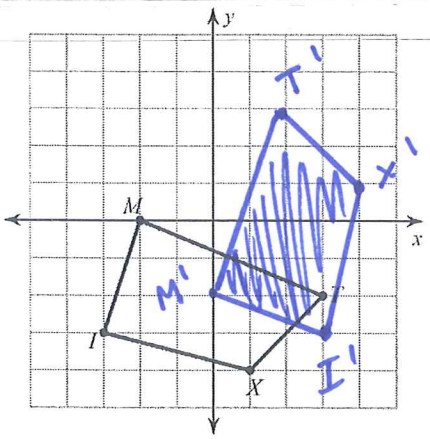
$T(4,1) \rightarrow (1,4)$

$(3,1)$

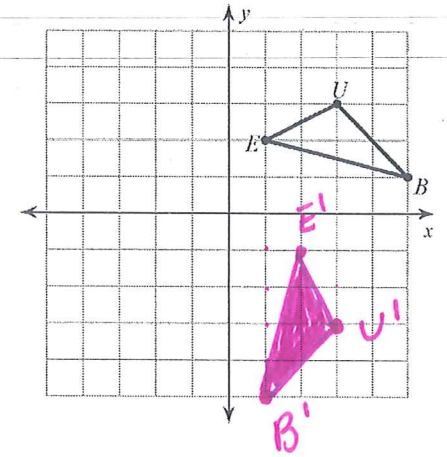
$(2,1)$

$(3,2)$

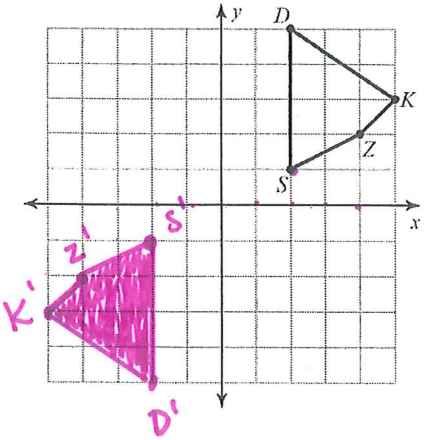
32. rotation 90° counterclockwise about the origin



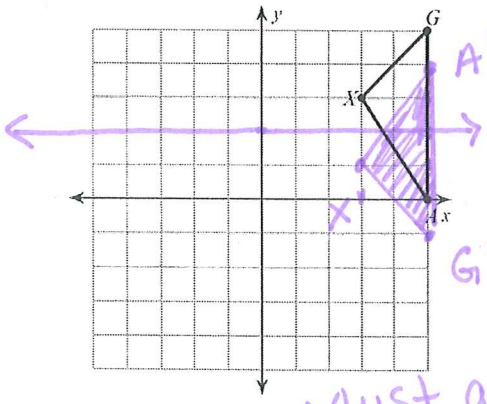
33. rotation 90° clockwise about the origin



34. rotation 180° about the origin $(-x, -y)$

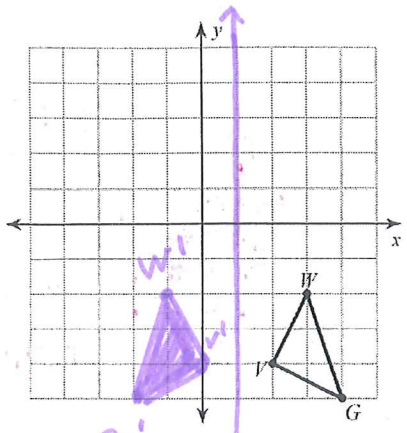


35. reflection across $y = 2$



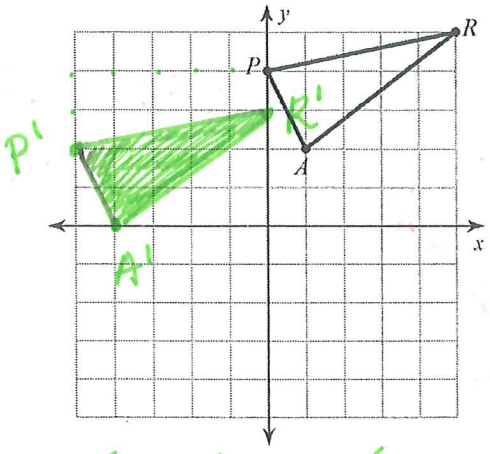
Must graph $y = 2$ 1st

36. reflection across $x = 1$



must graph $x = 1$

37. translation: 5 units left and 2 units down



$(x, y) \longrightarrow (x-5, y-2)$

$\vec{v} = \langle -5, -2 \rangle$

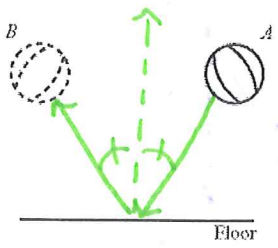
38. Create your own real world example of a rotation. (Draw it if it helps.)

Students' should have many different examples for # 38 -> #40

39. Create your own real world example of a reflection. (Draw it if it helps.)

40. Create your own real world example of a translation. (Draw it if it helps.)

41. 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.



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

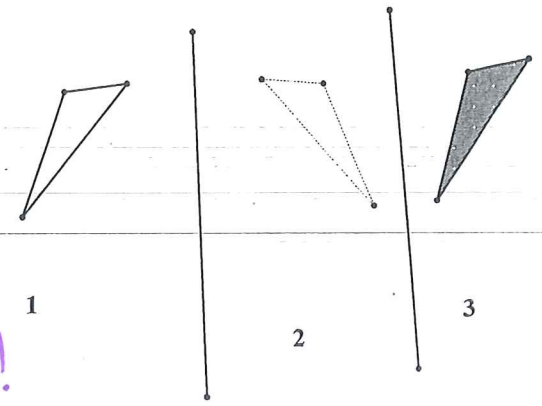
S(6, 5), T(-4, 3) X(-4,2), Y(-3,-3)

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

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

Slope of XY: -5

43. This is a composite of transformations. Translation



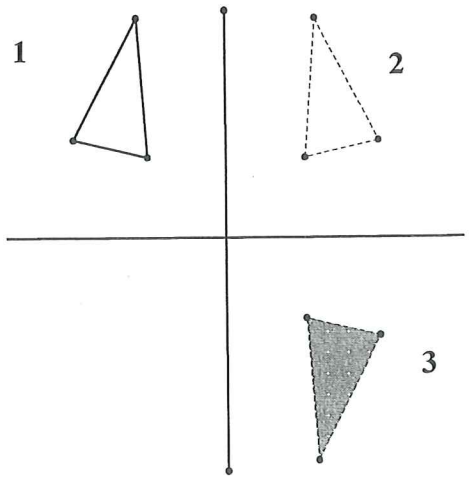
From 1 to 2 the transformation performed is : reflection

From 2 to 3 the transformation performed is : reflection

From 1 to 3 the transformation performed is : translation!!

44. The composite of reflections over two parallel lines results in a rotation

This is a composite of transformations.



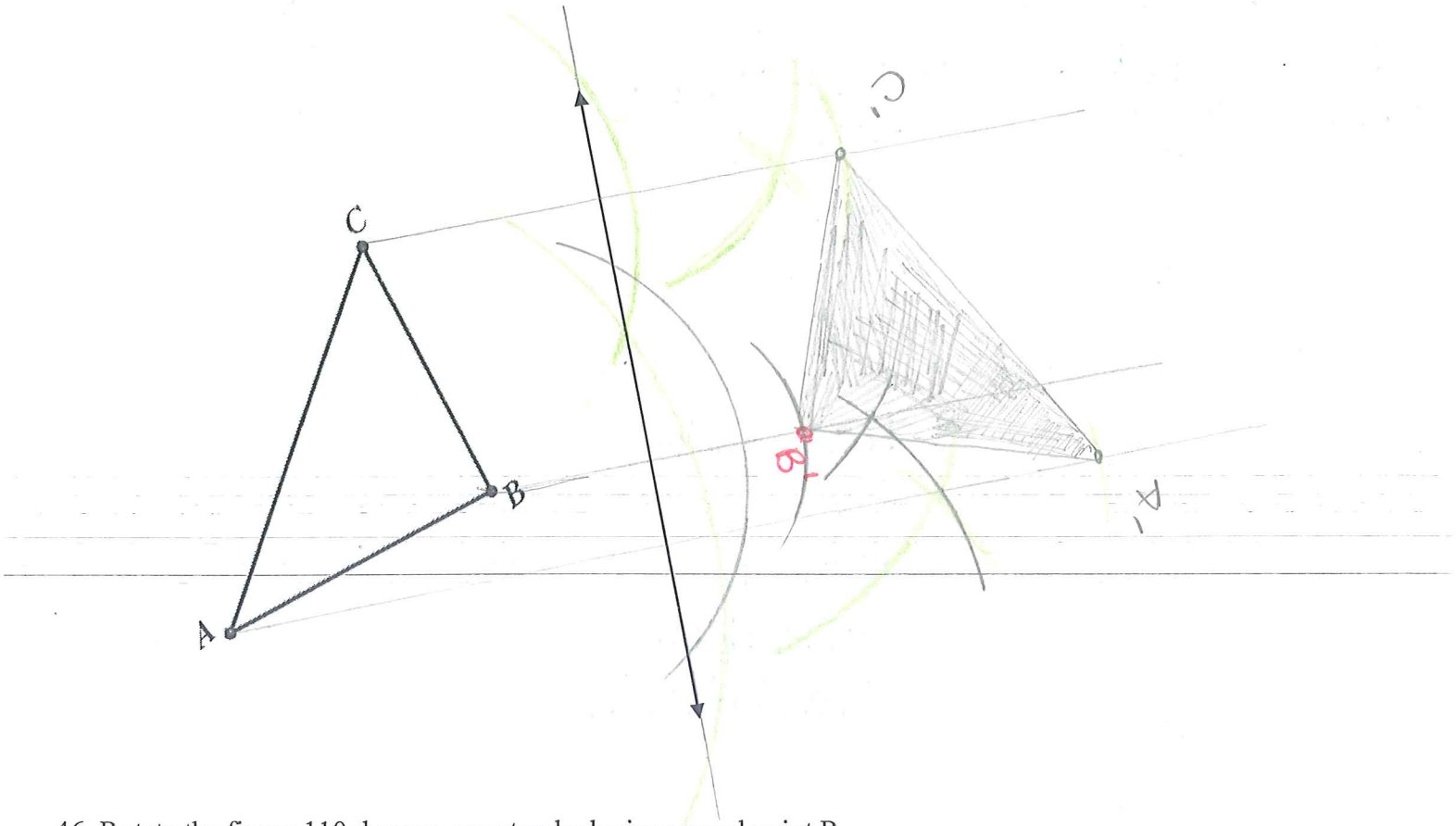
From 1 to 2 the transformation performed is : reflection

From 2 to 3 the transformation performed is : reflection

From 1 to 3 the transformation performed is : Rotation!!

45. Reflect the figure over the given line.

Will complete w/ students in class



46. Rotate the figure 110 degrees counterclockwise around point R