Name: Key HOUR: _____ Due Date: Friday 1/19

2017-2018 Geometry Midterm Review

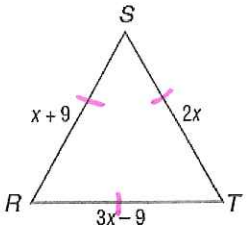
*all retakes due 1/19 also

The midterm assessment assesses the following topics:

Tools and Vocabulary	Angle Relationships	Transformations	Triangles	Quadrilaterals
17%	15%	13%	31%	24%

Directions: This review consists of problems that could be on your midterm. Make sure you complete each problem and **show your work.**

1. The perimeter of equilateral ΔRST is 54 inches. Find the value of x.



$2x + 3x - 9 + x + 9 = 54$

$6x = 54$

$x = 9$

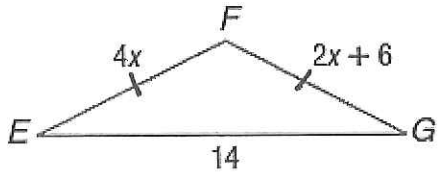
OR

since it is equilateral, set any 2 sides =

$x + 9 = 2x$

$9 = x$

2. Find the perimeter of isosceles ΔRST.



$4x = 2x + 6$

$2x = 6$

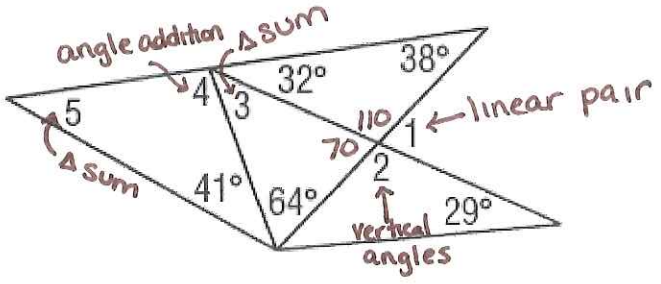
$x = 3$

$P = 4(3) + 2(3) + 6 + 14$

$P = 12 + 12 + 14$

$P = 38$

3. Find the missing angle measures.

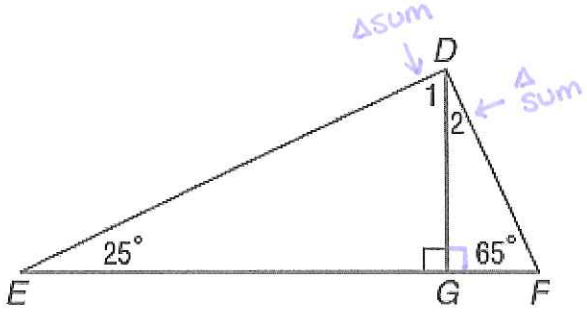


$\angle 1 = 70°$ $\angle 4 = 102°$

$\angle 2 = 110°$ $\angle 5 = 37°$

$\angle 3 = 46°$

4. Find the missing angle measures.

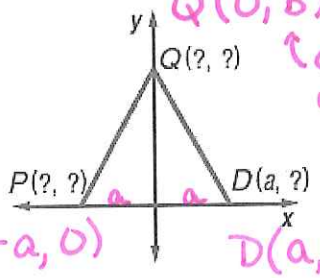


$\angle 1 = 65°$

$\angle 2 = 25°$

5. What are the missing coordinates of the isosceles triangle?

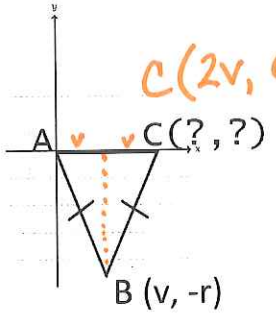
A.



Q(0, b) ↑ any variable other than a

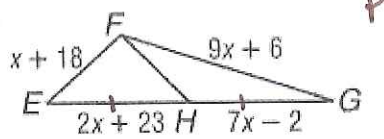
P(−a, 0) D(a, 0)

B.



C(2v, 0)

6. If FH is a median of ΔEFG (FH divides EG into two equal segments), find the perimeter of ΔEFG, then state 3 true things about this figure.



$P = 5+18+9(5)+6+2(5)+23+7(5)-2$

$P = 23+51+33+33$

P = 140

1) EH ≅ HG

2) H is the midpoint of EG

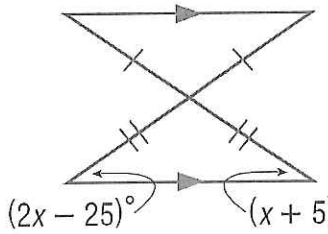
3) ΔEFG is scalene

$2x+23 = 7x-2$

$25 = 5x$

$5 = x$

7. Find x.

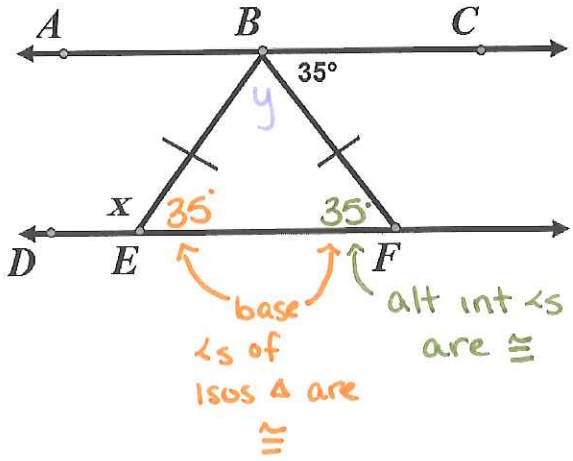


base ∠s of isos. Δ are ≅

$2x-25 = x+5$

$x = 30$

8. In the figure below, B is on $\overline{AC}$, E is on $\overline{DF}$, $\overline{AC}$ is parallel to $\overline{DF}$, and $\overline{BE}$ is congruent to $\overline{BF}$.. What is the measure of ∠DEB and ∠BFE?



base ∠s of isos Δ are ≅

alt int ∠s are ≅

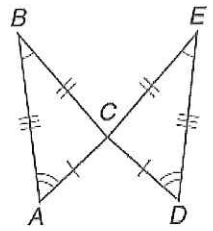
∠DEB = 145° linear pairs are suppl.

$180 = x+35$

∠EFB = 110°

$180 = 35+35+y$ Δ sum

9. Identify the triangle $\triangle CAB$ is congruent to, then name all corresponding parts. There should be 6 pairs.



$\triangle CAB \cong \triangle CDE$

Corresponding $\angle$s

$\angle B \cong \angle E$

$\angle A \cong \angle D$

$\angle ACB \cong \angle DCE$

Corresponding sides

$BC \cong CE$

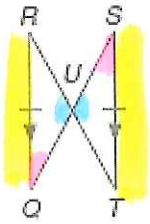
$CA \cong CD$

$AB \cong DE$

10. Write a two-column proof.

Given: $\overline{RQ} \cong \overline{ST}$ and $\overline{RQ} \parallel \overline{ST}$

Prove: $\triangle RUQ \cong \triangle TUS$

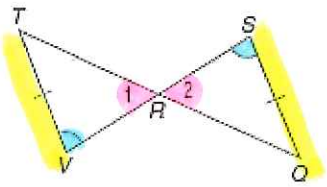


1. $RQ \cong ST$, $RQ \parallel ST$	1. given
2. $\angle Q \cong \angle S$	2. alt int $\angle$s are $\cong$
3. $\angle RUQ \cong \angle TUS$	3. vertical $\angle$s are $\cong$
4. $\triangle RUQ \cong \triangle TUS$	4. AAS

11. Write a two-column proof.

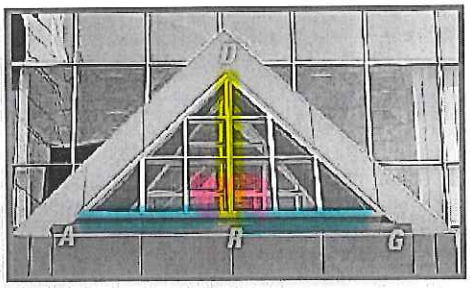
Given: $\angle V \cong \angle S$, $\overline{TV} \cong \overline{QS}$

Prove: $\overline{VR} \cong \overline{SR}$



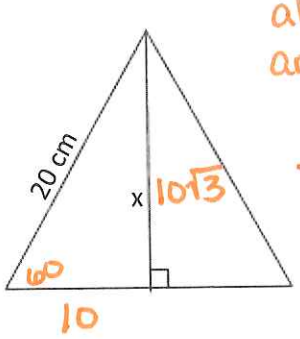
1. $\angle V \cong \angle S$, $TV \cong QS$	1. given
2. $\angle 1 \cong \angle 2$	2. vertical $\angle$s are $\cong$
3. $\triangle RTV \cong \triangle RQS$	3. AAS
4. $VR \cong SR$	4. CPCTC

12. **ARCHITECTURE** You are designing the window shown in the photo. You want to make $\triangle DRA$ congruent to $\triangle DRG$. You design the window so that $\overline{DR} \perp \overline{AG}$ and $\overline{RA} \cong \overline{RG}$. Can you conclude that $\triangle DRA \cong \triangle DRG$?



1. $DR \perp AG$, $RA \cong RG$	1. given
2. $\angle DRA = 90°$, $\angle DRG = 90°$	2. def of $\perp$
3. $\angle DRA \cong \angle DRG$	3. substitution
4. $DR \cong DR$	4. reflexive
5. $\triangle DRA \cong \triangle DRG$	5. SAS

13. Find x if the triangle is equilateral.

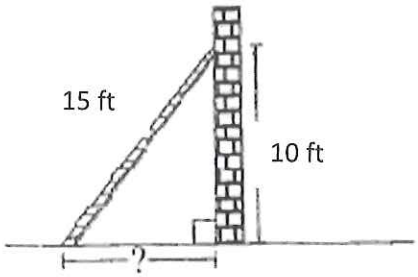


all 3 ∠s in an equilateral △ are 60°
∴ 30-60-90 SRT
$X = 10\sqrt{3}$

or

Use Pythag. Thm
$10^2 + x^2 = 20^2$
$100 + x^2 = 400$
$\sqrt{x^2} = \sqrt{300}$
$\sqrt{100}\ \sqrt{3}$
10
$X = 10\sqrt{3}$

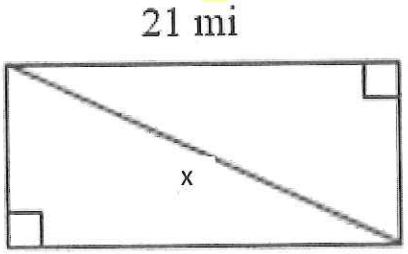
14. A ladder is 15ft long and reaches 10 feet up a wall, as shown in the picture. How many feet is the bottom of the base of the wall? Round to the nearest hundredth foot.



Pythagorean Thm
$10^2 + x^2 = 15^2$
$100 + x^2 = 225$
$\sqrt{x^2} = \sqrt{125}$
$X = 5\sqrt{5}$ ft

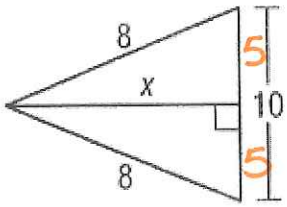
$\sqrt{125}$
$\sqrt{5}$ $\sqrt{25}$
5

15. Find the value of x.



Pythagorean Thm
$21^2 + 17^2 = x^2$
$441 + 289 = x^2$
$\sqrt{730} = \sqrt{x^2}$
$X = \sqrt{730}$ mi

16. Find x.

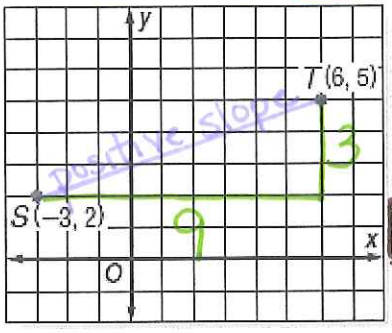


Pythagorean Thm
$5^2 + x^2 = 8^2$
$25 + x^2 = 64$
$\sqrt{x^2} = \sqrt{39}$
$X = \sqrt{39}$

Find the slope, distance, and midpoint between each set of points.

17. points S and T

slope = $\frac{\text{rise}}{\text{run}} = \frac{3}{9} = \boxed{\frac{1}{3}}$



distance

$3^2 + 9^2 = x^2$

$9 + 81 = x^2$

$90 = x^2$

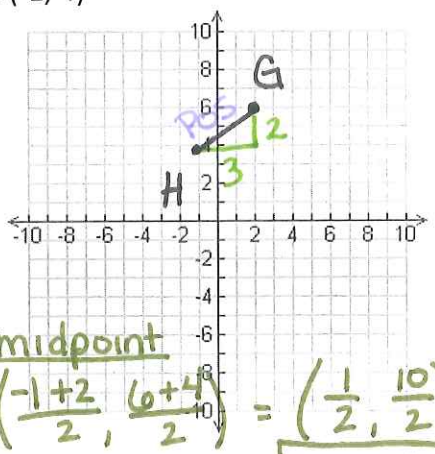
$\boxed{x = 3\sqrt{10}}$

Midpt: $\left(\frac{-3+6}{2}, \frac{2+5}{2}\right) = \boxed{\left(\frac{3}{2}, \frac{7}{2}\right)}$

18. G (2, 6) and H (−1, 4)

slope = $\frac{\text{rise}}{\text{run}}$

$\boxed{m = \frac{2}{3}}$



distance

$2^2 + 3^2 = x^2$

$4 + 9 = x^2$

$13 = x^2$

$\boxed{x = \sqrt{13}}$

midpoint $\left(\frac{-1+2}{2}, \frac{6+4}{2}\right) = \left(\frac{1}{2}, \frac{10}{2}\right) = \boxed{\left(\frac{1}{2}, 5\right)}$

19. Find the value of x, y, and z.

Find x: vertical <s are ≅

$4x + 3 = 87$

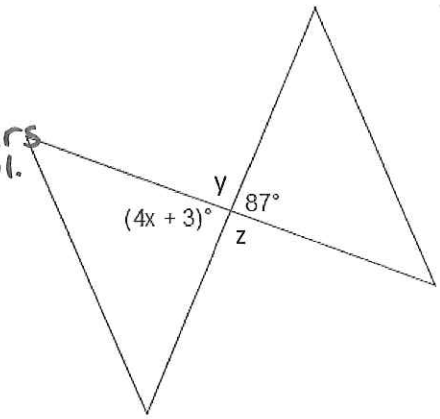
$4x = 84$

$\boxed{x = 21}$

Find z: linear pairs are suppl.

$z + 87 = 180$

$\boxed{z = 93°}$

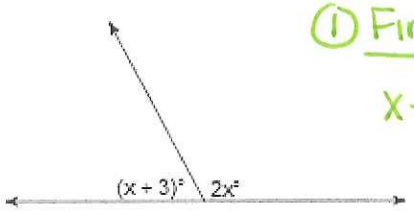


Find y: linear pairs are suppl.

$y + 87 = 180$

$\boxed{y = 93°}$

20. What is the degree measure of the larger of the two angles?



① Find x first! linear pairs are suppl.

$x + 3 + 2x = 180$

$3x + 3 = 180$

$3x = 177$

$\boxed{x = 59}$

② Find the measure.

$x + 3 = 59 + 3 = 62°$

$2x = 2(59) = 118°$

$\boxed{118°}$

21. Find x so that lines l and k are parallel, given $\angle 2 = 27x + 2$ and $\angle 7 = 18x - 2$.

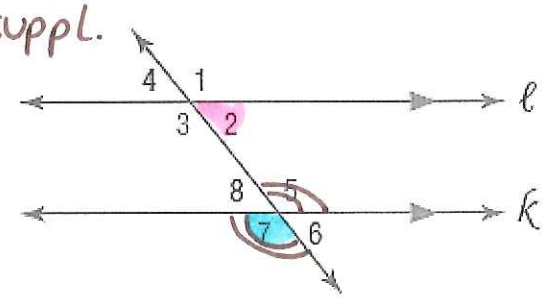
$\angle 7 \cong \angle 5$ Vertical <s are ≅

$\angle 2 + \angle 5 = 180$ Consec. int. <s are suppl.

$27x + 2 + 18x - 2 = 180$

$45x = 180$

$\boxed{x = 4}$



22. a) Given $l \parallel m$, name the relationship that makes $\angle 10 \cong \angle 16$?

alternate exterior angles

b) Given $r \parallel s$, name the relationship that makes $\angle 3 + \angle 12 = 180°$?

consecutive interior angles

c) If $\angle 11 \cong \angle 15$, what 2 lines are parallel?

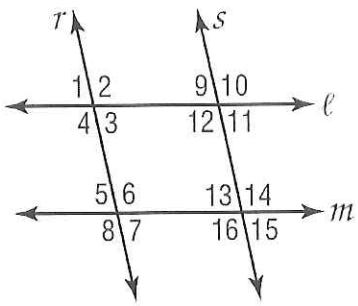
$\ell \parallel m$

d) If $\angle 2 \cong \angle 6$, what 2 lines are parallel?

$\ell \parallel m$

e) If $\angle 9 \cong \angle 13$, what 2 lines are parallel?

$\ell \parallel m$



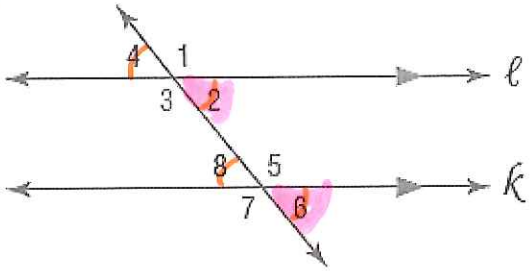
23. Find the measure of $\angle 1$ so that lines l and k are parallel, given $\angle 2 = 17x$ and $\angle 6 = -5 + 18x$.

$\angle 2 \cong \angle 6$ corres. $\angle$s are $\cong$

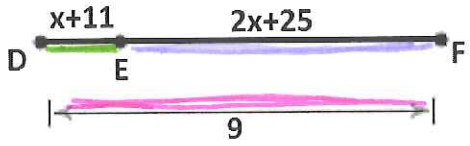
$17x = -5 + 18x$

$-x = -5$

$\boxed{x = 5}$



24. Find x, then the length of EF. Show your work!



DE + EF = DF Segment addition

$x + 11 + 2x + 25 = 9$

$3x + 36 = 9$

$3x = -27$

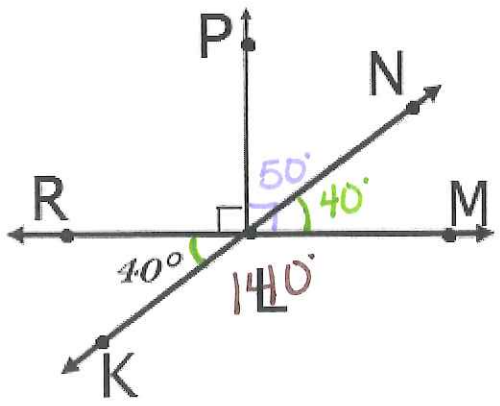
$\boxed{x = -9}$

$EF = 2x + 25$

$EF = 2(-9) + 25$

$\boxed{EF = 7}$

25. Find all the missing angle measures.



$m\angle NLM =$ 40°

$m\angle NLP =$ 50°

$m\angle MLK =$ 140°

$m\angle NLR =$ 140°

$m\angle PLM =$ 90°

90 − 40

$x + 40 = 180$

90 + 50

50 + 40

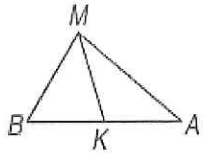
26. Given the following triangle with angle bisector MK, state if the following statements are true or false.

a. $m\angle MKA = 90°$ False

b. $\overline{BK} \cong \overline{AK}$ False

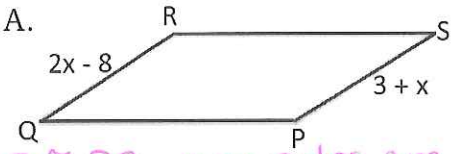
c. $m\angle BMK = m\angle AMK$ True

d. ΔBMA is isosceles with vertex angle M. False



27. The two quadrilaterals are parallelograms. Find x.

A.



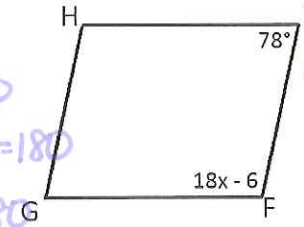
QR ≅ PS opp sides are ≅

$2x - 8 = 3 + x$

$x - 8 = 3$

$x = 11$

B.



$\angle E + \angle F = 180$ consec. int. ∠s are suppl.

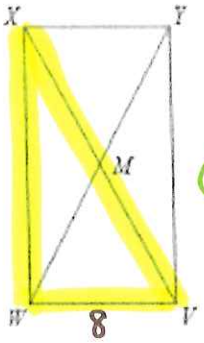
$78 + 18x - 6 = 180$

$18x + 72 = 180$

$18x = 108$

$x = 6$

28. Suppose VWXY is a rectangle and XV= 4x – 1 and WY = 3x + 2. If WV = 8, Find XW.



① $XV \cong WY$ diag. are ≅

$4x - 1 = 3x + 2$

$x = 3$

② $XV = 4x - 1$

$XV = 4(3) - 1$

$XV = 11$

③ $XW^2 + WV^2 = XV^2$

$x^2 + 8^2 = 11^2$

$x^2 + 64 = 121$

$\sqrt{x^2} = \sqrt{57}$

$XW = \sqrt{57}$

29. Use rhombus PLAN to write the correct geometric statement (if needed) and justification.

a.) AL ≅ PL because : def of Rhombus: 4 ≅ sides

b.) ∠NEA = 90 because : diag of a rhombus are ⊥ to each other

c.) EA ≅ PE because : diag. bisect each other

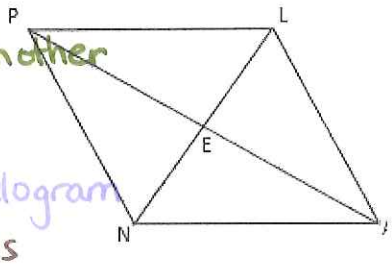
d.) NA || PL because : a rhombus is a parallelogram

e.) ∠NPE ≅ ∠LPE because : diag. bisect the angles

f.) ∠PLA ≅ ∠PNA because : opp. ∠s are ≅

g.) ∠LNA ≅ ∠PNL because : diag bisect the angles

h.) ∠LEA = 90 because : diag. are ⊥ to each other



30. $ABCD$ is a parallelogram with $B(5,-3), C(6,-6)$, and $D(9,-3)$. Find the coordinates of A.

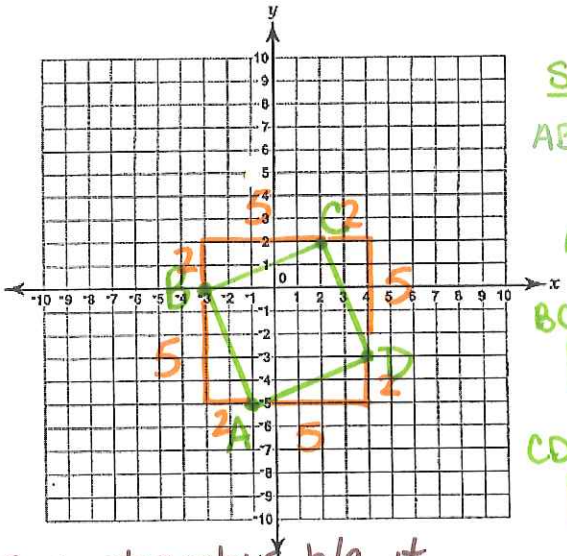
A(10, -6) see graph paper

31. Given the set of vertices, determine if it is a rhombus or not. If it is a rhombus, determine whether it is a square. Explain why or why not.

$A(-1,-5), B(-3,0), C(2,2), D(4,-3)$

Rhombus: 4 ≅ sides

Square: 4 ≅ sides + 4 right angles



Sides

AB: $2^2+5^2=x^2$

$4+25=x^2$

AB: $\sqrt{29}=x$

BC: $2^2+5^2=x^2$

BC = $\sqrt{29}$

CD: $2^2+5^2=x^2$

CD = $\sqrt{29}$

AD: $2^2+5^2=x^2$

AD = $\sqrt{29}$

Angles

slope AB = $-\frac{5}{2}$ ⊥

slope BC = $\frac{2}{5}$ ⊥

slope CD = $-\frac{5}{2}$ ⊥

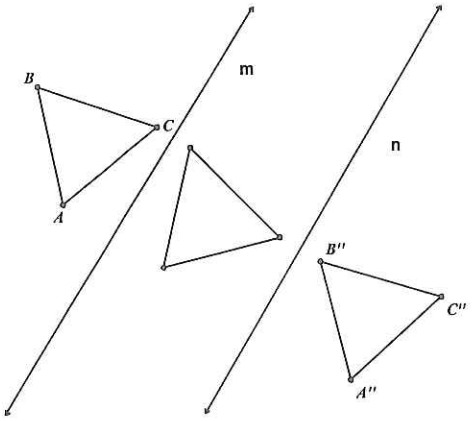
slope AD = $\frac{2}{5}$ ⊥

⊥

① It is a rhombus b/c it has 4 ≅ sides

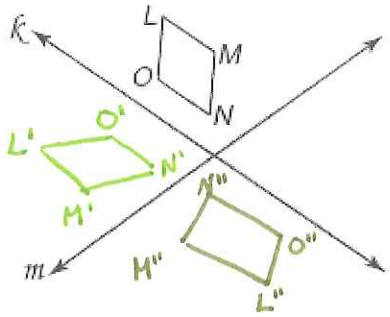
② ABCD is a square b/c it has 4 ≅ sides + 4 right angles

32. If $m \| n$ and triangle ABC is reflected over line m first, then line n, what transformation would occur from ΔABC to ΔA"B"C"?



Translation

33. If LMNO is reflected over line k first, then line m, what transformation would occur from LMNO to L"M"N"O"?



rotation

34. Given point A(6, -1), find its image if it is reflected across the x-axis, the y-axis, y = x, y = -x.

see graph paper

$y = x$ $A(6,-1) \rightarrow A'(-1,6)$ x axis $A(6,-1) \rightarrow A'(6,1)$

$y = -x$ $A(6,-1) \rightarrow A'(1,-6)$ y axis $A(6,-1) \rightarrow A'(-6,-1)$

35. Given the point (x, y), write the image point if it is reflected across the x-axis, y-axis, $y = x$, $y = -x$.

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

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

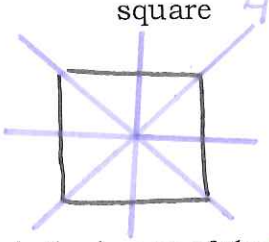
36. What are the coordinates of X´ if X(2, 5) is under the translation (x, y) → (x - 1, y + 2)?

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

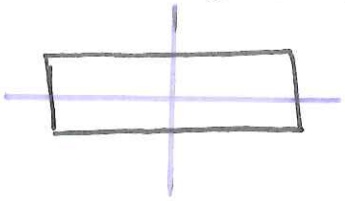
$(2,5) \rightarrow (2-1, 5+2)$ $X'(1,7)$

37. Draw all the lines of symmetry for the following figures.

square 4 lines

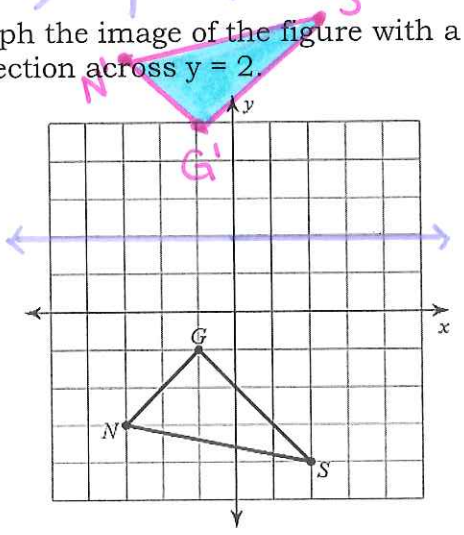


rectangle 2 lines

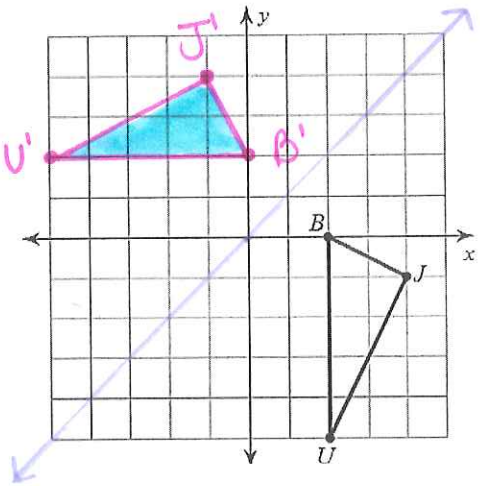


isosceles triangle 1 line

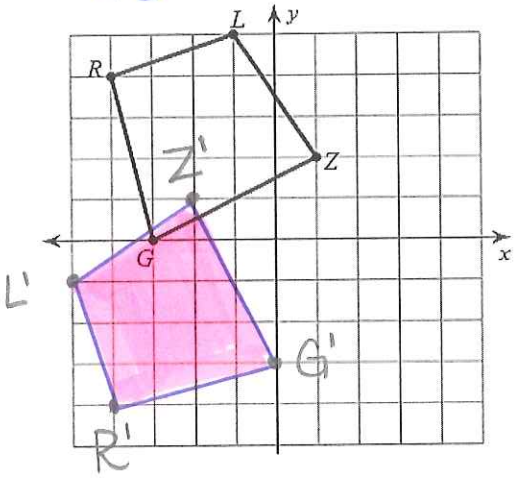
38. Graph the image of the figure with a reflection across y = 2.



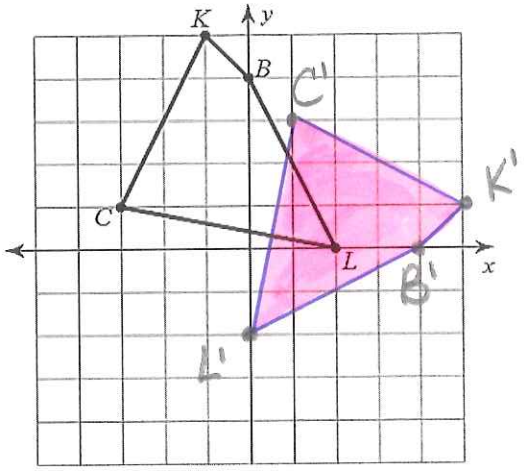
39. Graph the image of the figure with a reflection across y = x.



40. Graph the image of the figure with a rotation 90° counterclockwise about the origin.



41. Graph the image of the figure with a rotation 90° clockwise about the origin.

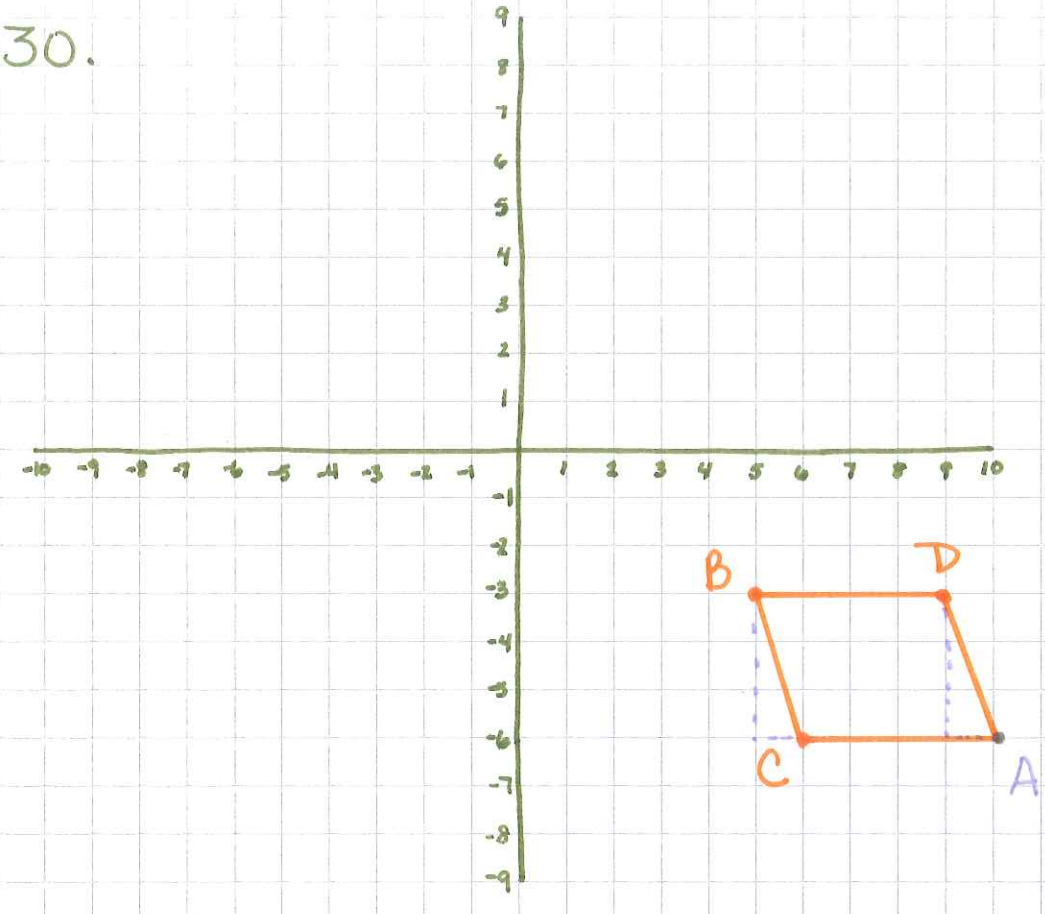


42. Identify each statement as true or false.

A. The diagonals of a parallelogram are always congruent. False (sometimes → rectangle, square)
B. A parallelogram is always a square. False (A square is always a //ogram)
C. The diagonals of a rectangle sometimes bisect each other. False (always)
D. The diagonals of a ~~rectangle~~ always bisect the angles. False (only a rhombus + square)
E. The diagonals of a square are ~~never~~ perpendicular bisectors of each other. False (always)
F. A rhombus is always a rectangle. False (A square is always a rectangle)
G. A square is never a rectangle. False (A square is always a rectangle)
H. A square is always a rhombus True

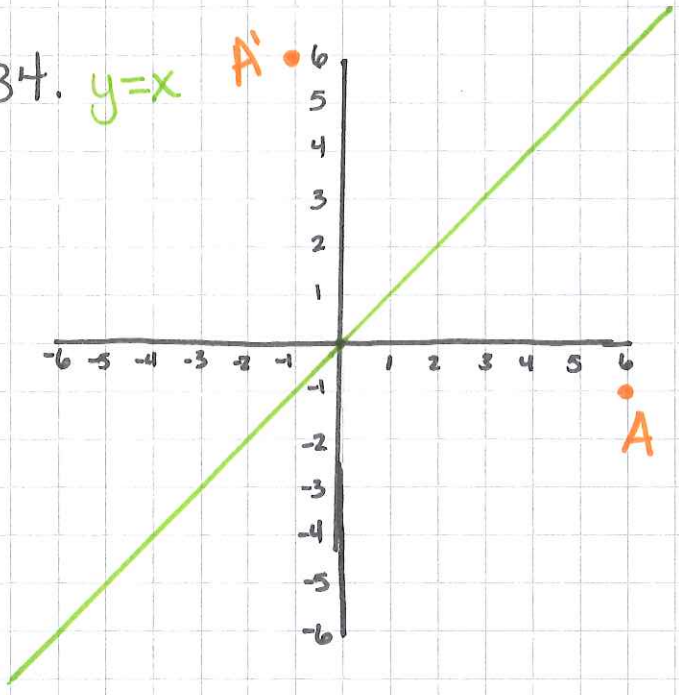
Opposite angles in a parallelogram are always ≅. True

30.

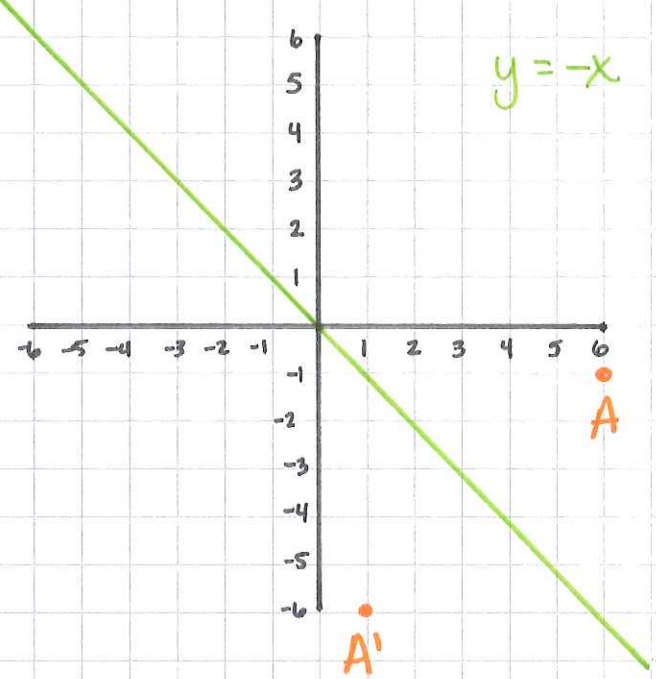


A(10, -6)

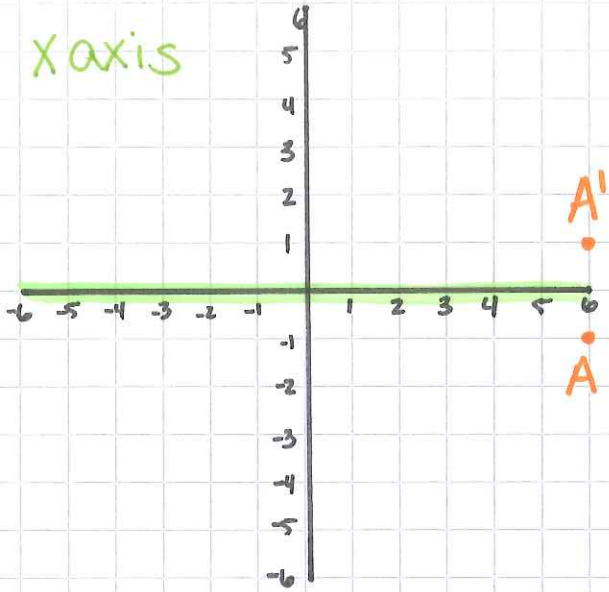
34. $y = x$



$y = -x$



x axis



y axis