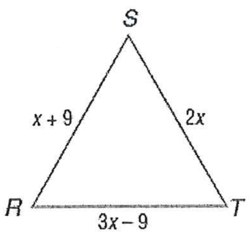
Name: Key HOUR: ____________ Due Date: ______________

2014 Geometry Midterm Review

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

1. For equilateral ΔRST, find the variable and the side lengths. All units are in inches.



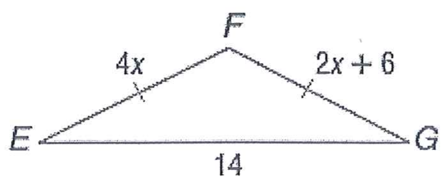
$RS \cong ST$ def of equilateral

$x + 9 = 2x$

$\boxed{9 = x}$

$\boxed{RS = 18}$
$\boxed{ST = 18}$
$\boxed{RT = 18}$
} inches!

2. For isosceles ΔRST, find the variable and the side lengths. All units are in centimeters.



$EF \cong FG$

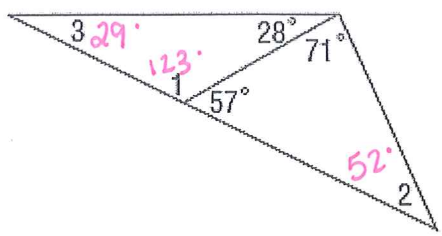
$4x = 2x + 6$

$2x = 6$

$\boxed{x = 3}$

EF = 12 inches
FG = 12 inches
EG = 14 inches

3. Find the missing angle measures, $m<1$ and $m<2$.



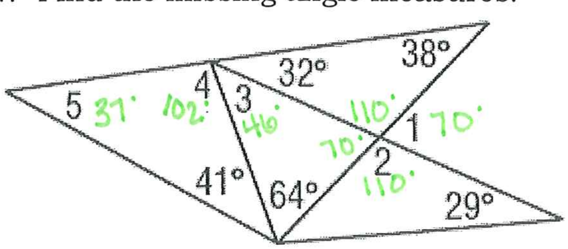
$<1 + 57 = 180°$ linear pairs are suppl.

$\boxed{<1 = 123°}$

$<2 + 71 + 57 = 180$ Δ sum

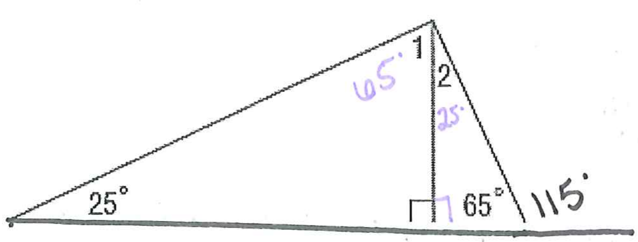
$\boxed{<2 = 52°}$

4. Find the missing angle measures.



<1 = 70°
<2 = 110°
<3 = 46°
<4 = 102°
<5 = 37°

5. Find the missing angle measures.

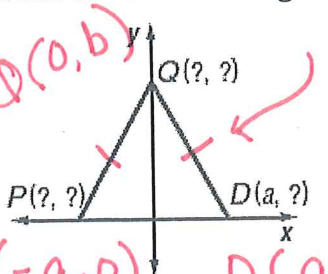


<1 = 65°
<2 = 25°

6. Do any of the following sets of numbers create a triangle?
   a. 7, 20, 10 NO
   b. 7, 9, 12 Yes
   c. 16, 10, 9 Yes
   d. $\sqrt{13}$, 6, 6 Yes
   e. 7, 18, 11 NO

7. What are the missing coordinates of the triangle?

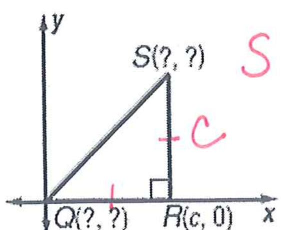
Q(0,b)



should indicate isosceles.

P(-a,0) D(a,0)

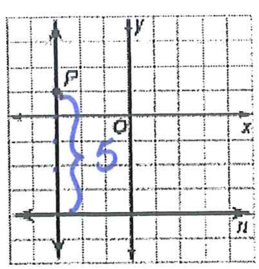
8. What are the missing coordinates of this isosceles right triangle?



S(c,c)

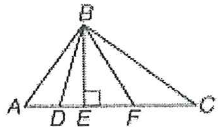
Q(0,0)

9. What is the shortest distance from P to line n?



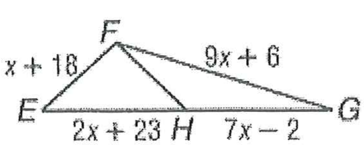
Just count!

10. What is the shortest distance from point B to segment AC?



BE

11. If FH is a median of ΔEFG, find the perimeter of ΔEFG.



EH = HG def of median

$2x + 23 = 7x - 2$

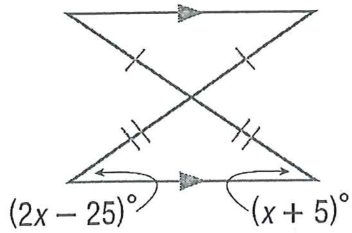
$25 = 5x$

$\boxed{5 = x}$

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

Perimeter: 140 units

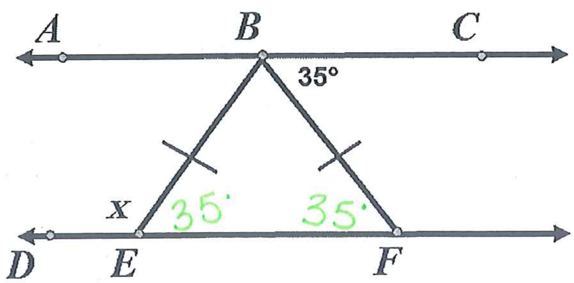
12. Find x.



$2x-25=x+5$ base ∠s of isosceles △s are ≅

$\boxed{x=30}$

13. 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 $\overline{BF}$.. Name the legs of the isosceles triangle, name the base angles and vertex angle of the isosceles triangle, and provide an example of an exterior angle. What is the measure of <DEB and <EBF?

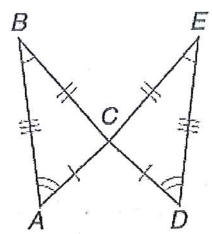


$35+x=180$

$\boxed{x=145^\circ}$

base ∠s of isosceles △s are ≅ and linear pairs are supp.

14. Identify the triangle ΔCAB is congruent to, then name all corresponding parts. There should be 6 pairs.



△CAB ≅ △CDE

∠ECD ≅ ∠BCA

∠E ≅ ∠B

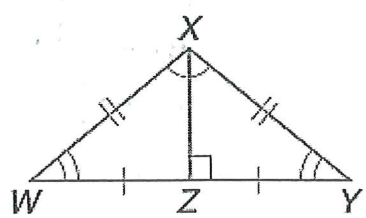
∠D ≅ ∠A

$\overline{AC} \cong \overline{CD}$

$\overline{CB} \cong \overline{CE}$

$\overline{BA} \cong \overline{ED}$

15. Identify the triangle ΔXZW is congruent to, then name all corresponding parts. There should be 6 pairs.



△XZW ≅ △XZY

∠W ≅ ∠Y

∠WXZ ≅ ∠YXZ

∠XZW ≅ ∠XZY

XZ ≅ XZ

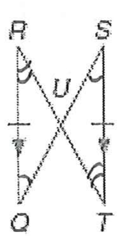
XY ≅ XW

ZY ≅ ZW

16. Write a two-column proof.

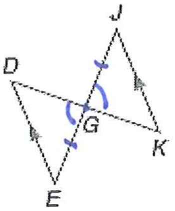
Given: $\overline{RQ} \cong \overline{ST}$ and $\overline{RQ} \parallel \overline{ST}$

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



1. RQ ≅ ST, RQ // ST	1. given
2. ∠S ≅ ∠Q, ∠R ≅ ∠T	2. ∥ lines form ≅ alt. int ∠s
3. △RUQ ≅ △TUS	3. ASA

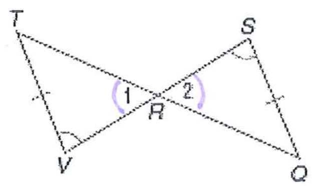
17. Write a two-column proof.
Given: $\overline{DE} \parallel \overline{JK}$, $\overline{DK}$ bisects $\overline{JE}$.
Prove: $\triangle ECD \cong \triangle JCK$



ASA <u>OR</u> AAS

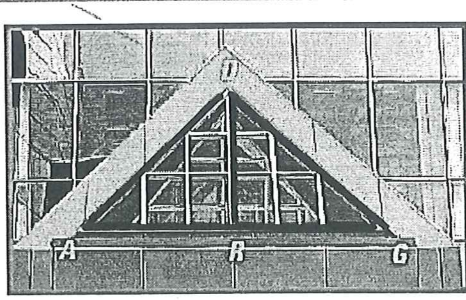
1. DE // JK, DK bisects JE	1. given
2. JG ≅ EG	2. def of Segment bisector
3. ∠DGE ≅ ∠KGJ	3. vertical ∠s are ≅
4. ∠E ≅ ∠J, ∠D ≅ ∠K	4. // lines form ≅ alt. int ∠s.
5. △EGD ≅ △JGK	5. AAS OR ASA

18. Write a two-column proof.
Given: $\angle V \cong \angle S$, $\overline{TV} \cong \overline{QS}$
Prove: $\overline{VR} \cong \overline{SR}$



1. ∠V ≅ ∠S, TV ≅ QS	1. given
2. ∠1 ≅ ∠2	2 vertical ∠s are ≅
3. △SRQ ≅ △VRT	3. AAS
4. VR ≅ SR	4. cpctc

19. **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 $\triangle DRA \cong \triangle DRG$?

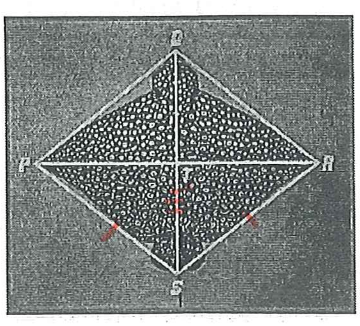


1. DR ⊥ AG, RA ≅ RG	1. given
2. ∠DRA = 90°, ∠DRG = 90°	2. def of ⊥
3. ∠DRA ≅ ∠DRG	3. substitution
4. DR ≅ DR	4. reflexive
5. △DRA ≅ △DRG	5. SAS

20. Write a two column proof using the stingray below.

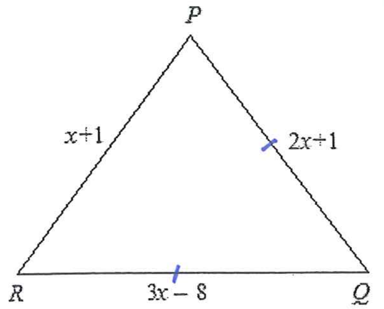
GIVEN ▸ $\overline{QS} \perp \overline{RP}$, $\overline{PT} \cong \overline{RT}$

PROVE ▸ $\overline{PS} \cong \overline{RS}$



1. QS ⊥ RP, PT ≅ RT	1. given
2. ∠STP = 90°, ∠STR = 90°	2. def of ⊥
3. ∠STP ≅ ∠STR	3. substitution
4. ST ≅ ST	4. reflexive
5. △STP ≅ △STR	5. SAS
6. PS ≅ RS	6. cpctc

21. Find x, PQ, QR, and RP if $\triangle PQR$ is an isosceles triangle with $\overline{PQ} \cong \overline{QR}$.



"Vertex ∠Q"

$PQ \cong RQ$ def of isosceles Δ

$2x+1 = 3x-8$

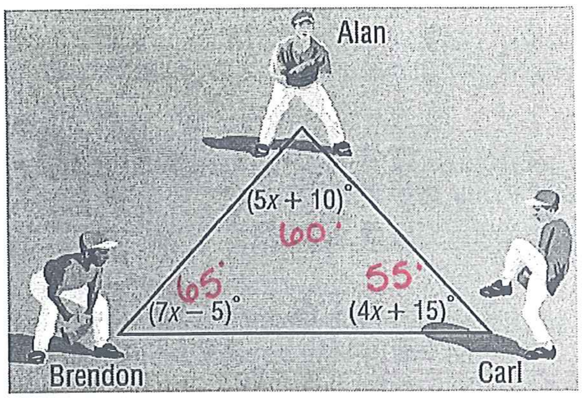
$\boxed{9 = x}$

$\boxed{PQ = 19}$

$\boxed{RQ = 19}$

$\boxed{PR = 10}$

22. **BASEBALL** Alan, Brendon, and Carl were standing in a triangular formation shown. They were throwing the baseball to warm up for the game. Find the value of x, the measure of each angle and then conclude what two people must throw the farthest distance.



Alon + Carl + Brendon = 180° Δ sum

$5x+10 + 4x+15 + 7x-5 = 180°$

$16x + 20 = 180°$

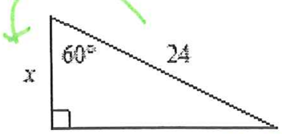
$\boxed{x = 10}$

Alon and Carl must throw the farthest distance because opposite the greatest angle is the greatest side.

23. Find x and y.

$2 \div$

12



$y = 12\sqrt{3}$

a. $x = 24\sqrt{3}, y = 24$

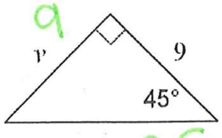
b. $x = 12\sqrt{3}, y = 12$

c. $x = 24, y = 24\sqrt{3}$

d. $x = 12, y = 12\sqrt{3}$

24.

9



$9\sqrt{2}$

A) $u = 9\sqrt{2},\ v = 9$

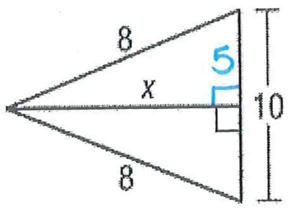
B) $u = \dfrac{9\sqrt{3}}{2},\ v = 18\sqrt{2}$

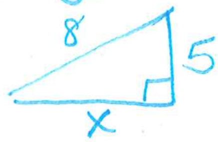
C) $u = 9,\ v = 9\sqrt{2}$

D) $u = 18\sqrt{2},\ v = \dfrac{9\sqrt{3}}{2}$

25. Find x.

Pythagorean Theorem



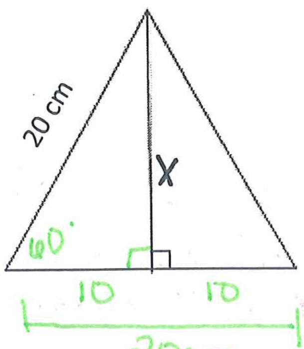


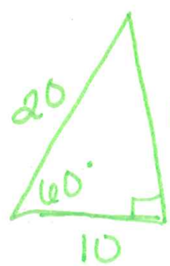
$x^2+5^2=8^2$

$\boxed{x=\sqrt{39}}$

26. Find the altitude of an equilateral triangle whose sides are 20 cm long.

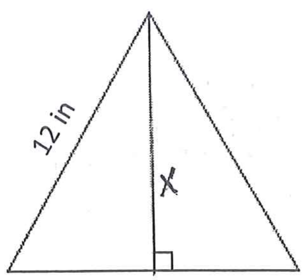
60° ∠s

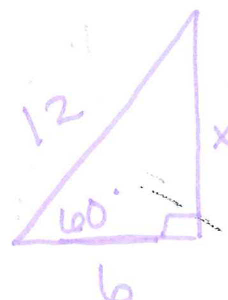




$\boxed{x=10\sqrt{3}\text{cm}}$

27. Find the altitude of an equilateral triangle whose sides are 12 in long.

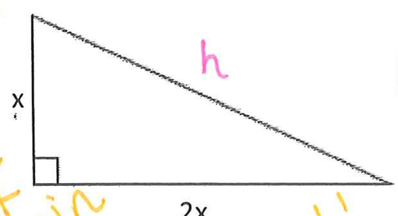




$\boxed{x=6\sqrt{3}\text{in}}$

28. Find the hypotenuse of a right triangle where one leg is twice the other leg.

This is a great question! I ♥ it and might give it to you in the near future!!



$(2x)^2+x^2=h^2$

$4x^2+x^2=h^2$

$5x^2=h^2$

$\sqrt{5x^2}=h$

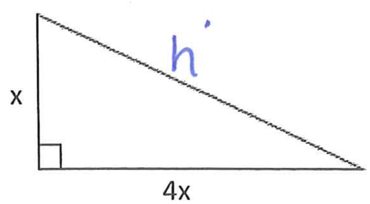
$\sqrt{5x^2}$

$\sqrt{5}$ $\sqrt{x^2}$

x

$h=x\sqrt{5}$

29. Find the hypotenuse of a right triangle where one leg is 4 times the other leg.



$x^2+(4x)^2=h^2$

$x^2+16x^2=h^2$

$17x^2=h^2$

$\sqrt{17x^2}=h$

$\boxed{h=x\sqrt{17}}$

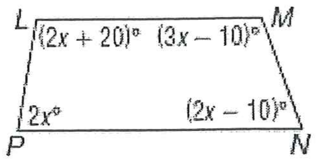
$\sqrt{17x^2}$

$\sqrt{17}$ $\sqrt{x^2}$

x

I ♥ This question!!

30. Find x, the interior sum, exterior sum, and <M.



Int ∠ sum

$180(n-2) = S$

$180(4-2) = S$

$360° = S$

Interior Angle Sum = 360°

Exterior Angle Sum = 360°

x = 40

<M = 110°

Find x:

$\angle L + \angle M + \angle N + \angle P = 360°$

$2x + 20 + 3x - 10 + 2x - 10 + 2x = 360°$

$9x = 360$

$\boxed{x = 40°}$

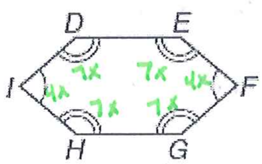
Find m<M

$\angle M = 3(40) - 10$

$\boxed{\angle M = 110°}$

31. Find x, the interior sum, exterior sum, and <G.

hexagon *DEFGHI* with
$\angle D \cong \angle E \cong \angle G \cong \angle H, \angle F \cong \angle I,$
$m\angle D = 7x, m\angle F = 4x$



Int ∠ sum

$180(6-2) = 720°$

Interior Angle Sum = 720°

Exterior Angle Sum = 360°

x = 20°

<G = 140°

Find x

$4(7x) + 2(4x) = 720°$

$36x = 720°$

$\boxed{x = 20}$

$\angle G \cong \angle D$

$\angle G = 7(20)$

$\boxed{\angle G = 140°}$

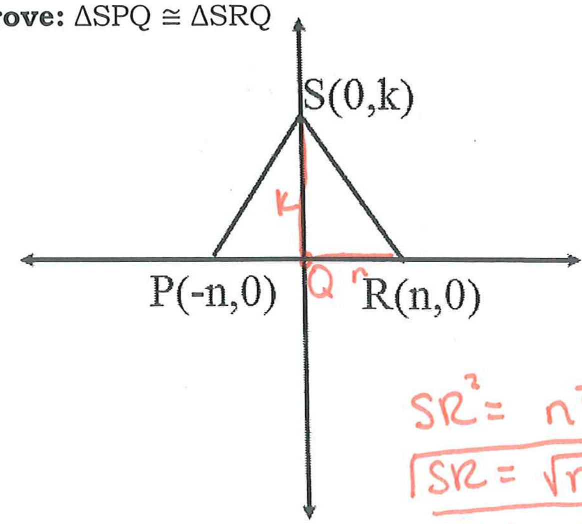
32. Write a coordinate proof. Q is (0,0)

Given: Coordinates of vertices of ΔSPQ and ΔSRQ. SQ = k

Prove: ΔSPQ ≅ ΔSRQ

SQ ≅ SQ Reflexive

QR = n QP = n → QR ≅ QP



Conclude:

ΔSPQ ≅ ΔSRQ by SSS

$SR^2 = n^2 + k^2$

$\boxed{SR = \sqrt{n^2 + k^2}}$

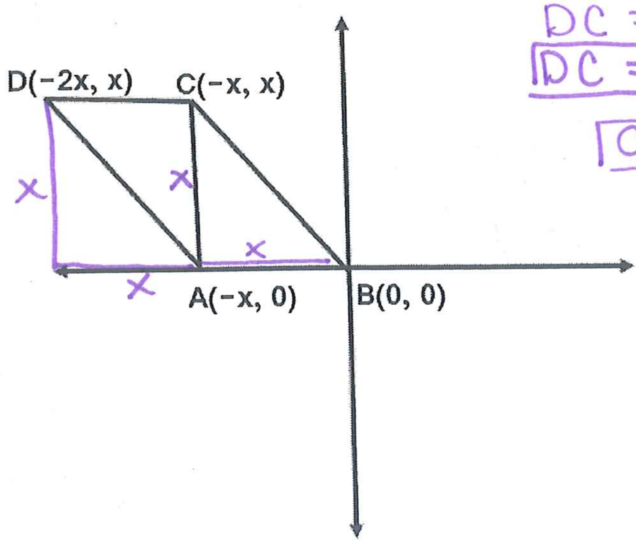
$SP^2 = n^2 + k^2$ ⟩ SR ≅ SP

$\boxed{SP = \sqrt{n^2 + k^2}}$

33. Write a coordinate proof.

Given: Coordinates of vertices of ΔACD and ΔCAB.

Prove: ΔACD ≅ ΔCAB



$\boxed{AB = x}$

$DC = 2x - x$ ⟩ $AB \cong DC$

$\boxed{DC = x}$

$\boxed{CA = x = AC}$ Reflexive

$AD^2 = x^2 + x^2$

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

$AD = |x|\sqrt{2}$

or just

$\boxed{AD = x\sqrt{2}}$

$CB^2 = x^2 + x^2$

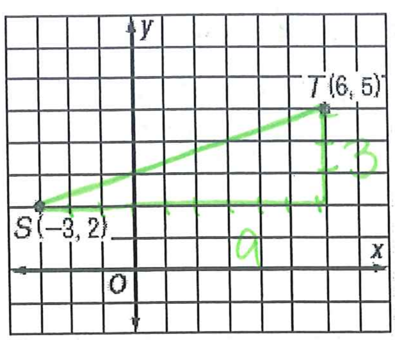
$CB = \sqrt{2x^2}$

$\boxed{CB = |x|\sqrt{2}}$

$\boxed{AD \cong CB}$

ΔACD ≅ ΔCAB by SSS

34. Find the distance between points S and T.



$ST^2 = 9^2 + 3^2$

$ST^2 = 81 + 9$

$\sqrt{ST^2} = \sqrt{90}$

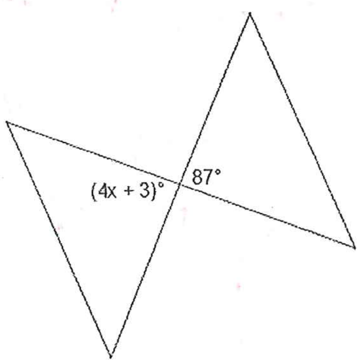
$ST = \sqrt{90}$

$\sqrt{9}$ $\sqrt{10}$

3

$\boxed{ST = 3\sqrt{10} \text{ units}}$

35. Find the value of x.

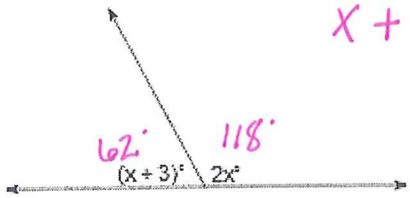


$4x + 3 = 87$ vertical ∠s are ≅

$4x = 84$

$\boxed{x = 21}$

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



$x + 3 + 2x = 180°$ linear Pairs are Suppl.

$3x + 3 = 180$

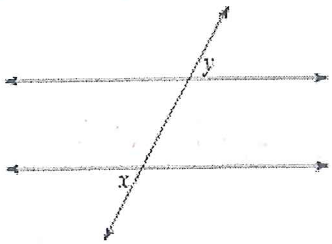
$3x = 177°$

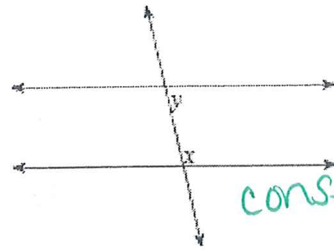
$\boxed{x = 59°}$

The larger ∠ is 118°

37. Name the relationships.

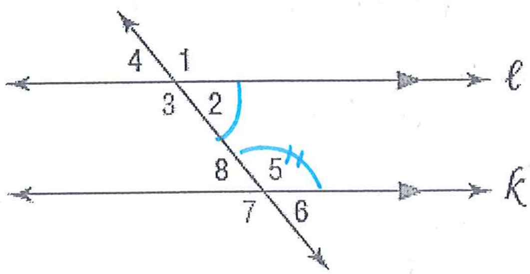
alt. ext. ∠s





consecutive int ∠s

38. Find x so that lines l and k are parallel, given $< 2 = 27x + 2$ and $< 5 = 18x - 2$. (// lines form)



$<2 + <5 = 180°$ con. int ∠s are suppl.

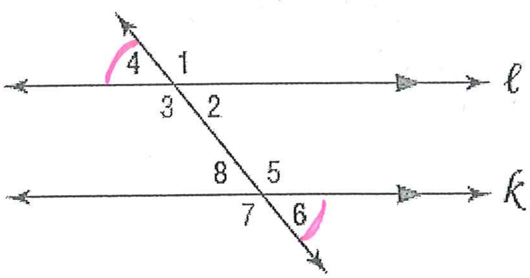
$27x + 2 + 18x - 2 = 180°$

$45x = 180°$

$\boxed{x = 4}$

39. Find x so that lines l and k are parallel, given $< 4 = 17x$ and $< 6 = -5 + 18x$.

(// lines form)



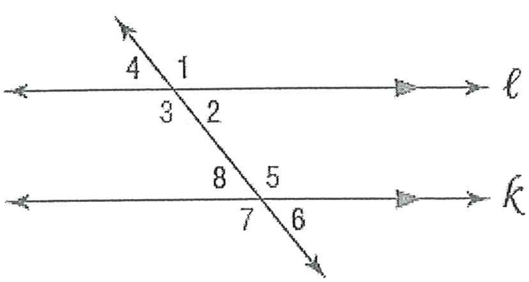
$\angle 4 \cong \angle 6$ alt ext. ∠s are ≅

$17x = -5 + 18x$

$-x = -5$

$\boxed{x = 5}$

40. Name all the relationships that allow us to say l is parallel to k.



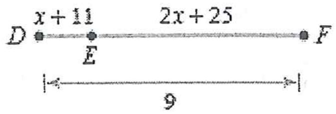
$< 1 \cong < 7$ proves $l||k$ because ≅ alt. ext. form // lines

$< 2 \cong < 8$ proves $l||k$ because ≅ alt int ∠s form // lines

$< 3 \cong < 7$ proves $l||k$ because ≅ coresp. ∠s form // lines

$< 3 + < 8 = 180$ proves $l||k$ because suppl. con. int ∠s form // lines.

41. Find x, then the length of EF. Show your work, geometry and justify your set up!



DE + EF = DF Segment addition

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

$3x+36=9$

$3x=-27$

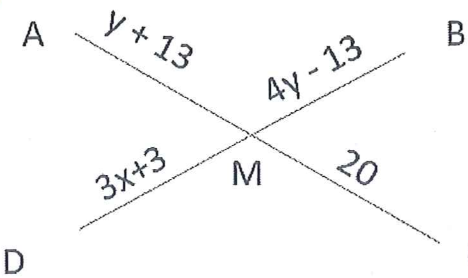
$\boxed{x=-9}$

$EF=2(-9)+25$

$\boxed{EF=7}$

AC and BD Bisect each other.

42. Point M is the segment bisector of lines AC and BD. Find x, y, and BM. Show your work, geometry and justify your set up!



$AM \cong MC$ def. of bisector.

$y+13=20$

$\boxed{y=7}$

$BM=4(7)-13$

$\boxed{BM=15}$

$DM \cong MB$ def of bisector

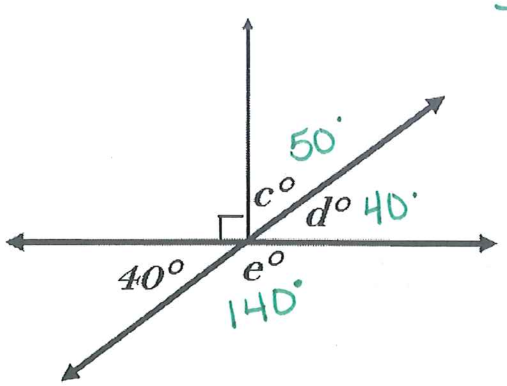
$3x+3=4(7)-13$

$3x+3=15$

$3x=12$

$\boxed{x=4}$

43. Find all the missing angle measures. Then find the value of 2d – 3(e – c).



This is NOT a hard question at all!! You can't freak out!

$2(40)-3(140-50)$

$\boxed{=-190}$

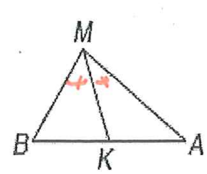
44. Given the following triangle with angle bisector MK state if the following statements are true or false.

a. $m < MKA = 90°$ ✗

b. $BK \cong AK$ ✗

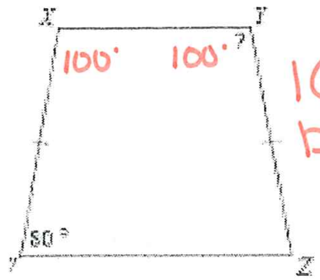
c. $m < BMK = m < AMK$ ✓

d. ΔBMA is isosceles with vertex angle M. ✗



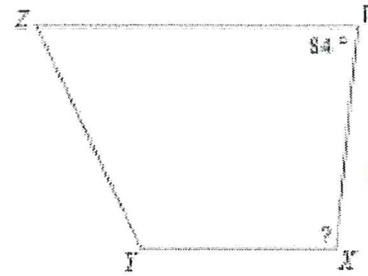
45. Find the missing angle in the following trapezoids.

a.



100°
base ∠s of isosceles trapezoids are ≅

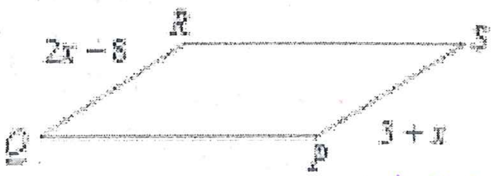
b.



? + 84 = 180°
con. int ∠s are suppl.
$\boxed{96°}$

46. Given that the following are parallelograms, find x.

a.

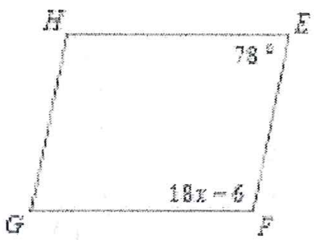


QR ≅ PS   op. sides of //-ogram are ≅

$2x - 8 = 3 + x$

$\boxed{x = 11}$

b.



∠E + ∠F = 180°   con. int ∠s are suppl.

$78 + 18x - 6 = 180°$

$18x + 72 = 180°$

$18x = 108$

$\boxed{x = 6}$

c.

∠P ≅ ∠R   op. ∠s of a parallelogram are ≅

$46 = 4x + 10$

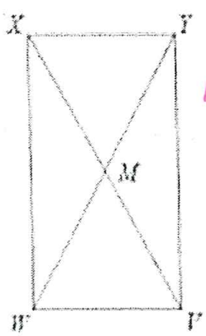
$36 = 4x$

$\boxed{9 = x}$

47. Find x for the following quadrilaterals:

a. Suppose VWXY is a rectangle and

XV= 4x - 9 and WY = x + 3



XV ≅ WY   diags of a rectangle are ≅

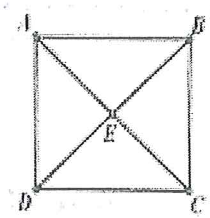
$4x - 9 = x + 3$

$3x = 12$

$\boxed{x = 4}$

b. Suppose ABCD is a square and

AC = 9y – 8 and BD = 7y +8



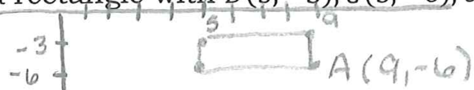
AC ≅ BD   diags of a square are ≅

$9y - 8 = 7y + 8$

$2y = 16$

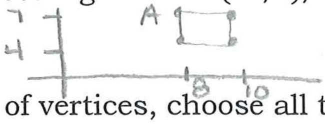
$\boxed{y = 8}$

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



A(9, -6)

b. $ABCD$ is a rectangle with $B(10,7)$, $C(10,4)$, and $D(8,4)$. Find the coordinates of A.



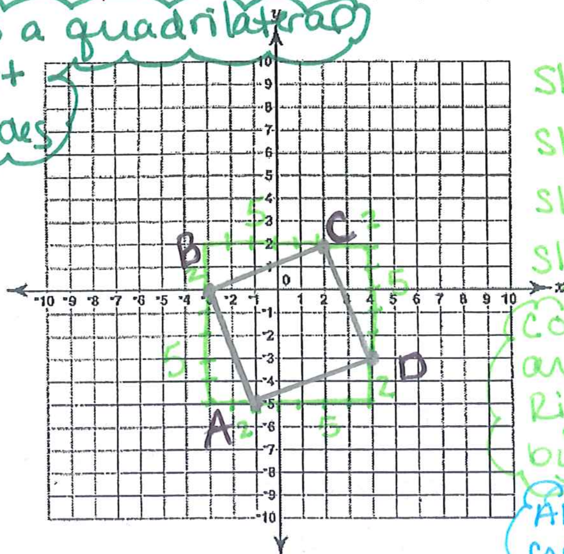
A(8, 7)

49. Given the set of vertices, choose all that apply: Quadrilateral, Parallelogram, Rectangle, Rhombus, and/or Square.

Must Find ALL Slopes AND ALL Distances!

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

ABCD is a quadrilateral because it has 4 sides



Slope AB = $-\frac{5}{2}$

Slope BC = $\frac{2}{5}$

Slope CD = $-\frac{5}{2}$

Slope AD = $\frac{2}{5}$

$2^2+5^2=AB^2$

$4+25=AB^2$

$29=AB^2$

$\boxed{\sqrt{29}=AB}$

$5^2+2^2=BC^2$

$\boxed{\sqrt{29}=BC}$

$2^2+5^2=CD^2$

$\boxed{\sqrt{29}=CD}$

$5^2+2^2=AD^2$

$\boxed{\sqrt{29}=AD}$

ALL 4 sides are ≅ ∴ it is a Rhombus by def

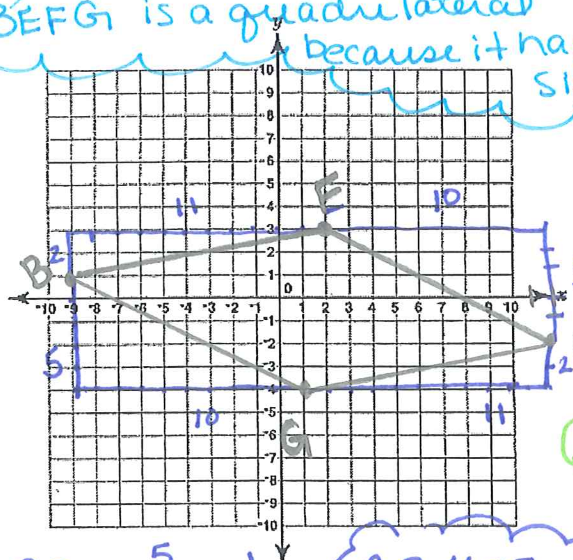
Consecutive sides are ⊥ creating 4 Right ∠s ∴ Rectangle by def

AB // CD and BC // AD creating op. sides parallel ∴ it is a Parallelogram by def

ALL 4 sides are ≅ and all consecutive sides are ⊥ ∴ it is a square by def

b. $B(-9,1)$, $E(2,3)$, $F(12,-2)$, $G(1,-4)$

BEFG is a quadrilateral because it has 4 sides



distances

$2^2+11^2=BE^2$

$125=BE^2$

$\sqrt{125}=BE$

$\sqrt{125}$ → 5 $\sqrt{5}$

$\boxed{5\sqrt{5}=BE}$

$2^2+11^2=GF^2$

$\boxed{5\sqrt{5}=GF}$

$10^2+5^2=EF^2$

$100+25=EF^2$

$125=EF^2$

$\boxed{5\sqrt{5}=EF}$

≅

$10^2+5^2=BG^2$

$125=BG^2$

$\boxed{5\sqrt{5}=BG}$

Slope GB = $-\frac{5}{10}=-\frac{1}{2}$

Slope BE = $\frac{2}{11}$

Slope EF = $-\frac{5}{10}=-\frac{1}{2}$

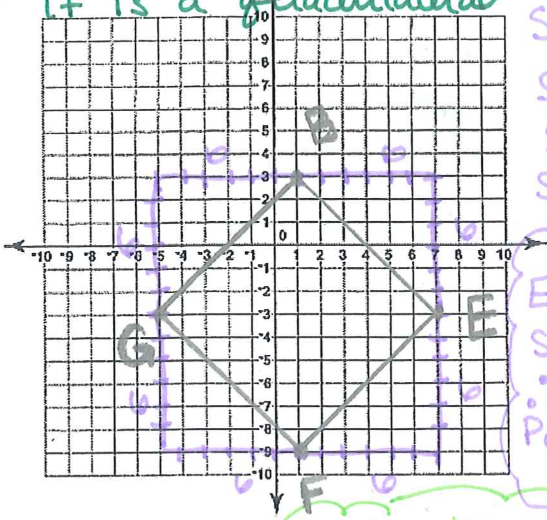
Slope FG = $\frac{2}{11}$

GB // EF and BE // FG op. sides are parallel ∴ BEFG is a parallelogram

ALL 4 sides are ≅ ∴ BEFG is a Rhombus but NOT a square!

c. $B(1, 3), E(7, -3), F(1, -9), G(-5, -3)$

BEFG has 4 sides ∴ It is a quadrilateral



Slope BE = −1
Slope EF = 1
Slope FG = −1
Slope GB = 1

BE ∥ FG and EF ∥ GB so op. sides are ∥ ∴ BEFG is a Parallelogram by def.

$GB^2 = 6^2 + 6^2$ $\boxed{GB = 6\sqrt{2}}$
$BE^2 = 6^2 + 6^2$ $\boxed{BE = 6\sqrt{2}}$
$FE^2 = 6^2 + 6^2$ $\boxed{FE = 6\sqrt{2}}$
$GF^2 = 6^2 + 6^2$ $\boxed{GF = 6\sqrt{2}}$

ALL 4 ≅ sides ∴ BEFG is a Rhombus by def

ALL 4 sides are ≅, and Consecutive sides are ⊥ creating 4 right ∠s ∴ BEFG is a square

Consecutive sides are ⊥ creating 4 Right ∠s ∴ BEFG is a rectangle by def

50. a. In a heptagon, one interior angle measures 35 degrees. What is the total measure of the other 6 interior angles?

Sum of int∠s = 180(7−2) = 900° Total

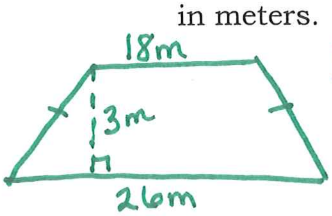
one ∠ = 35°
The other 6 angles must be 900 − 35
$\boxed{865°}$

b. In a nonagon, one interior angle measures 120 degrees. What is the total measure of the other 8 interior angles?

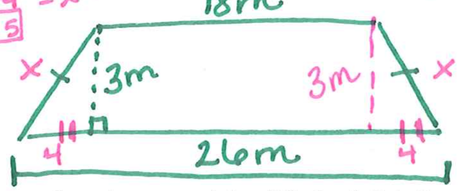
Total sum: = 180(9−2) = 1,260°

120° + x = 1260 (x = sum of the other 8 interior ∠s)
$\boxed{x = 1,140°}$

51. a. Given an isosceles trapezoid with height 3m and bases 18m and 26m. Find the perimeter, in meters.



$3^2 + 4^2 = x^2$ $\boxed{x = 5}$

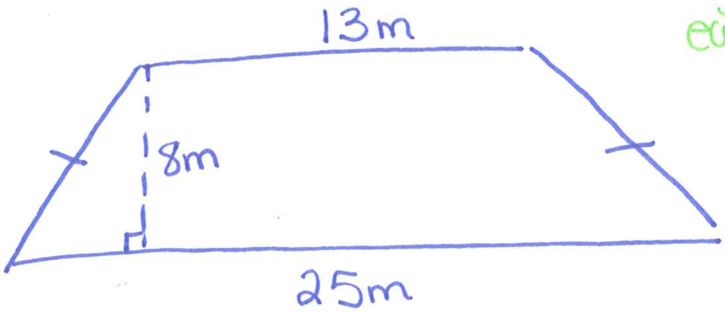


26 − 18 = 8 ÷ 2 = 4

18 + 5 + 26 + 5 = 54m

b. Given an isosceles trapezoid with height 8 m and bases 13 m and 25 m. Find the perimeter, in meters.

legs are 10m each :)

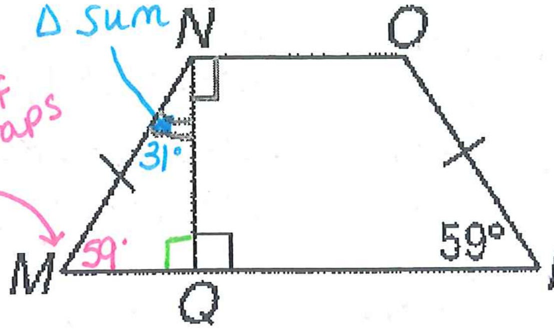


Perimeter: 58m

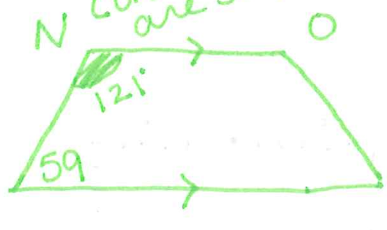
52. For isosceles trapezoid *MNOP*, find m<M, m<MNO and *m<MNQ*.

Δ sum

Base ∠s of isosceles traps are ≅



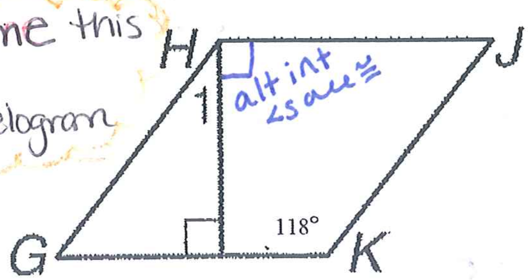
con. int ∠s are suppl



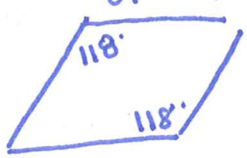
m<M= 59° m<MNO= 121° m<MNQ= 31°

53. Find m< 1 if m<K=118.

Assume this is a Parallelogram



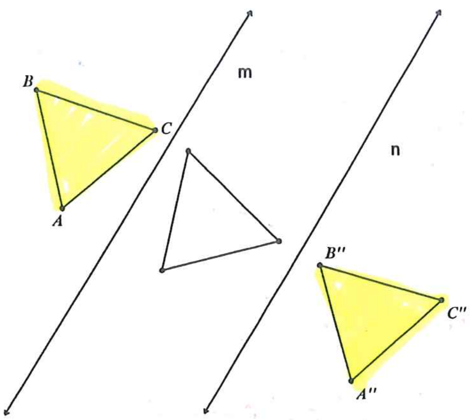
op ∠s of a para are ≅



118
− 90

m<1 = 28°

54. 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"?



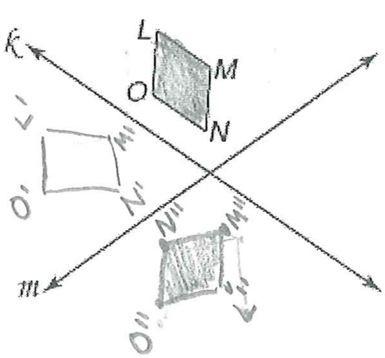
a. reflection

b. dilation

c. rotation

d. translation

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



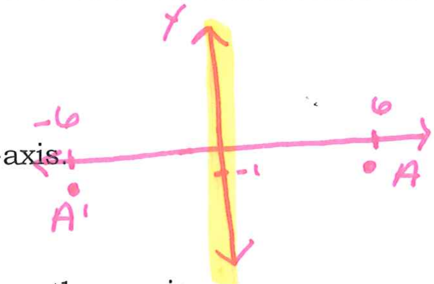
a. reflection

b. dilation

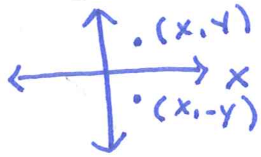
c. rotation

d. translation

56. Given point A(6, -1), find its image if it is reflected across the y-axis.
   a. (-6, -1) b. (6, -1)
   c. (-6, 1) d. (-1, 6)



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



(x, -y)

58. What is the image of Y(-7, 4) under the translation (x,y) → (x + 5, y)?

Y'(-2, 4)

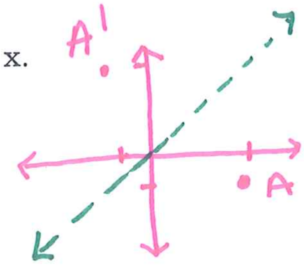
59. What is the pre-image of X'(2, 5) under the translation (x,y) → (x - 1, y + 2)?

Read

X(3, 3)

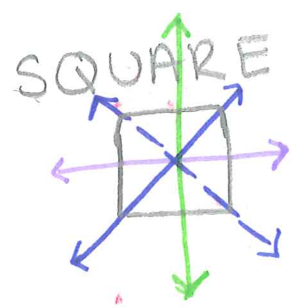
60. Find the reflection of the point A(6, -1) across the line y = x.

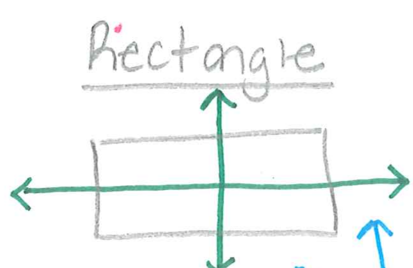
A'(-1, 6)

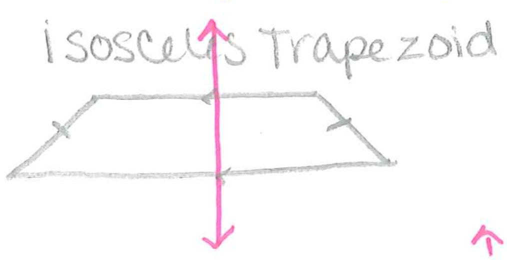


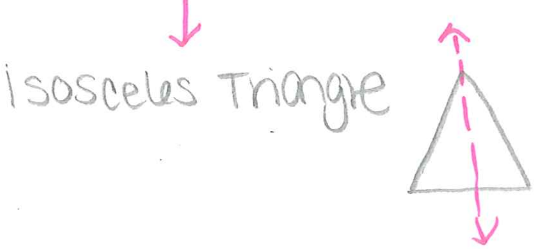
61. Symmetry: How many lines of symmetry does a(n) ....

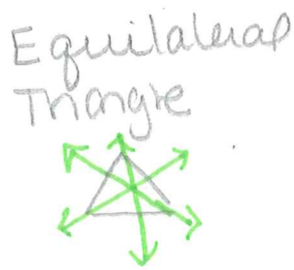
   a. Square have? 4
   b. Rectangle have? 2
   c. Isosceles Trapezoid have? 1
   d. Isosceles Triangle have? 1
   e. Equilateral Triangle have? 3
   f. Pentagon have? 0
   Regular pentagon 5

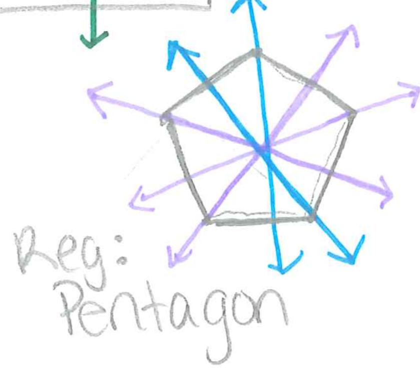




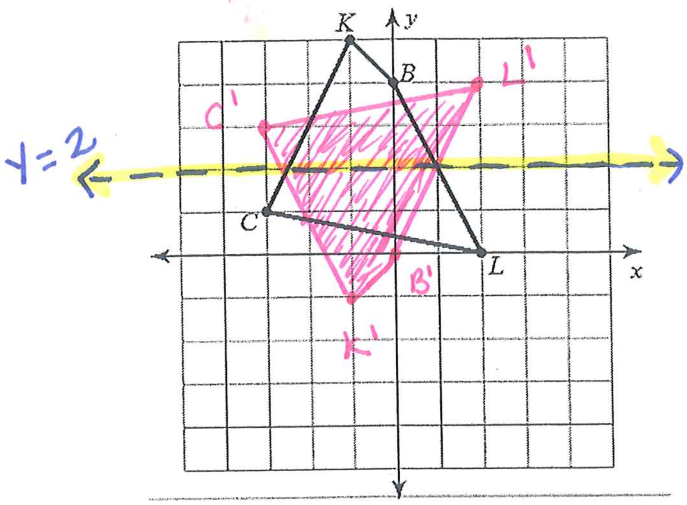




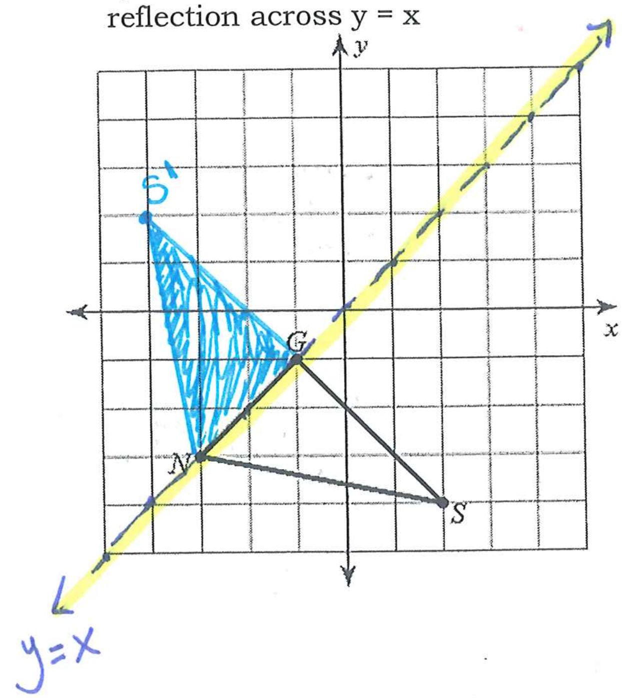




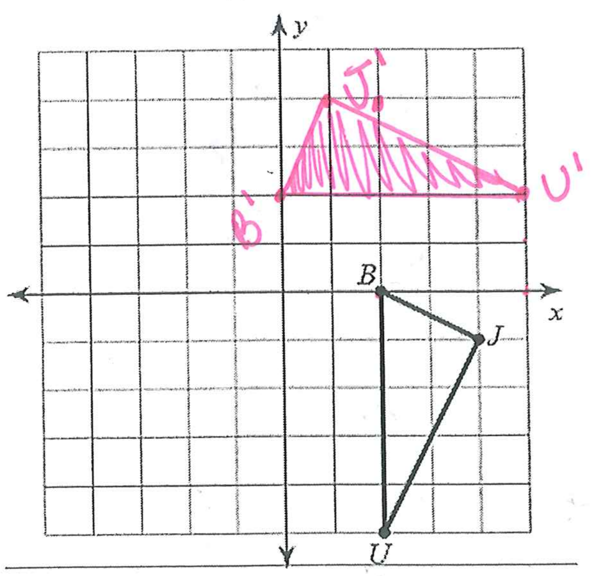
62. Graph the image of the figure with a reflection across y = 2



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



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



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