Name: Key

Date:

Period:

Geometry Semester 2 Study Guide

State which metric unit you would probably use to measure each item.

1. Length of a notebook

Cm

2. Radius of a tennis ball

mm

Big → Small
multiply
Small → Big
Divide

1 in ≈ 2.54 cm

3. **Complete each sentence**

A. 120 in = 10 ft

$\frac{120}{12} = 10$ ft

B. 8 in ≈ ____ cm

$8 \cdot 2.54 \approx 20.32$ cm

C. 10 km = _____ m

1000 m = 1 km

$10 \cdot 1000 = 10000$ m

D. 10 mi ≈ ____ km

1 m ≈ 1.61 km

$10 \cdot 1.61 \approx 16.1$ km

4 **Write the ordered pair and name the quadrant in which each point is located**

a. B (-2, 3) II

b. W (3, 0) None

c. P (3, 3) I

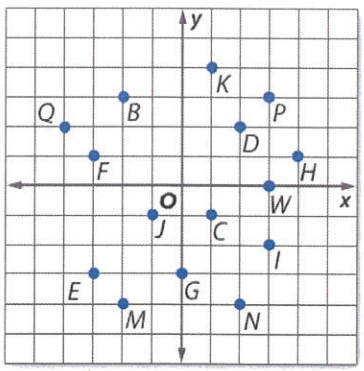
d. G (0, -3) None

e. J (3, -2) IV

f. J (-1, -1) III

II | I

III | IV



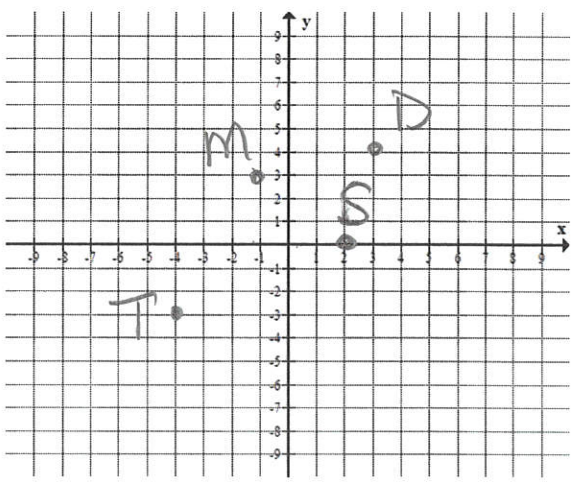
5 **Graph and label each point and name the quadrant in which each point is located**

a. M(-1,3) II

c. D(3,4) I

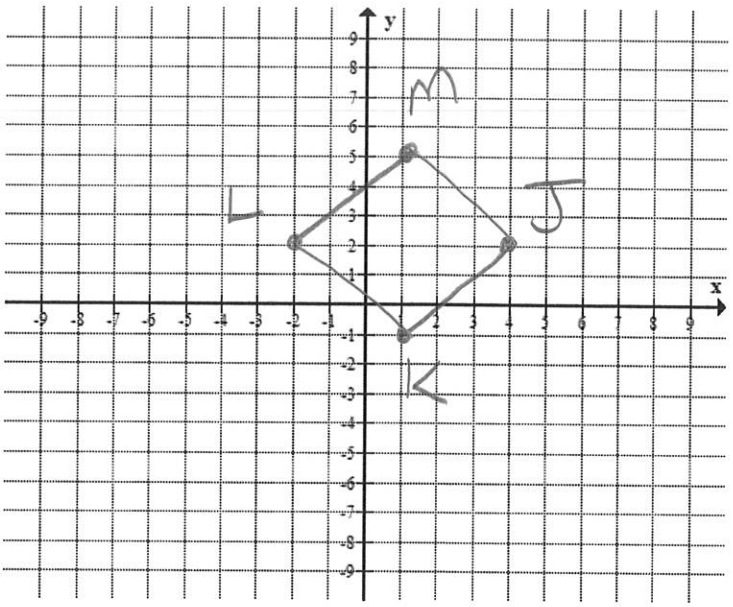
b S(2,0) None

d. T(-4,-3) III



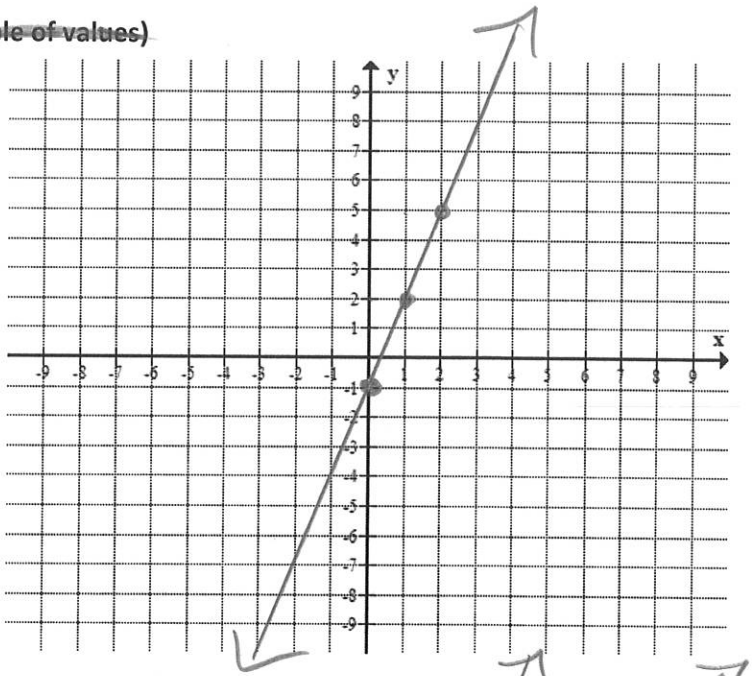
Graph the following geometric figure

4. A polygon with vertices J(4,2), K(1, -1), L(-2,2) and M(1,5)



Graph ~~four points that satisfy~~ the equation (~~make a table of values~~)

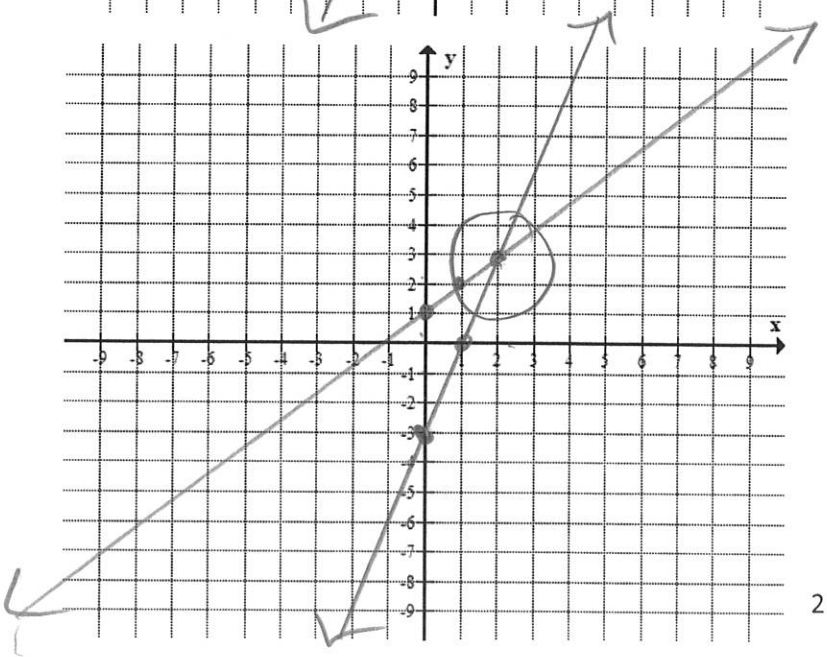
5. $y = 3x - 1$



Solve the system by graphing

6. $y = 3x - 3$
   $y = x + 1$

(2, 3)



Solve the system by substitution

7. $-5x+3y=16$
   $x=-2y+2$

$-5(-2y+2)+3y=16$

$10y-10+3y=16$

$13y-10=16$

$+10 \quad +10$

$\frac{13y}{13}=\frac{26}{13}$

$y=2$

$x=-2(2)+2$

$x=-4+2$

$x=-2$

$(-2, 2)$

Solve the system by elimination

8. $3y+x=3$) 5
   $2y-5x=-15$

$15y+5x=15$

$+2y-5x=-15$

$\frac{17y}{17}=\frac{0}{17}$ $y=0$

$3\cdot 0+x=3$

$x=3$

$(3, 0)$

9. Simplify each radical expression

a. $\sqrt{125}$

125

5 25

5 5

$5\sqrt{5}$

b. $\sqrt{98x^3y^6}$

98

2 49

7 7

$x\cdot x\cdot x$

$y\cdot y \; y\cdot y \; y\cdot y$

$7xy^3\sqrt{2x}$

c. $\sqrt{\frac{121}{16}}=\frac{\sqrt{121}}{\sqrt{16}}=\frac{11}{4}$

d. $\frac{3}{\sqrt{48}}\cdot\frac{\sqrt{48}}{\sqrt{48}}=\frac{3\sqrt{48}}{48}$

$=\frac{3\cdot 2\cdot 2\sqrt{3}}{48}$

$=\frac{12\sqrt{3}}{48}=\frac{\sqrt{3}}{4}$

48

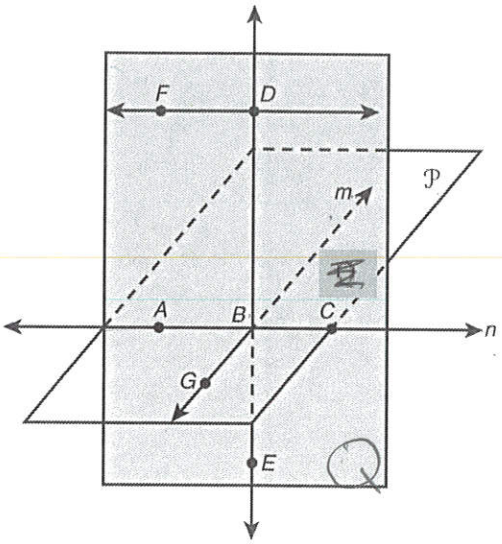
2 24

2 12

2 6

2 3

Figure A



10. In **Figure A** what is a name for the plane containing point *G*?

$\mathcal{P}$

11. Use **Figure A** to name the segment that is on plane $\mathcal{P}$ but is NOT on line *n*?

$\overline{GB}$

12. Use **Figure A** to name the intersection of the two planes

$\overline{AC}$ or n

13. Use a ruler to measure $\overline{AB}$ to the nearest 16th of an inch

you must be w/in a 16th

4 3/16"

A _____ B

14. Use a ruler to measure $\overline{CD}$ in centimeters.

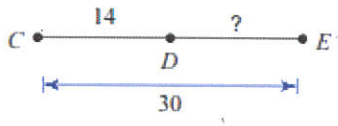
6.1 cm

you must be w/in a mm.

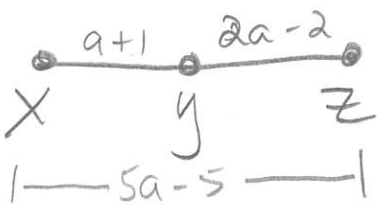
C _____ D

15. Find the measure of $\overline{DE}$

30 - 14 = 16



16. Find the value of a and $\overline{XY}$ if Y is between X and Z if $\overline{XY} = a+1$, $\overline{XZ} = 5a-5$, and $\overline{YZ} = 2a-2$.



$a+1+2a-2 = 5a-5$

$3a-1 = 5a-5$

$+1 \quad +1$

$3a = 5a-4$

$-5a \quad -5a$

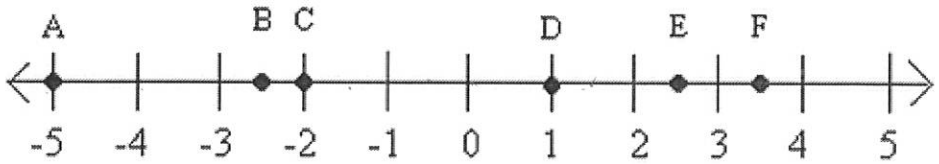
$-2a = -4$

$\frac{-2a}{-2} = \frac{-4}{-2}$

$a = 2$

$\overline{XY} = 2+1$ $\boxed{\overline{XY} = 3}$

17. Use the number line to find each measure.



a. $\overline{AE}$ $\boxed{7.5}$

b. $\overline{FB}$ $\boxed{6}$

18. Find the distance between $C(-7,-1)$ and $D(3,7)$.

$d = \sqrt{(3--7)^2 + (7--1)^2}$

$d = \sqrt{(3+7)^2 + (7+1)^2}$

$d = \sqrt{10^2 + 8^2}$

$d = \sqrt{100+64}$

$d = \sqrt{164}$

$d = 2\sqrt{41}$

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

164

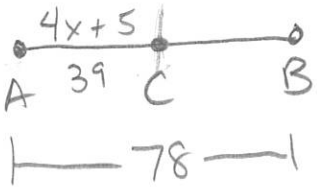
2 82

2 41

19. Find the coordinates of *M*, the midpoint of $\overline{ST}$, for $S(-10,8)$ and $T(4,6)$.

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $\left(\frac{-10+4}{2}, \frac{8+6}{2}\right) = \left(\frac{-6}{2}, \frac{14}{2}\right) = (-3, 7)$

20. Find the value of x and $\overline{AC}$ if C is the midpoint of $\overline{AB}$, $\overline{AC} = 4x+5$, and $\overline{AB} = 78$.



$\frac{78}{2} = 39$ $\boxed{\overline{AC} = 39}$

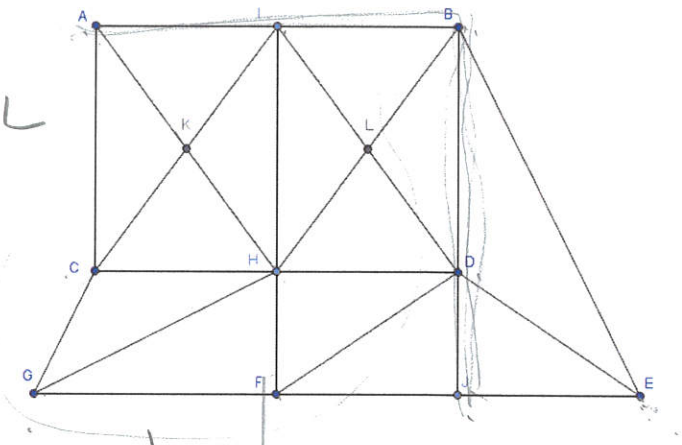
$4x+5 = 39$

$-5 \quad -5$

$\frac{4x}{4} = \frac{34}{4}$ $\boxed{x = 8.5}$

Figure C

21. Use the **Figure C** to answer the following questions



a. Name three angles that have H as a vertex

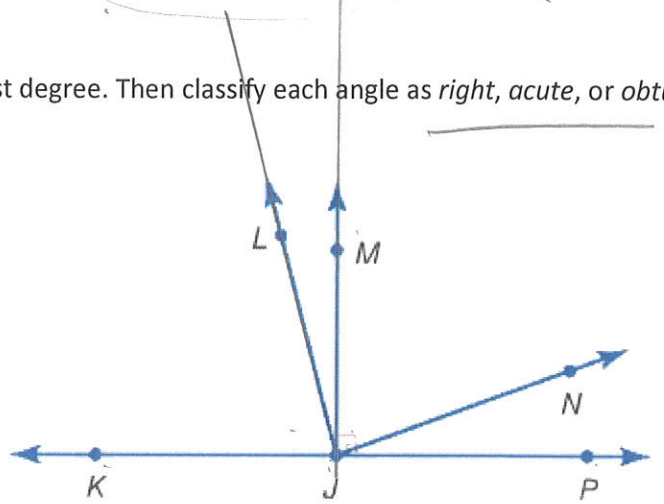
$\angle CHK, \angle KHI, \angle IHL$

b. Name the sides of $\angle JED$

$\overline{EJ}$ $\overline{ED}$

c. Name a point in the interior of $\angle ABJ$ K

22. Use a protractor to measure the angle to the nearest degree. Then classify each angle as *right*, *acute*, or *obtuse*.



a. $\angle LJP$

104° obtuse

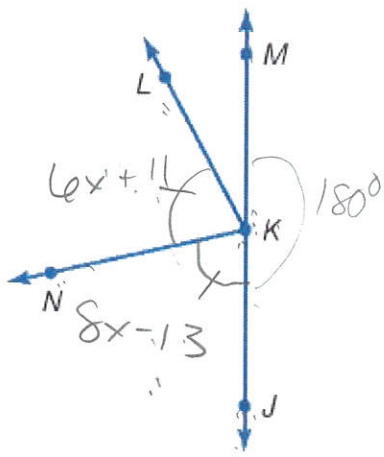
b. $\angle MJN$

71° Acute

c. $\angle KJM$

90° Right

23. In the figure $\overrightarrow{KJ}$ and $\overrightarrow{KM}$ are opposite rays, and $\overrightarrow{KN}$ bisects $\angle JKL$. If $m\angle JKN = 8x - 13$ and $m\angle NKL = 6x + 11$, find $m\angle JKN$.



$6x + 11 = 8x - 13$

$-6x \quad -6x$

$11 = 2x - 13$

$+13 \quad +13$

$\frac{24}{2} = \frac{2x}{2}$

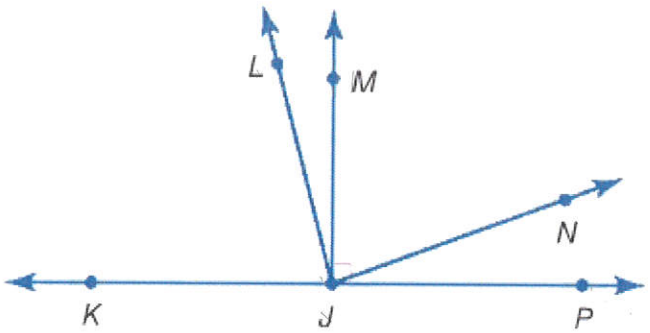
$x = 12$

$8 \cdot 12 - 13$

$96 - 13 = 83$

$\angle JKN = 83°$

24. Use the figure to name each of the following



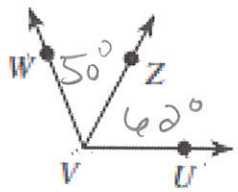
a. A ray with end point *K*

$\overrightarrow{KJ}$ or $\overrightarrow{KP}$

b. A angle with *N* in its interior

$\angle MJP$

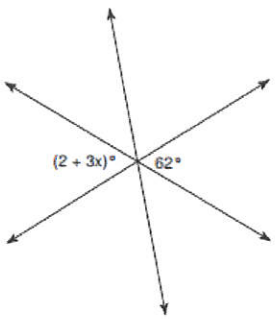
25. Find $m\angle WVU$ if $m\angle ZVU = 62^\circ$ and $m\angle WVZ = 50^\circ$



$50^\circ + 62^\circ$

$m\angle WVU = 112^\circ$

26. Find x



$2 + 3x = 62$

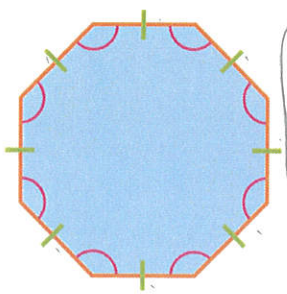
$-2 \quad -2$

$\frac{3x}{3} = \frac{60}{3}$

$x = 20$

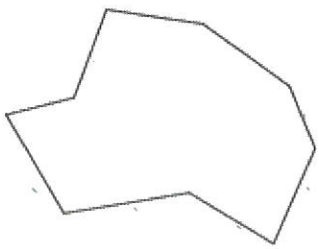
27. Name the polygon by its number of sides. Then classify it as convex or concave and regular or irregular.

a.



octagon
regular
convex

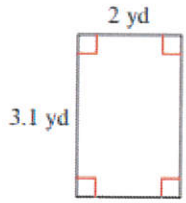
b.



nonagon
irregular
Concave

28. Find the **PERIMETER/CIRCUMFERENCE** and **AREA** of each figure

a.



$P = 2\ell + 2w$

$P = 2 \cdot 3.1 + 2 \cdot 2$

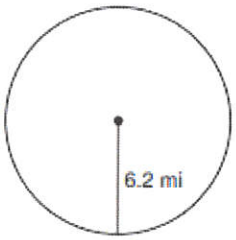
$P = 10.2$ yds

$A = \ell \cdot w$

$A = 2 \cdot 3.1$

$A = 6.2\ \text{yd}^2$

b.



$C = 2\pi r$

$= 2 \cdot \pi \cdot 6.2$

$C \approx 38.955\,7489$ mi

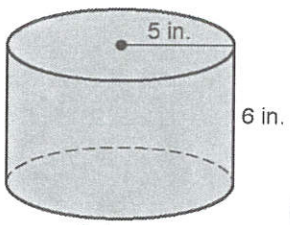
$A = \pi r^2$

$= \pi \cdot 6.2^2$

$A \approx 120.7628216\ \text{mi}^2$

29. Find the **SURFACE AREA** and **VOLUME** of the solid. Round to the nearest 10th.

a.



$V = \pi r^2 h$

$V = \pi \cdot 5^2 \cdot 6$

$V \approx 471.238898$

$V = 471.2\ \text{in}^3$

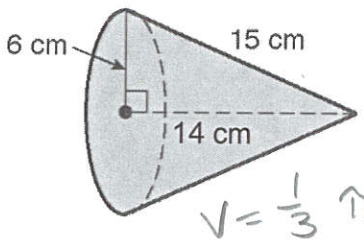
$SA = 2\pi rh + 2\pi r^2$

$= 2\pi \cdot 5 \cdot 6 + 2\pi \cdot 5^2$

$SA \approx 345.5751919$

$SA = 345.6\ \text{in}^2$

b.



$V = \frac{1}{3}\pi r^2 \cdot h$

$V = \frac{1}{3}\pi \cdot 6^2 \cdot 14$

$V = 527.7875658$

$V \approx 527.8\ \text{cm}^3$

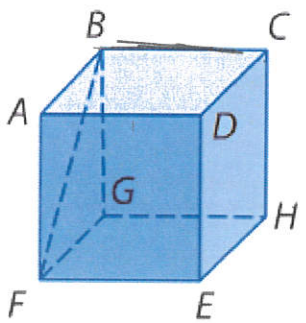
$SA = \pi r\ell + \pi r^2$

$= \pi \cdot 6 \cdot 15 + \pi \cdot 6^2$

$SA = 395.8406744$

$SA = 395.8\ \text{cm}^2$

30. Identify each of the following using the cube shown.



a. All segments skew to $\overleftrightarrow{BC}$

$\overline{ED}, \overline{AF}, \overline{EH}, \overline{FG}$

b. A segment parallel to $\overleftrightarrow{EH}$

$\overline{FG}$

c. All planes parallel to plane DCH

ABG

31. Use the figure to the right to give an example of each of each angle pair.

a. Alternate Interior Angles

$\angle 3$ & $\angle 8$ or $\angle 4$ & $\angle 7$

b. Consecutive (Same – Side) Interior Angles

$\angle 3$ & $\angle 7$ or $\angle 4$ & $\angle 8$

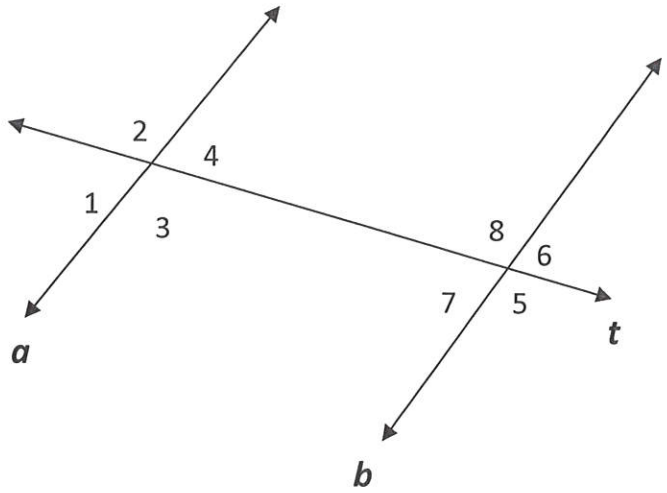
c. Corresponding Angles

$\angle 2$ & $\angle 8$ or $\angle 6$, $\angle 4$

$\angle 1$ & $\angle 7$ or $\angle 3$, $\angle 5$

d. Alternate Exterior Angles

$\angle 5$ & $\angle 2$ or $\angle 1$ & $\angle 6$



32. Given that line m, is parallel to line n. Find Each Angle Measure. ***Treat each letter as a new problem completely separate problem***

a. $m\angle 2 = 106°$ find the $m\angle 6$

106°

b. $m\angle 5 = 65°$ find the $m\angle 3$

65°

c. $m\angle 1 = (60x - 2)°$ and $m\angle 8 = (57x + 1)°$ find $m\angle 8$

$60x - 2 = 57x + 1$

$-57x \quad -57x$

$3x - 2 = 1$

$+2 \quad +2$

$\frac{3x}{3} = \frac{3}{3}$ $x = 1$

$57(1) + 1$

$m\angle 8 = 58°$

d. $m\angle 2 = (3x - 15)°$ and $m\angle 5 = (2x + 25)°$ find $m\angle 2$

$3x - 15 + 2x + 25 = 180$

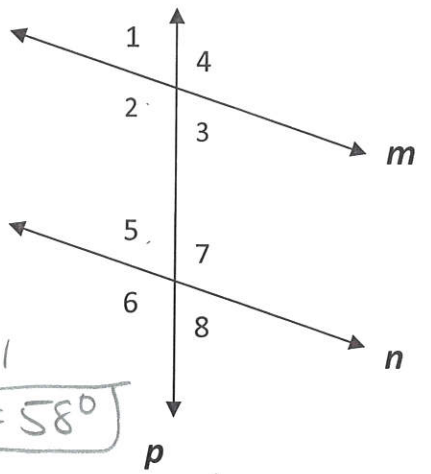
$5x + 10 = 180$

$-10 \quad -10$

$\frac{5x}{5} = \frac{170}{5}$ $x = 34$

$3(34) - 15$

$m\angle 2 = 87°$



33. Given the following information, determine which lines if any are parallel. **State the postulate or theorem that justifies your answer.**

a. $\angle 1 \cong \angle 3$

j // k by conv Corresponding ∠'s

b. $\angle 2 \cong \angle 5$

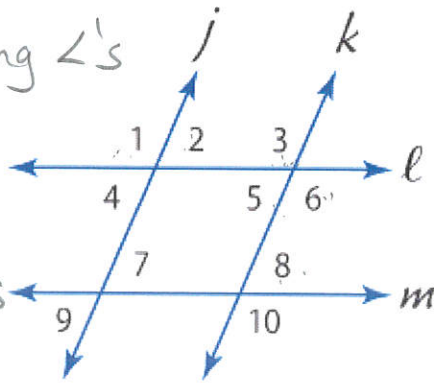
j // k by conv Alt. Int ∠'s

c. $\angle 3 \cong \angle 10$

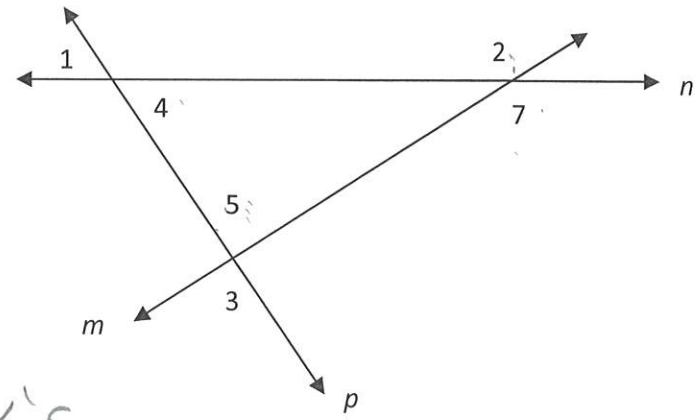
ℓ // m by conv. Alt. Ext. ∠'s

d. $m\angle 6 + m\angle 8 = 180°$

ℓ // m by conv. S.S. Int ∠'s



34. Identify the transversal and classify each angle pair.



a. $\angle 1$ and $\angle 7$

n; Alt. Ext. ∠'s

b. $\angle 7$ and $\angle 5$

m; Alt. Int ∠'s

c. $\angle 2$ and $\angle 5$

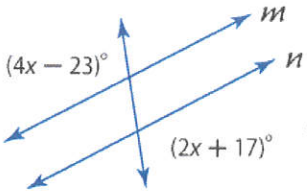
m; Corresponding ∠'s

d. $\angle 5$ and $\angle 4$

p; S.S. Int ∠'s

35. Find x so that $m \parallel n$. Identify the postulate or theorem you used.

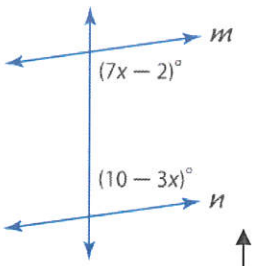
a.



$4x-23 = 2x+17$
$-2x \quad -2x$
$2x-23 = 17$
$+23 \quad +23$
$\frac{2x}{2} = \frac{40}{2}$ $x=20$

Alt. Ext. ∠'s

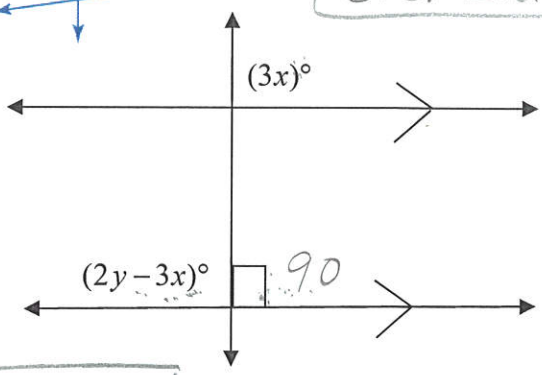
b.



$7x-2+10-3x = 180$
$4x+8 = 180$
$-8 \quad -8$
$\frac{4x}{4} = \frac{172}{4}$ $x=43$

S.S. Int ∠'s

36. Solve to find x and y in the diagram



$\frac{3x}{3} = \frac{90}{3}$ $x=30$

$2y-3x=90$
$2y-3\cdot 30=90$

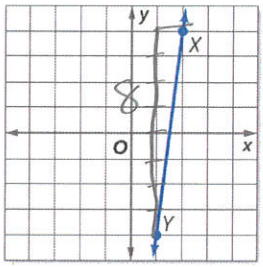
$2y-90=90$
$+90 \quad +90$
$\frac{2y}{2} = \frac{180}{2}$ $y=90$

37. Use the slope formula to find the slope of the line passing through (3, 2) and (2, 3).

$m = \frac{y_2-y_1}{x_2-x_1} = \frac{3-2}{2-3} = \frac{1}{-1}$ $m=-1$

38. Find the slope of each line.

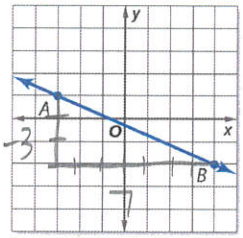
a.



$\frac{8}{1}$

8

b.



$\frac{-3}{7}$

Same m opposite reprocals m & $-\frac{1}{m}$

39. Determine whether $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are parallel, perpendicular, or neither. random

a. $A(-6,-9), B(8,19), C(0,-4), D(2,0)$

$\overline{AB} = \frac{19--9}{8--6} = \frac{28}{14} = 2$ $\overline{CD} = \frac{0--4}{2-0} = \frac{4}{2} = 2$

parallel

b. $A(4,-2), B(-2,-8), C(4,6), D(8,5)$

$\overline{AB} = \frac{-8--2}{-2-4} = \frac{-6}{-6} = 1$ $\overline{CD} = \frac{5-6}{8-4} = \frac{-1}{4}$ Neither

$\overline{AB} = \frac{-1--2}{4-8} = \frac{1}{-4}$ $\overline{CD} = \frac{-9-11}{-2-3} = \frac{-20}{-5} = 4$

c. $A(8,-2), B(4,-1), C(3,11), D(-2,-9)$

perpendicular

40. Write the equation of line in slope intercept form passing through the points (0, 2) and (3, 3).

$m = \frac{3-2}{3-0} = \frac{1}{3}$ $y - y_1 = m(x - x_1)$

$y - 2 = \frac{1}{3}(x - 0)$

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

$+2 \quad +2$

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

41. Write the equation of line in slope intercept form perpendicular to $y = \frac{4}{3}x + 1$ and passing through (8, 4).

$m = \frac{4}{3} \Rightarrow -\frac{3}{4}$

$y - 4 = \frac{-3}{4}(x - 8)$

$y - 4 = \frac{-3}{4}x + 6$

$+4 \quad +4$

$y = \frac{-3}{4}x + 10$

42. Write the equation of line in slope intercept form parallel to the line $y = \frac{3}{2}x + 5$ and passing through (2, 6).

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

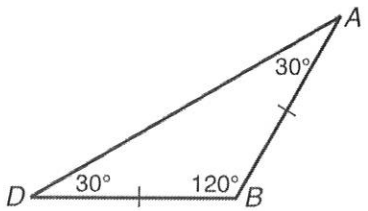
$y - 6 = \frac{3}{2}(x - 2)$

$y - 6 = \frac{3}{2}x - 3$

$+6 \quad +6$

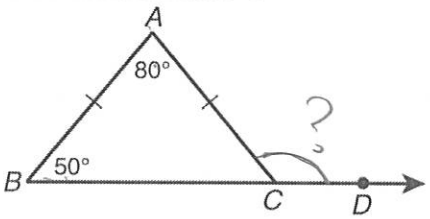
$y = \frac{3}{2}x + 3$

43. Classify $\triangle ABC$ using the **Side Lengths**.



Isosceles

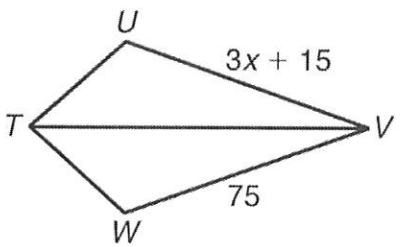
44. What is $m\angle ACD$?



$m\angle ACD = 80 + 50$

$m\angle ACD = 130°$

45. Given: $\triangle TUV \cong \triangle TWV$. What is the value of x?



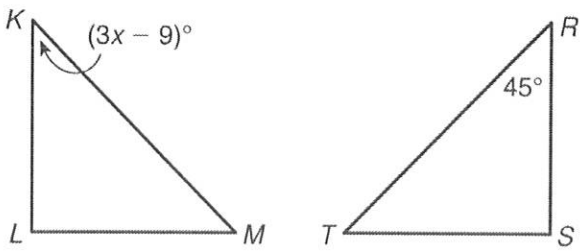
$3x + 15 = 75$

$-15 \quad -15$

$\frac{3x}{3} = \frac{60}{3}$

$x = 20$

46. If $\triangle KLM \cong \triangle RST$, find the value of x.



$3x - 9 = 45$

$+9 \quad +9$

$\frac{3x}{3} = \frac{54}{3}$

$x = 18$

47. If $\triangle KMQ \cong \triangle WJR$, which segment is congruent to $\overline{RW}$?

QK

48. Which angle is congruent to $\angle Z$ if $\triangle ZLV \cong \triangle SPN$?

$\angle S$

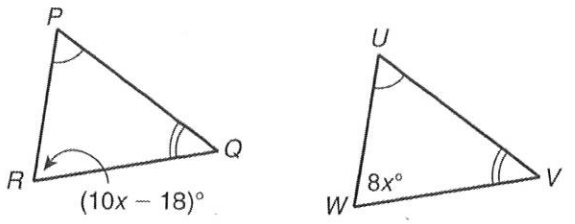
49. Two angles of a triangle measure 22° and 53°. What is the measure of the third angle?

$180 - 22 - 53 = 105°$

50. What is the value of x if the acute angles of a right triangle measure $8x°$ and $12x°$?

$8x + 12x = 90$ $\quad \frac{20x}{20} = \frac{90}{20}$ $\quad x = 4.5$

51. In the figure, $\triangle PQR \cong \triangle UVW$. What is m$\angle R$?

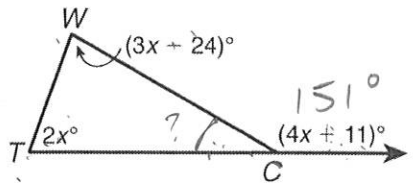


$10x - 18 = 8x$
$-10x \quad -10x$
$-18 = -2x$
$\frac{-18}{-2} = \frac{-2x}{-2}$
$9 = x$

$8 \cdot 9 = 72°$

$m\angle R = 72°$

52. What is m$\angle TCW$?



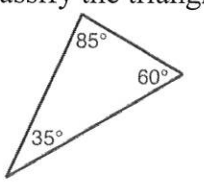
$2x + 3x - 24 = 4x + 11$
$5x - 24 = 4x + 11$
$+24 \quad +24$
$5x = 4x + 35$
$-4x \quad -4x$
$x = 35$

$4(35) + 11 = 151°$

$180 - 151 = 29$

$m\angle TCW = 29°$

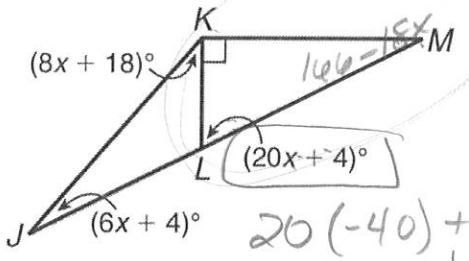
53. Classify the triangle using **Angle Measures**.



Acute

Bad Problem

54. Given that m∠*KMJ* = (166 – 18x)° what is m∠ *KLM*?



$166 - 18x + 20x + 4 = 90$

$2x + 170 = 90$

$-170 \quad -170$

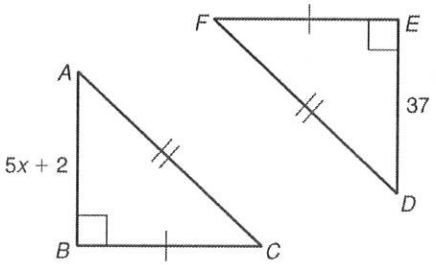
$\frac{2x}{2} = \frac{-80}{2}$

$x = -40$

$20(-40) + 4$

$-800 + 4 = -796°$

55. Which value for *x* proves that △*ABC* ≅ △*DEF* by SSS?



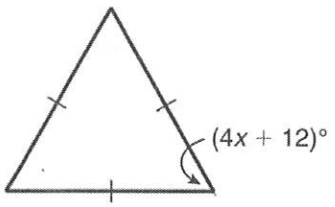
$5x + 2 = 37$

$-2 \quad -2$

$\frac{5x}{5} = \frac{35}{5}$

$x = 7$

56. What is the value of *x*



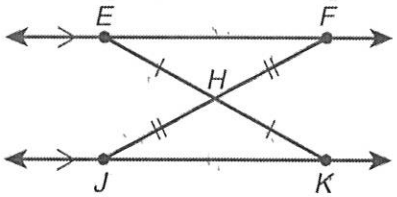
$4x + 12 = 60$

$-12 \quad -12$

$\frac{4x}{4} = \frac{48}{4}$

$x = 12$

57. In the figure, *H* is the midpoint of $\overline{EK}$ and $\overline{FJ}$. What reason can be used in a prove $\overline{EF} \cong \overline{JK}$?



A. ~~AAS~~

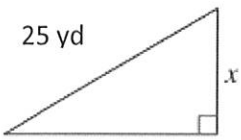
B. ~~HL~~

D. CPCTC

C. ~~Def. of bisects~~

58. Find the missing side in each triangle. Write answers in simplest radical form.

a. $a^2 + b^2 = c^2$



$22^2 + x^2 = 25^2$

$484 + x^2 = 625$

$-484 \quad -484$

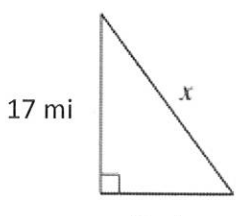
$\sqrt{x^2} = \sqrt{141}$

$x = \sqrt{141}$

141

3 47

b.



$17^2 + 7^2 = x^2$

$289 + 49 = x^2$

$\sqrt{338} = \sqrt{x^2}$

$x = 13\sqrt{2}$

338

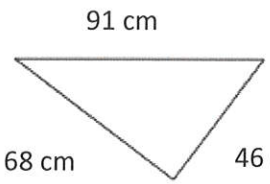
2 169

13 13

$a^2+b^2=c^2$ Right+ $a^2+b^2>c^2$ Acute $a^2+b^2<c^2$ obtuse

59. State if each triangle is acute, obtuse, or right.

a.

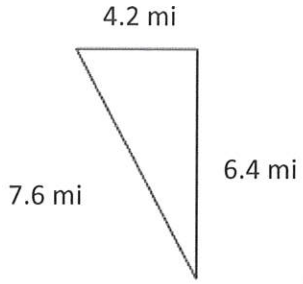


$68^2+46^2 \stackrel{?}{=} 91^2$

$6740 < 8281$

obtuse

b.



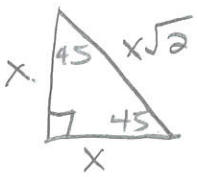
$4.2^2+6.4^2 \stackrel{?}{=} 7.6^2$

$58.67 \quad 57.76$

Acute

60. Use a special right triangle to write each trigonometric ration as a fraction.

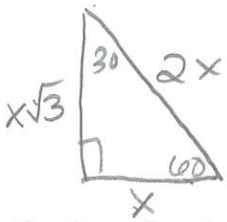
a. $\sin 45^\circ$



$\frac{x}{x\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{2}}{2}$

b. $\tan 60^\circ$



$\frac{x\sqrt{3}}{x} = \sqrt{3}$

61. Use your calculator to find each trigonometric ratio. Round to the nearest hundredth.

a. $\cos 79^\circ$

0.1908089954

0.19

b. $\tan^{-1}\left(\frac{7}{5}\right)$

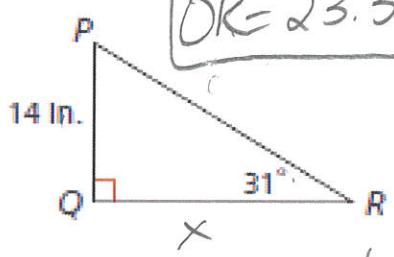
54.46232221

54.46°

62. Find each length. Round to the nearest hundredth.

a.

QR



$\overline{QR} = 23.30$ in

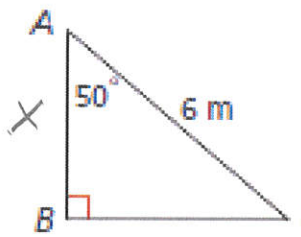
$x \cdot \tan 31 = \frac{14}{x} \cdot x$

$\frac{x \tan 31}{\tan 31} = \frac{14}{\tan 31}$

$x \approx 23.29991275$

b.

AB



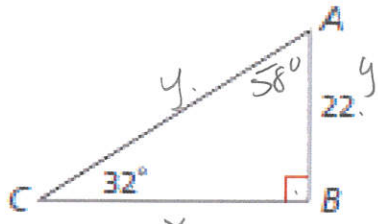
$6 \cdot \cos 50 = \frac{x}{6} \cdot 6$

$x \approx 3.856725658$

$\overline{AB} \approx 3.86$ m

63. Find ALL unknown measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.

a.



$90 - 32 = 58°$

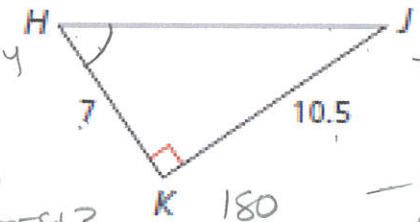
$x \cdot \tan 32° = \frac{22}{x} \cdot x$

$\frac{x \tan 32}{\tan 32} = \frac{22}{\tan 32}$

$x \approx 13.74712574$

$x \approx 13.75$

b.



$y \cdot \sin 32 = \frac{22}{y} \cdot y$

$\frac{y \sin 32}{\sin 32} = \frac{22}{\sin 32}$

$y \approx 41.51575813$

$y \approx 41.52$

$180 - 90 - 56$

$J = 34°$

$\tan H = \frac{10.5}{7}$

$H = \tan^{-1}\left(\frac{10.5}{7}\right)$

$H \approx 56.30993247$

$H \approx 56.3°$

$7^2 + 10.5^2 = c^2$

$49 + 110.25 = c^2$

$\sqrt{c^2} = \sqrt{159.25}$

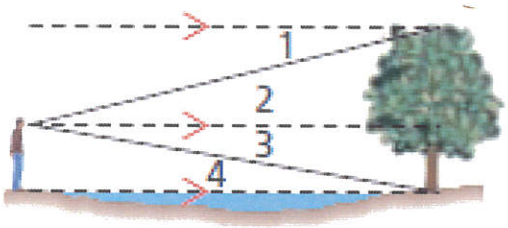
$c \approx 12.61942946$

$HJ \approx 12.62$

64. **Classify each angle as an angle of elevation or angle of depression.**

a. $\angle 1$

Depression



b. $\angle 2$

Elevation

65. When the angle of elevation to the sun is 37°, a flagpole casts a shadow that is 24.2 feet long. What is the height of the flagpole to the nearest foot?

$24.2 \cdot \tan 37 = \frac{x}{24.2} \cdot 24.2$

$x \approx 18.23600801$

$x \approx 18$ ft

The flag pole is about 18 ft tall