

Name: Key

Date: _____

Period: _____

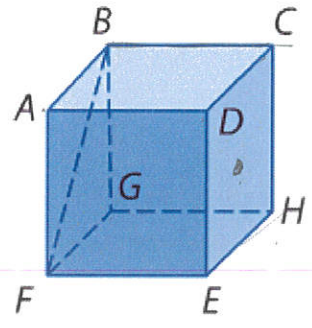
Geometry Chapter 3 Study Guide

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

a. All segments skew to \overline{BC}
 $\overline{AF}, \overline{DE}, \overline{HE}, \overline{GF}$

b. A segment parallel to \overline{EH}
 \overline{FG}

c. All planes parallel to plane DCH
 ABG



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

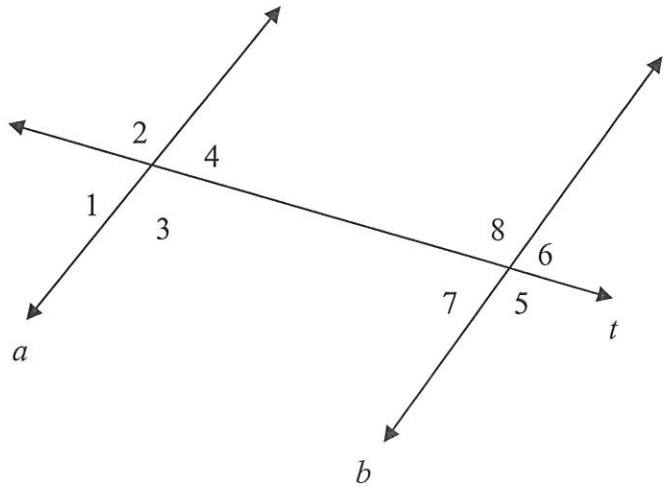
a. Alternate Interior Angles
 $\angle 4 + \angle 7$ OR $\angle 3 + \angle 8$

b. Consecutive (Same-Side) Interior Angles
 $\angle 4 + \angle 8$ OR $\angle 3 + \angle 7$

only need one

c. Corresponding Angles
 $\angle 1 + \angle 7$ OR $\angle 3 + \angle 5$
 $\angle 2 + \angle 8$ OR $\angle 4 + \angle 6$

d. Alternate Exterior Angles
 $\angle 2 + \angle 5$ or
 $\angle 1 + \angle 6$



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

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

$$m\angle 6 = 106^\circ$$

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

$$m\angle 3 = 65^\circ$$

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

$$\begin{array}{r} 60x - 2 = 57x + 1 \\ -57x \quad -57x \\ \hline 3x - 2 = 1 \end{array}$$

$$\begin{array}{r} 3x - 2 = 1 \\ +2 \quad +2 \\ \hline 3x = 3 \\ \frac{3x}{3} = \frac{3}{3} \\ x = 1 \end{array}$$

$$m\angle 8 = 57(1) + 1 = 57 + 1$$

$$m\angle 8 = 58^\circ$$

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

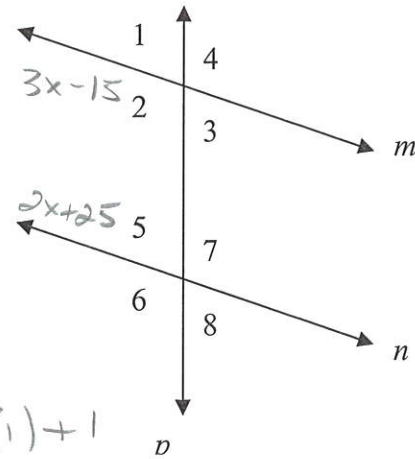
$$3x - 15 + 2x + 25 = 180$$

$$\begin{array}{r} 5x + 10 = 180 \\ -10 \quad -10 \\ \hline 5x = 170 \end{array}$$

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

$$m\angle 2 = 3 \cdot 34 - 15 = 102 - 15$$

$$m\angle 2 = 87^\circ$$



4. Use the theorems and the given information to show whether or not line c is parallel to line d . Make sure to state the theorem that allows you to say the lines are parallel

Converse

a. $\angle 2 \cong \angle 7$

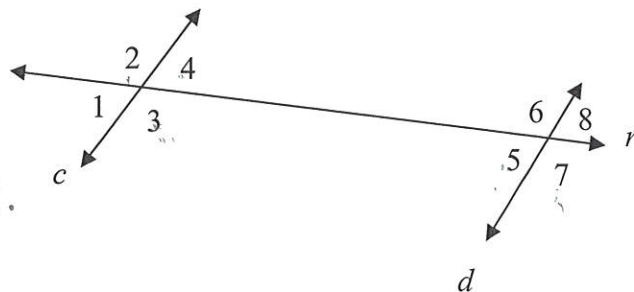
yes c || d by Con. Alt. Ext. \angle 's

b. $\angle 4 \cong \angle 5$

yes c || d by Con. Alt Int. \angle 's

c. $\angle 3 + \angle 5 = 180^\circ$

yes c || d by Con. S.S. Int \angle 's



d. $\angle 7 = (13x - 4)^\circ$, $\angle 3 = (9x + 16)^\circ$, $x = 5$

$$\angle 7 = 13 \cdot 5 - 4$$

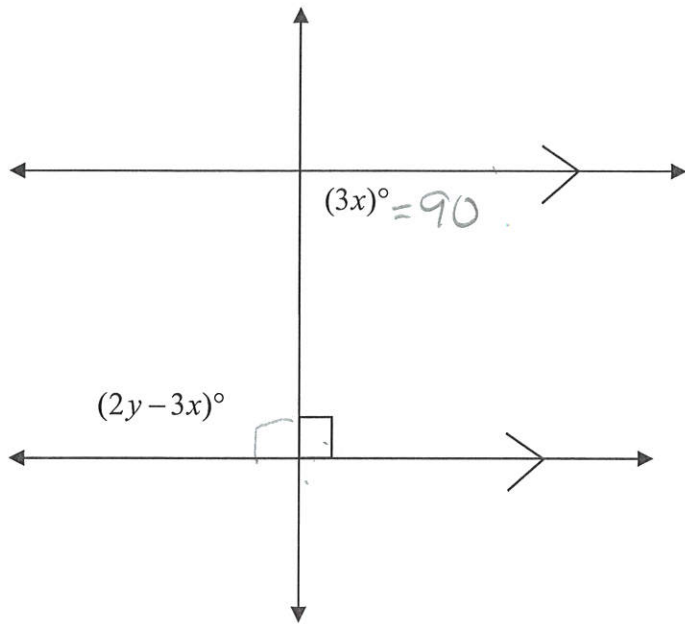
$$\angle 7 = 61^\circ$$

$$\angle 3 = 9 \cdot 5 + 16$$

$$\angle 3 = 61^\circ$$

yes c || d by Con. Corresp. \angle 's

5. Solve to find x and y in the diagram



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

$$x = 30$$

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

$$2y - 90 = 90$$

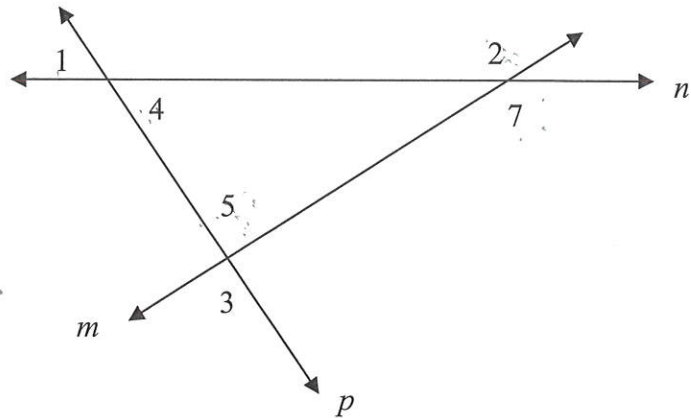
$$\frac{2y}{2} = \frac{180}{2}$$

$$y = 90$$

6. Identify the transversal and classify each angle pair.

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

n ; Alt. Ext. \angle 's



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

m ; Alt. Int. \angle 's

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

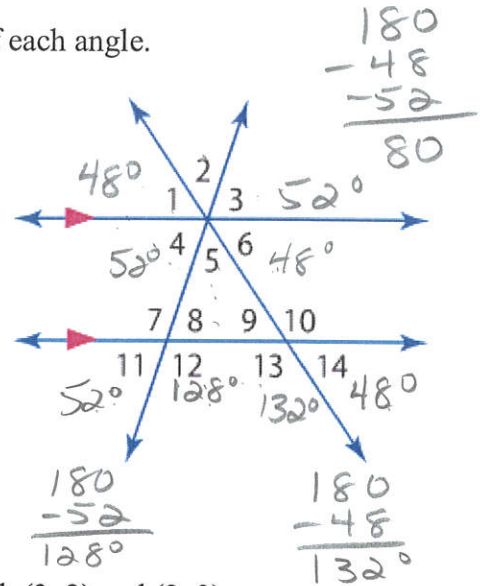
m ; corresp. \angle 's

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

p ; s. s. Int \angle 's

7. In the figure, $m\angle 11 = 52^\circ$ and $m\angle 14 = 48^\circ$. Find the measure of each angle.

$$\begin{aligned} \angle 1 &= 48^\circ & \angle 8 &= 52^\circ \\ \angle 2 &= 80^\circ & \angle 9 &= 48^\circ \\ \angle 3 &= 52^\circ & \angle 10 &= 132^\circ \\ \angle 4 &= 52^\circ & \angle 11 &= 52^\circ \\ \angle 5 &= 80^\circ & \angle 12 &= 128^\circ \\ \angle 6 &= 48^\circ & \angle 13 &= 132^\circ \\ \angle 7 &= 128^\circ & \angle 14 &= 48^\circ \end{aligned}$$



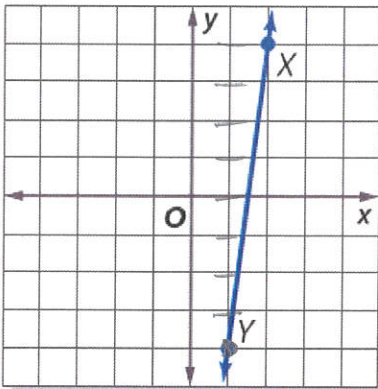
8. Use the slope formula to find the slope of the line passing through (3, 2) and (2, 3).

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

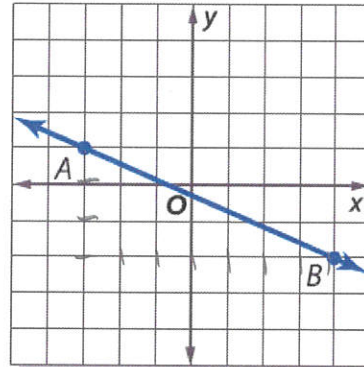
9. Find the slope of each line.

Count $\frac{\text{Rise}}{\text{Run}} = \frac{\text{up/down}}{\text{left/right}}$

a.

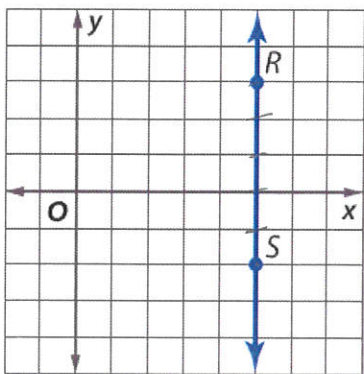


$$\frac{8}{0} = \boxed{\text{undefined}}$$



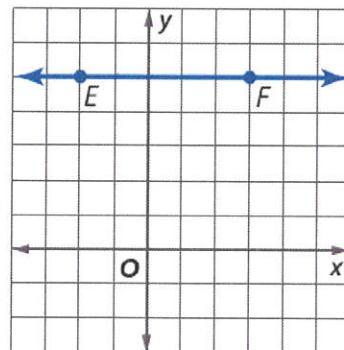
$$\frac{-3}{7} = \boxed{-\frac{3}{7}}$$

b.



$$\frac{0}{5} = \boxed{0}$$

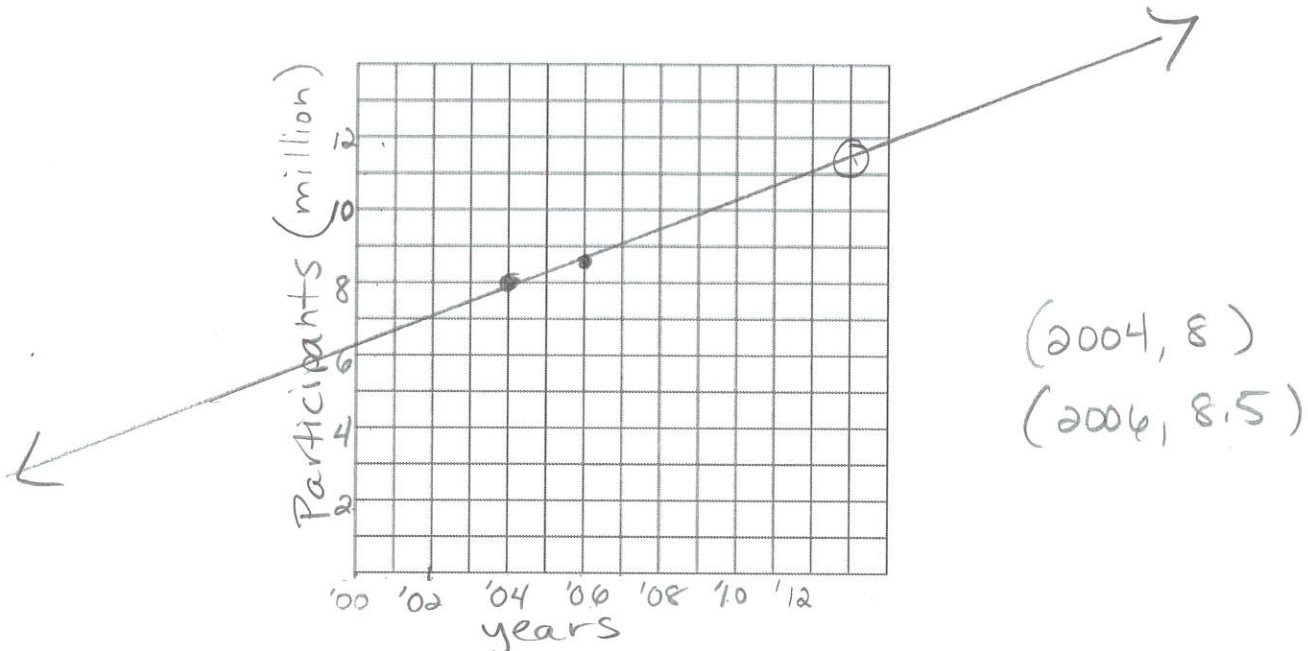
d.



$$\frac{0}{5} = \boxed{0}$$

10. In 2004, 8 million Americans over the age of 7 participated in mountain biking, and in 2006, 8.5 million participated.

- a. Create a graph to show the number of participants in mountain biking based on the change in participation from 2004 to 2006.



- b. Based on the data what is the growth per year of the sport?

$$\text{Slope } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8.5 - 8}{2006 - 2004} = \frac{0.5}{2} = 0.25$$

Mountain biking is going up by 0.25 million each year.

- c. If participation continues at the same rate, what will be the participation in 2013 to the nearest 10,000?

* Based on Graph ≈ 11.5 million participants

$$* 2006 - 2013 = 7 \text{ years}$$

$$\begin{array}{r} \times 0.25 \\ \hline 1.75 \text{ increase} \end{array}$$

$$\begin{array}{r} 8.5 \\ + 1.75 \\ \hline \end{array}$$

10.25 million participants

Better Answer

11. Write the equation of the line with slope $\frac{1}{2}$ and passing through (6, 8).

$$y - y_1 = m(x - x_1)$$

$$y - 8 = \frac{1}{2}(x - 6)$$

$$\begin{array}{r} y - 8 = \frac{1}{2}x - 3 \\ +8 \qquad \qquad +8 \end{array}$$

$$y = \frac{1}{2}x + 5$$

12. Determine whether \overline{AB} and \overline{CD} are parallel, perpendicular, or neither. Graph each line to verify your answer.

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

$$\overleftrightarrow{AB} = \frac{-9 - 19}{-6 - 8} = \frac{-28}{-14} = 2$$

$$\overleftrightarrow{CD} = \frac{-4 - 0}{0 - 2} = \frac{-4}{-2} = 2$$

parallel

parallel
- same slope
perpendicular
- opposite reciprocal

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

$$\overleftrightarrow{AB} = \frac{-2 - (-8)}{4 - (-2)} = \frac{-2 + 8}{4 + 2} = \frac{6}{6} = 1$$

$$\overleftrightarrow{CD} = \frac{6 - 5}{4 - 8} = \frac{1}{-4} = -\frac{1}{4}$$

Neither

$\frac{1}{2} - 2$
neither
- completely different

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

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

$$\overleftrightarrow{AB} = \frac{-2 - (-1)}{8 - 4} = \frac{-2 + 1}{8 - 4} = \frac{-1}{4}$$

$$\overleftrightarrow{CD} = \frac{11 - (-9)}{3 - (-2)} = \frac{11 + 9}{3 + 2} = \frac{20}{5} = 4$$

perpendicular

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

$$y = mx + b$$

$$m = \frac{2 - 3}{0 - 3} = \frac{-1}{-3} = \frac{1}{3}$$

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

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

$$+2$$

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

$(0, \#)$
 $(0, b)$

14. Determine whether the lines are parallel, perpendicular or neither.

a. $y = \frac{-1}{2}x + 4$ and $y + 3 = 2x$

$$m = \frac{-1}{2}$$

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

$$m = 2$$

m solve for y

perpendicular

b. $\frac{3y}{3} = \frac{-2x + 6}{3}$ and $6y + 6 = -4x$

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

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

$$\frac{6y}{6} = \frac{-4x - 6}{6} \quad m = -\frac{2}{3}$$

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

parallel

c. $y = 3x + 1$ and $2x - 3y = 4$

$$m = 3$$

$$\frac{-2x - 2x}{-3} = \frac{-4x}{-3} + \frac{4}{-3}$$

$$y = \frac{2}{3}x - \frac{4}{3} \quad m = \frac{2}{3}$$

Neither

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

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

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

$$y - 4 = -\frac{3}{4}x + \frac{24}{4}$$

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

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

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

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

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

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

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

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

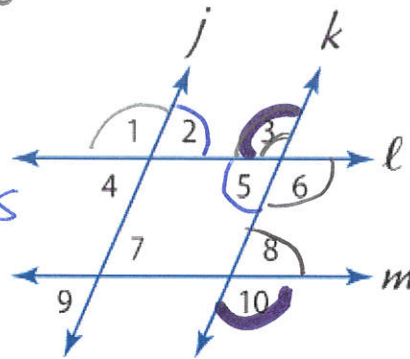
17. Given the following information, determine which lines if any are parallel. State the postulate or theorem that justifies your answer.

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

$j \parallel k$ by Converse of Corresponding \angle 's

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

$j \parallel k$ by Converse Alt. Interior \angle 's



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

$l \parallel m$ by Converse Alt. Exterior \angle 's

d. $m\angle 6 + m\angle 8 = 180^\circ$

$l \parallel m$ by Converse Same-side Int \angle 's

18. Write the equation of line s .

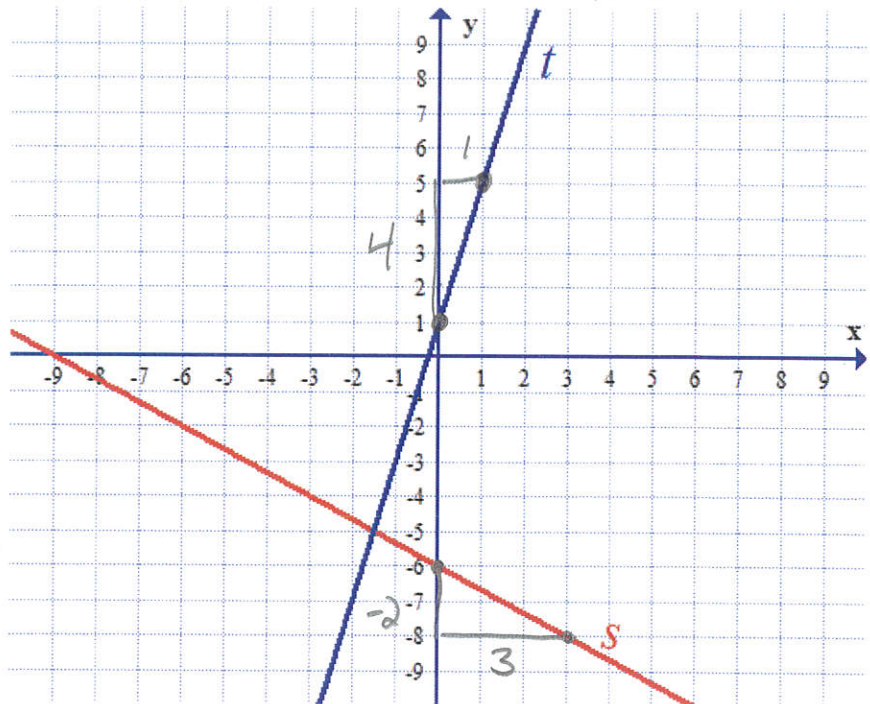
$$y = mx + b$$

$$y = -\frac{2}{3}x - 4$$

19. Write the equation of line t .

$$y = mx + b$$

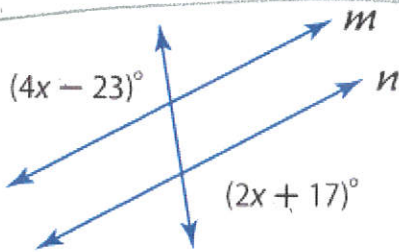
$$y = 4x + 1$$



$$m = -\frac{2}{3} \quad b = -4$$

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

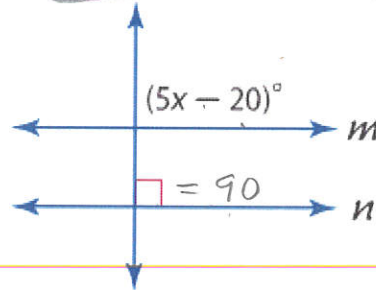
a. Alt. Ext. \angle 's



$$4x - 23 = 2x + 17$$

$$\begin{array}{r} 4x - 23 = 2x + 17 \\ -2x \quad -2x \\ \hline 2x - 23 = 17 \\ +23 \quad +23 \\ \hline 2x = 40 \\ \frac{2x}{2} = \frac{40}{2} \\ x = 20 \end{array}$$

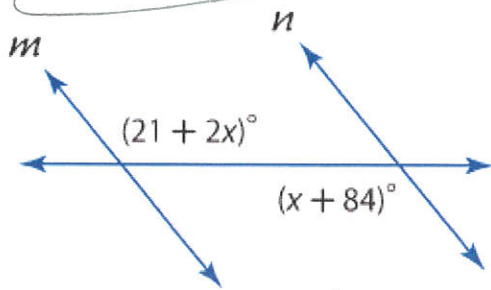
c. Corresponding \angle 's



$$5x - 20 = 90$$

$$\begin{array}{r} 5x - 20 = 90 \\ +20 \quad +20 \\ \hline 5x = 110 \\ \frac{5x}{5} = \frac{110}{5} \\ x = 22 \end{array}$$

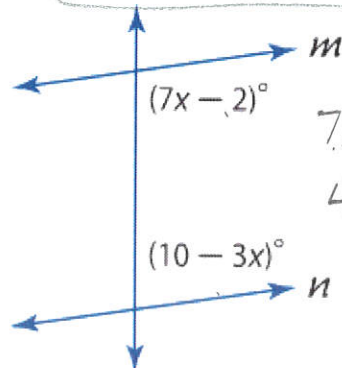
b. Alt Int. \angle 's



$$21 + 2x = x + 84$$

$$\begin{array}{r} 21 + 2x = x + 84 \\ -x \quad -x \\ \hline 21 + x = 84 \\ -21 \quad -21 \\ \hline x = 63 \end{array}$$

d. Same-side Int.



$$7x - 2 + 10 - 3x = 180$$

$$4x - 8 = 180$$

$$\begin{array}{r} 4x - 8 = 180 \\ +8 \quad +8 \\ \hline 4x = 188 \\ \frac{4x}{4} = \frac{188}{4} \\ x = 47 \end{array}$$