

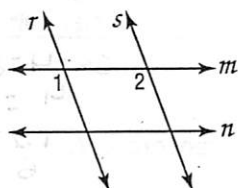
3-5 Study Guide and Intervention

Proving Lines Parallel

Identify Parallel Lines If two lines in a plane are cut by a transversal and certain conditions are met, then the lines must be parallel.

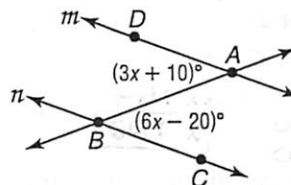
If	then
- corresponding angles are congruent, - alternate exterior angles are congruent, - consecutive interior angles are supplementary, - alternate interior angles are congruent, or - two lines are perpendicular to the same line,	the lines are parallel.

Example 1 If $m\angle 1 = m\angle 2$, determine which lines, if any, are parallel.



Since $m\angle 1 = m\angle 2$, then $\angle 1 \cong \angle 2$. $\angle 1$ and $\angle 2$ are congruent corresponding angles, so $r \parallel s$.

Example 2 Find x and $m\angle ABC$ so that $m \parallel n$.



We can conclude that $m \parallel n$ if alternate interior angles are congruent.

$$m\angle BAD = m\angle ABC$$

$$3x + 10 = 6x - 20$$

$$10 = 3x - 20$$

$$30 = 3x$$

$$10 = x$$

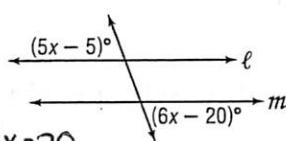
$$m\angle ABC = 6x - 20$$

$$= 6(10) - 20 \text{ or } 40$$

Exercises

Find x so that $\ell \parallel m$.

1.

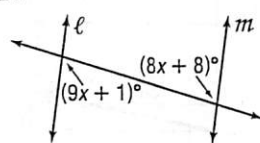


$$5x - 5 = 6x - 20$$

$$-5 = x - 20$$

$$\boxed{15 = x}$$

4.

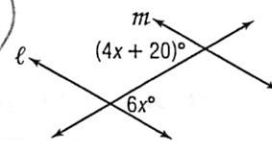


$$9x + 1 = 8x + 8$$

$$x + 1 = 8$$

$$\boxed{x = 7}$$

2.

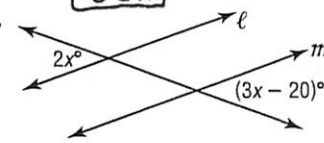


$$4x + 20 = 6x$$

$$20 = 2x$$

$$\boxed{10 = x}$$

5.



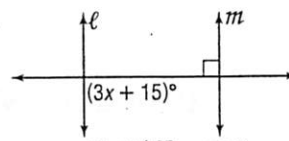
$$2x = 3x - 20$$

$$-x = -20$$

$$\boxed{x = 20}$$

35

3.

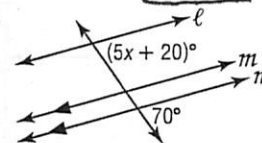


$$3x + 15 = 90$$

$$3x = 75$$

$$\boxed{x = 25}$$

6.



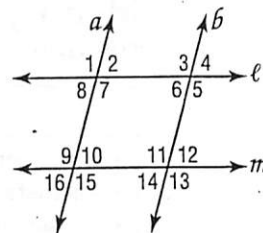
$$5x + 20 = 70$$

$$5x = 50$$

$$\boxed{x = 10}$$

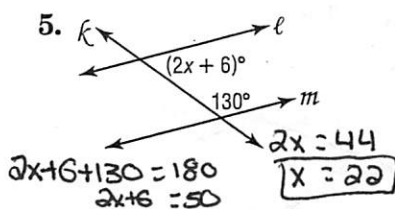
3-5 Skills Practice**Proving Lines Parallel**

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



1. $\angle 3 \cong \angle 7$
two lines are parallel if the alternate interior angles are congruent.

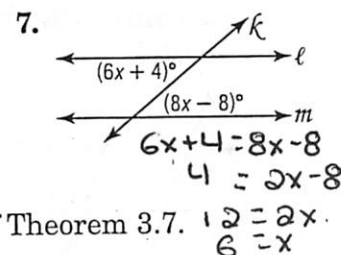
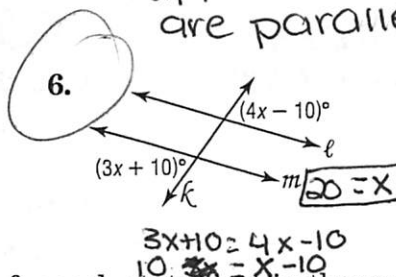
3. $\angle 2 \cong \angle 16$
two lines are parallel if the alternate interior angles are congruent
Find x so that $\ell \parallel m$.



2. $\angle 9 \cong \angle 11$
two lines are parallel if corresponding angles are congruent.

4. $m\angle 5 + m\angle 12 = 180$

if consecutive interior angles are supplementary then the lines are parallel.



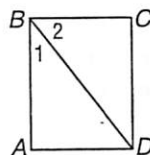
8. **PROOF** Provide a reason for each statement in the proof of Theorem 3.7.

Given: $\angle 1$ and $\angle 2$ are complementary.

$\overline{BC} \perp \overline{CD}$

Prove: $\overline{BA} \parallel \overline{CD}$

Proof:



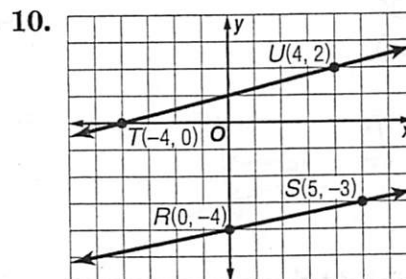
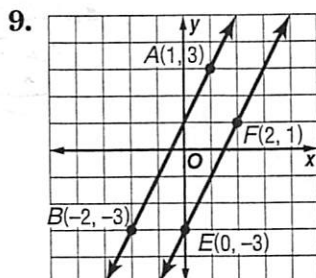
Statements

Reasons

1. $\overline{BC} \perp \overline{CD}$
2. $m\angle ABC = m\angle 1 + m\angle 2$
3. $\angle 1$ and $\angle 2$ are complementary.
4. $m\angle 1 + m\angle 2 = 90$
5. $m\angle ABC = 90$
6. $\overline{BA} \perp \overline{BC}$
7. $\overline{BA} \parallel \overline{CD}$

1. def of perpendicular lines
2. def of complementary angles
3. def of complementary
4. angle addition
5. substitution
6. def of perpendicular lines
7. def of parallel lines

Determine whether each pair of lines is parallel. Explain why or why not.



$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 0}{4 - (-4)} = \frac{2}{8} = \frac{1}{4}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - (-4)}{5 - 0} = \frac{-3 - (-4)}{5 - 0} = \frac{-3 + 4}{5} = \frac{1}{5}$$

not parallel
because they have
a different slope

3-4 Study Guide and Intervention

Equations of Lines

Write Equations of Lines You can write an equation of a line if you are given any of the following:

- the slope and the y-intercept,
- the slope and the coordinates of a point on the line, or
- the coordinates of two points on the line.

If m is the slope of a line, b is its y-intercept, and (x_1, y_1) is a point on the line, then:

- the **slope-intercept form** of the equation is $y = mx + b$,
- the **point-slope form** of the equation is $y - y_1 = m(x - x_1)$.

Example 1 Write an equation in slope-intercept form of the line with slope -2 and y-intercept 4 .

$$y = mx + b \quad \text{Slope-intercept form}$$

$$y = -2x + 4 \quad m = -2, b = 4$$

The slope-intercept form of the equation of the line is $y = -2x + 4$.

Example 2 Write an equation in point-slope form of the line with slope $-\frac{3}{4}$ that contains $(8, 1)$.

$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

$$y - 1 = -\frac{3}{4}(x - 8) \quad m = -\frac{3}{4}, (x_1, y_1) = (8, 1)$$

The point-slope form of the equation of the line is $y - 1 = -\frac{3}{4}(x - 8)$.

Exercises

Write an equation in slope-intercept form of the line having the given slope and y-intercept.

1. $m: 2$, y-intercept: -3
 $y + 3 = 2(x - 0)$

3. $m: \frac{1}{4}$, y-intercept: 5
 $y - 5 = \frac{1}{4}(x - 0)$

5. $m: -\frac{5}{3}$, y-intercept: $\frac{1}{3}$
 $y - \frac{1}{3} = -\frac{5}{3}(x - 0)$

4. $m: 0$, y-intercept: -2
 $y + 2 = 0(x - 0)$

6. $m: -3$, y-intercept: -8
 $y + 8 = -3(x - 0)$

Write an equation in point-slope form of the line having the given slope that contains the given point.

7. $m = \frac{1}{2}$, $(3, -1)$
 $y + 1 = \frac{1}{2}(x - 3)$

9. $m = -1$, $(-1, 3)$
 $y - 3 = -1(x + 1)$

11. $m = -\frac{5}{2}$, $(0, -3)$
 $y + 3 = -\frac{5}{2}(x - 0)$

8. $m = -2$, $(4, -2)$
 $y + 2 = -2(x - 4)$

10. $m = \frac{1}{4}$, $(-3, -2)$
 $y + 2 = \frac{1}{4}(x + 3)$

12. $m = 0$, $(-2, 5)$
 $y - 5 = 0(x + 2)$

3-4 Word Problem Practice

Equations of Lines

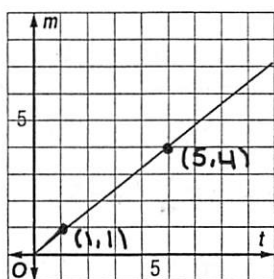
1. **GROWTH** At the same time each month over a one year period, John recorded the height of a tree he had planted. He then calculated the average growth rate of the tree. The height h in inches of the tree during this period was given by the formula $h = 1.7t + 28$, where t is the number of months. What are the slope and y -intercept of this line and what do they signify?

$$h = 1.7t + 28$$

slope = 1.7, rate of growth per month

y intercept = 28, the height the tree has started at.

2. **DRIVING** Ellen is driving to a friend's house. The graph shows the distance (in miles) that Ellen was from home t minutes after she left her house.



$$\frac{4-0}{5-0} = \frac{4}{5}$$

Write an equation that relates m and t .

$$y = mx + b$$

$$y = m \quad x = t$$

$$m = \frac{3}{5}t + b$$

$$\frac{2}{5} = b$$

$$1 = \frac{3}{5}(\frac{1}{1}) + b$$

$$m = \frac{3}{5}t + \frac{2}{5}$$

3. **COST** Carla has a business that tests the air quality in artist's studios. She had to purchase \$750 worth of testing equipment to start her business. She charges \$50 to perform the test. Let n be the number of jobs she gets and let P be her net profit. Write an equation that relates P and n . How many jobs does she need to make \$750?

$$750 - \text{start} \\ 50 / \text{test}$$

$$P - 750 = 50n$$

$$750 = 50n$$

$$15 = n$$

Chapter 3

she needs 15 jobs to make \$750

4. **PAINT TESTING** A paint company decided to test the durability of its white paint. They painted a square all white with their paint and measured the reflectivity of the square each year. Seven years after being painted, the reflectivity was 85%. Ten years after being painted, the reflectivity dropped to 82.9%. Assuming that the reflectivity decreases steadily with time, write an equation that gives the reflectivity R (as a percentage) as a function of time t in years. What is the reflectivity of a fresh coat of their white paint?

$$\frac{85 - 82.9}{7 - 10} = \frac{2.1}{-3} = -0.7$$

$$t = -0.7r + b$$

$$85 = -0.7(7) + b \quad 85 = -4.9 + b \quad 89.9 = b$$

$$85 = -4.9 + b \quad 89.9 = b$$

ARTISTRY For Exercises 5–7, use the following information.

Gail is an oil painter. She paints on canvases made from Belgian linen. Before she paints on the linen, she has to prime the surface so that it does not absorb the oil from the paint she uses. She can buy linen that has already been primed for \$21 per yard, or she can buy unprimed linen for \$15 per yard, but then she would also have to buy a jar of primer for \$30.

5. Let P be the cost of Y yards of primed Belgian linen. Write an equation that relates P and Y .

$$P = 21Y$$

6. Let U be the cost of buying Y yards of unprimed linen and a jar of primer. Write an equation that relates U and Y .

$$U = 15Y + 30$$

7. For how many yards would it be less expensive for Gail to buy the primed linen?

$$15Y = 21Y$$

10

Do now
page 167 example 4

Write an equation in slope-intercept form for a line containing $(2,0)$ that is perpendicular to the line with equation $y = -x + 5$.

- since the slope of the line $y = -x + 5$ is -1 , the slope of a line perpendicular to it is 1

$$y - y_1 = m(x - x_1) \quad \text{point-slope form}$$

$$y - 0 = 1(x - 2)$$

$$y = x - 2 \quad \text{distributive}$$

to color

Do now
page 14 example 4

Write an equation in slope-intercept form for a line containing (3,0) that is perpendicular to the line with equation $y = x + 2$.
Since the slope of the line $y = x + 2$ is 1, the slope of the line perpendicular to it is -1.
Point-slope form: $y - 0 = -1(x - 3)$
 $y = -x + 3$
Simplify: $y = -x + 3$

3-2

Study Guide and Intervention

Angles and Parallel Lines

Parallel Lines and Angle Pairs When two parallel lines are cut by a transversal, the following pairs of angles are congruent.

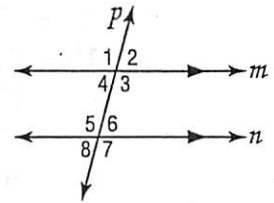
- corresponding angles
- alternate interior angles
- alternate exterior angles

Also, consecutive interior angles are supplementary.

Example

In the figure, $m\angle 2 = 75$. Find the measures of the remaining angles.

- $m\angle 1 = 105$ $\angle 1$ and $\angle 2$ form a linear pair.
 $m\angle 3 = 105$ $\angle 3$ and $\angle 2$ form a linear pair.
 $m\angle 4 = 75$ $\angle 4$ and $\angle 2$ are vertical angles.
 $m\angle 5 = 105$ $\angle 5$ and $\angle 3$ are alternate interior angles.
 $m\angle 6 = 75$ $\angle 6$ and $\angle 2$ are corresponding angles.
 $m\angle 7 = 105$ $\angle 7$ and $\angle 3$ are corresponding angles.
 $m\angle 8 = 75$ $\angle 8$ and $\angle 6$ are vertical angles.

**Exercises**

In the figure, $m\angle 3 = 102$. Find the measure of each angle.

1. $\angle 5$

$$\angle 6 + \angle 5 = 180 \quad \angle 5 = 102$$

$$78 + \angle 5 = 180$$

3. $\angle 11$

$$\angle 1 = \angle 11$$

$$102 = \angle 11$$

5. $\angle 15$

$$\angle 15 = \angle 14$$

$$\angle 15 = 78$$

2. $\angle 6$

$$\angle 3 + \angle 6 = 180 \quad \angle 6 = 78$$

$$102 + \angle 6 = 180$$

4. $\angle 7$

$$\angle 6 + \angle 7 = 180 \quad \angle 7 = 102$$

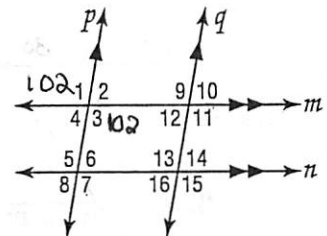
$$78 + \angle 7 = 180$$

6. $\angle 14$

$$\angle 14 + \angle 15 = 180$$

$$\angle 14 + 102 = 180$$

$$\angle 14 = 78$$



In the figure, $m\angle 9 = 80$ and $m\angle 5 = 68$. Find the measure of each angle.

7. $\angle 12$

$$\angle 12 + \angle 9 = 180$$

$$\angle 12 + 80 = 180$$

$$\angle 12 = 100$$

9. $\angle 4$

$$\angle 4 + \angle 5 = 180$$

$$\angle 4 + 68 = 180$$

$$\angle 4 = 112$$

11. $\angle 7$

$$\angle 7 = \angle 5$$

$$\angle 7 = 68$$

8. $\angle 1$

$$\angle 9 = \angle 1$$

$$80 = \angle 1$$

10. $\angle 3$

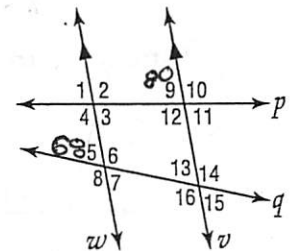
$$\angle 3 + \angle 4 = 180$$

$$\angle 3 + 112 = 180 \quad \angle 3 = 68$$

12. $\angle 16$

$$\angle 7 + \angle 16 = 180 \quad \angle 16 = 112$$

$$68 + \angle 16 = 180$$



3-2 Study Guide and Intervention (continued)**Angles and Parallel Lines**

Algebra and Angle Measures Algebra can be used to find unknown values in angles formed by a transversal and parallel lines.

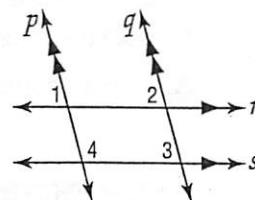
Example If $m\angle 1 = 3x + 15$, $m\angle 2 = 4x - 5$, $m\angle 3 = 5y$, and $m\angle 4 = 6z + 3$, find x and y .

$p \parallel q$, so $m\angle 1 = m\angle 2$
because they are
corresponding angles.

$$\begin{aligned} 3x + 15 &= 4x - 5 \\ 3x + 15 - 3x &= 4x - 5 - 3x \\ 15 &= x - 5 \\ 15 + 5 &= x - 5 + 5 \\ 20 &= x \end{aligned}$$

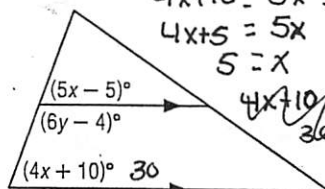
$r \parallel s$, so $m\angle 2 = m\angle 3$
because they are
corresponding angles.

$$\begin{aligned} m\angle 2 &= m\angle 3 \\ 75 &= 5y \\ \frac{75}{5} &= \frac{5y}{5} \\ 15 &= y \end{aligned}$$

**Exercises**

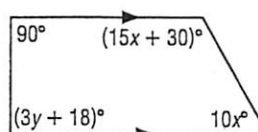
Find x and y in each figure.

1.



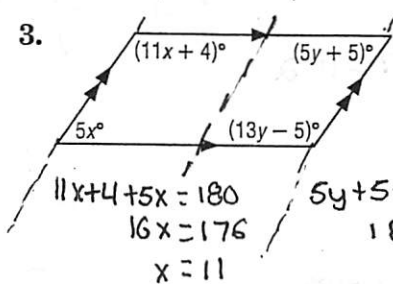
$$\begin{aligned} 4x+10 &= 5x-5 & 20+10+6y-4 &= 180 \\ 4x+5 &= 5x & 10+6y-4 &= 160 \\ 5 &= x & 6y &= 154 \\ & & 6y &= 154 \\ & & y &= 25.67 \end{aligned}$$

2.



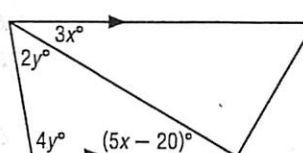
$$\begin{aligned} 15x+30+10x &= 180 \\ 25x &= 150 \\ x &= 6 \\ 90+3y+18 &= 180 \\ 3y+18 &= 90 \\ 3y &= 72 \\ y &= 24 \end{aligned}$$

3.



$$\begin{aligned} 11x+4+5x &= 180 \\ 16x &= 176 \\ x &= 11 \\ 5y+5+13y-5 &= 180 \\ 18y &= 180 \\ y &= 10 \end{aligned}$$

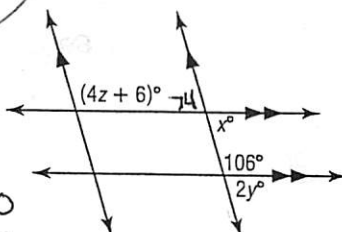
4.



$$\begin{aligned} 3x-20 &= 2y \\ -20 &= -2y \\ 10 &= y \\ 2y+4y+30 &= 180 \\ 6y &= 150 \\ y &= 25 \end{aligned}$$

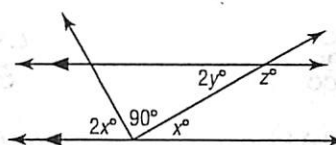
Find x , y , and z in each figure.

5.



$$\begin{aligned} 74+4z+6 &= 180 \\ 4z+6 &= 106 \\ 4z &= 100 \\ z &= 25 \\ x+106 &= 180 \\ x &= 74 \\ 106+2y &= 180 \\ 2y &= 74 \\ y &= 37 \end{aligned}$$

6.



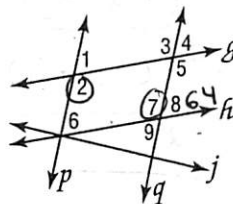
$$\begin{aligned} 2x+x+90 &= 180 \\ 3x &= 90 \\ x &= 30 \\ 30 &= 2y \\ 15 &= y \\ 30+z &= 180 \\ z &= 150 \end{aligned}$$

3 Chapter 3 Quiz 3SCORE 9

(Lessons 3-4 and 3-5)

- Write an equation in point-slope form of the line with slope $-\frac{1}{3}$ that contains (3, 8).
- Write an equation in slope-intercept form of the line with slope $\frac{5}{3}$ and y -intercept of -2 .
- Write an equation in slope-intercept form of the line that contains $(-1, 7)$ and $(3, -9)$.
- A bottled water company charges \$8 per month for a water cooler and \$5 per bottle b of water. Write an equation that represents the total cost C for monthly water service.

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



- $\angle 1 \cong \angle 6$
- $\angle 2 \cong \angle 3$
- $\angle 4 \cong \angle 9$
- $m\angle 7 + m\angle 6 = 180$
- Given $g \parallel h$ and $m\angle 8 = 64$, find $m\angle 5$.
- If $m\angle 2 = 5x - 17$ and $m\angle 7 = 3x + 35$, find x so that $g \parallel h$.

1. $y - 8 = -\frac{1}{3}(x - 3)$

2. $y = \frac{5}{3}x - 2$

3. $y = -4x + 3$

4. _____

5. _____

6. _____
 if alternating exterior $\angle$'s are $\cong$, then the lines are $\parallel$. (line g , line h)
 7. _____
 if consecutive interior $\angle$'s = 180, then the lines are $\parallel$. (line p , line q)

9. $m\angle 5 = 116$

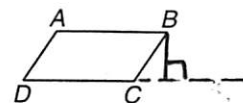
10. $x = 26$

3 Chapter 3 Quiz 4

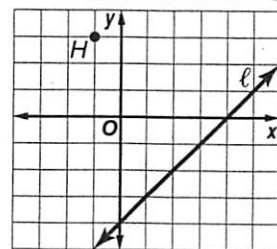
SCORE _____

(Lesson 3-6)

- Draw the segment that represents the distance from B to $\overline{DC}$.



- Construct a line perpendicular to ℓ through $H(-1, 3)$. Then find the distance from H to ℓ .



Find the distance between each pair of parallel lines.

$$\begin{aligned} \textcircled{3} \quad y &= -8 \\ y &= 4 \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad y &= -x - 9 \\ y &= -x - 7 \end{aligned}$$

$d = 12$

- What is the distance from the point $A(-1, 5)$ to the line with equation $4x - 5y = 12$?

3. $d = 12$

4. $d = \frac{15\sqrt{2}}{5}$

5. _____

$$4. y = -x - 9$$

$$y = -x - 7$$

$$\perp y = x - 9$$

$$x - 9 = -x - 7 \quad y = x - 9$$

$$2x - 9 = -7 \quad y = 1 - 9$$

$$2x = 2 \quad y = -8$$

$$x = 1 \quad \text{point of intersect}$$

$$(-1, -9) \quad (1, -8)$$

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

$$d = \sqrt{(1 - (-1))^2 + (-8 - (-9))^2}$$

$$d = \sqrt{2^2 + 1^2}$$

$$d = \sqrt{4 + 1}$$

$$d = \sqrt{5}$$

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

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

$$y = -2x - 2$$

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

$$-2.5x - 2 = \frac{1}{2}$$

$$-2.5x = 2.5$$

$$x = 1$$

$$(1, -4)$$

$$y = -2x - 2$$

$$y = -2(1) - 2$$

$$y = -4$$

~~(2, -2)~~

$$\del{(2, -2)} \quad (-1, 0) \quad (0, -2)$$

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

$$d = \sqrt{}$$

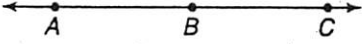
Study Guide

Integration: Non-Euclidean Geometry

Spherical Geometry

Spherical geometry is one type of **non-Euclidean geometry**.

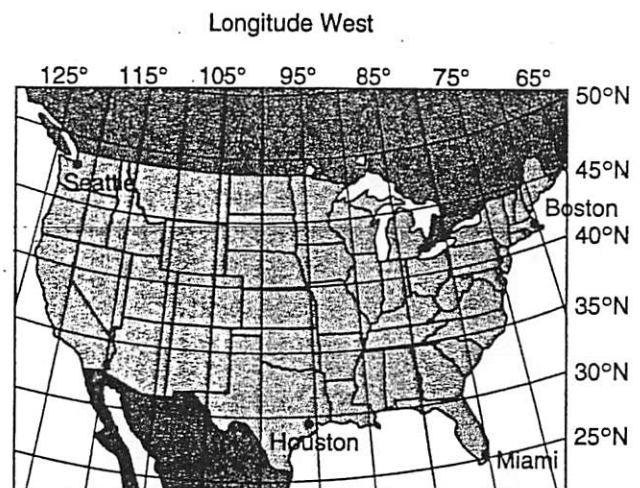
A line is defined as a great circle of a sphere that divides the sphere into two equal half-spheres. A plane is the sphere itself.

Plane Euclidean Geometry Lines on the Plane	Spherical Geometry Great Circles (Lines) on the Sphere
1. A line segment is the shortest path between two points.	1. An arc of a great circle is the shortest path between two points.
2. There is a unique straight line passing through any two points.	2. There is a unique great circle passing through any pair of nonpolar points.
3. A straight line is infinite.	3. A great circle is finite and returns to its original starting point.
4. If three points are collinear, exactly one is between the other two. 	4. If three points are collinear, any one of the three points is between the other two. A is between B and C. B is between A and C. C is between A and B. 

Latitude and longitude, measured in degrees, are used to locate places on a world map. Latitude provides the locations north or south of the equator. Longitude provides the locations east or west of the prime meridian (0°).

Example: Find a city located near the point with coordinates 29°N and 95°W .

The city near these coordinates is Houston, Texas.



Decide which statements from Euclidean geometry are true in spherical geometry. If false, explain your reasoning.

- Given a point Q and a line r , where Q is not on r , exactly one line perpendicular to r passing through Q can be drawn.
false, with spherical geometry there are 2 perpendicular points that will meet.
- Two lines equidistant from each other are parallel.
false, no lines are parallel in the spherical geometry.

Use a globe or world map to name the latitude and longitude of each city.

3. Havana, Cuba
 $23^\circ\text{N}, 82^\circ\text{W}$

4. Beira, Mozambique
 $20^\circ\text{S}, 35^\circ\text{E}$

5. Kabul, Afghanistan
 $33^\circ\text{N}, 69^\circ\text{E}$

Use a globe or world map to name the city located near each set of coordinates.

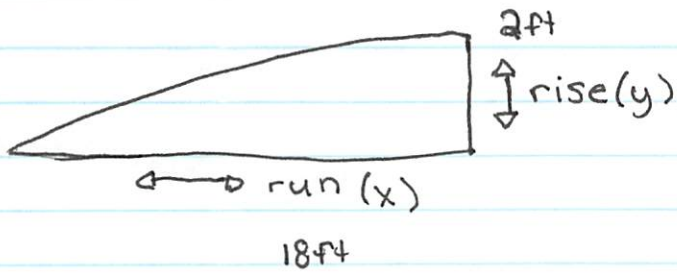
6. $39^\circ\text{N}, 73^\circ\text{W}$
Costa Rica, NYC
Greenland

7. $59^\circ\text{N}, 18^\circ\text{E}$
Stockholm, Sweden

8. $42^\circ\text{S}, 146^\circ\text{E}$
Tasmania, Australia

10

ramp activity



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

$$m = \frac{2}{18}$$

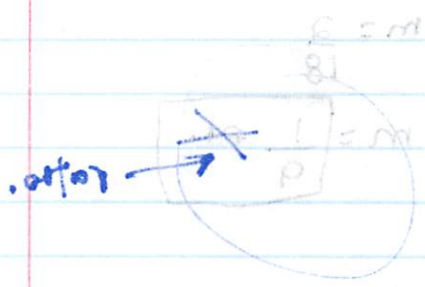
$$m = \frac{1}{9}$$

ratio.

Relative Stationary
Body Motion
Period

10

Long activity



3.2 homework

section 3.2 (4-12, 19-21, 23, 25) E.C 24

9+
+1ec
10+ good4. ~~36+31=67~~

$$36 + 31$$

$$= 67^\circ$$

$$m\angle 1 = 67^\circ$$

$$180 = 10x + 50$$

$$130 = 10x$$

$$13 = x$$

$$6. 4x + 3x + 11 = 180$$

$$4x - 5 = 3x + 11$$

$$18x - 5 = 149$$

$$x - 5 = 11$$

$$12x = 174$$

$$x = 16$$

$$4(16) - 5 = 59$$

$$3y + 1 + 59 = 180$$

$$3y + 60 = 180$$

$$y = 40$$

$$7. m\angle 3 + m\angle 2 = 180$$

$$m\angle 2 + 43 = 180$$

$$m\angle 2 = 138$$

$$8. m\angle 2 + m\angle 7 = 180$$

$$m\angle 7 + 138 = 180$$

$$m\angle 7 = 42$$

$$9. m\angle 7 + m\angle 10 = 180$$

$$42 + m\angle 10 = 180$$

$$m\angle 10 = 138$$

$$10. \angle 11 + \angle 10 = 180$$

$$m\angle 11 + 138 = 180$$

$$m\angle 11 = 42$$

$$11. m\angle 11 = m\angle 13$$

$$42 = m\angle 13$$

$$12. m\angle 10 = m\angle 16$$

$$138 = m\angle 16$$

$$19. 3y - 11 + 56 = 180$$

$$180 - 56 = 124$$

$$3y - 11 = 124$$

$$4x = 124$$

$$3y = 135$$

$$x = 31$$

$$y = 45$$

$$20. 2x = 68$$

$$87 + 68 + y^2 = 180$$

$$x = 34$$

$$68 + y^2 = 93$$

$$y^2 = 25$$

$$y = 5$$

$$21. 180 - m\angle 1 + 70 + 37$$

$$143 = m\angle 1 + 70$$

$$73 = m\angle 1$$

$$180 - 143 = 37$$

$$180 - 110 = 70$$

$$m\angle 1 = 107$$

$$180 - 143 = 37$$

$$180 - 110 = 70$$

$$70 + 37 = m\angle 1$$

$$m\angle 1 = 107$$

23. given - $\ell \parallel m$

prove - $\angle 1 \cong \angle 8$

$\angle 2 \cong \angle 7$

Statements

Reasons

1. $\ell \parallel m$

given

2. $\angle 1 \cong \angle 5, \angle 2 \cong \angle 6$

def of corresponding $\angle$'s

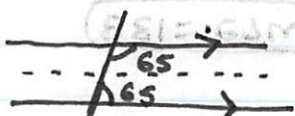
3. $\angle 5 \cong \angle 8, \angle 6 \cong \angle 7$

def of vertical $\angle$'s

4. $\angle 1 \cong \angle 8, \angle 2 \cong \angle 7$

def of alternate exterior $\angle$'s

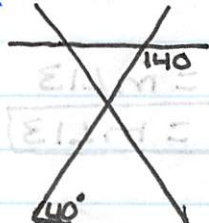
25.



on the other side of the road, the angle would measure 115° because

$65 + x = 180$, making $x = 115^\circ$.

24.



Anthony should cut this leg at an angle of 140° because the table has to sit on a line of 180° since one end is already cut at 40° , the other end must be cut at 140° to give the table a balance of 180° .

$$180 = 40 + x$$

$$140 = x$$

height assignment

$$y = \frac{1}{4}x + 3 \quad \text{a) calculate ages}$$

age = x height = y find ages 4, 8, 12, 16

x	4	8	12	16
y	8	5	6	7

b)

$$y = \frac{1}{4} \cdot \frac{4}{1} + 3$$

$$y = 4$$

$$y = \frac{1}{4} \cdot \frac{8}{1} + 3$$

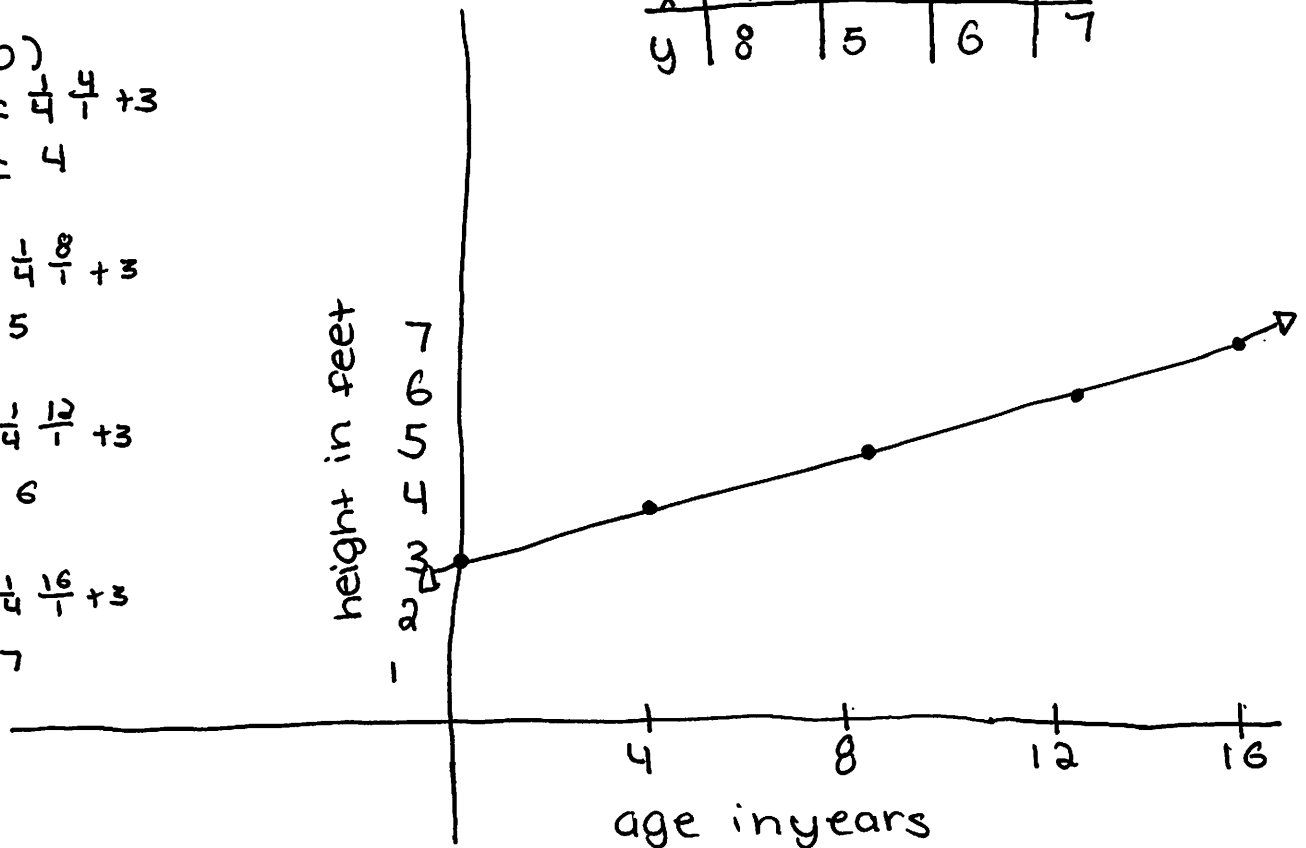
$$y = 5$$

$$y = \frac{1}{4} \cdot \frac{12}{1} + 3$$

$$y = 6$$

$$y = \frac{1}{4} \cdot \frac{16}{1} + 3$$

$$y = 7$$



c) no this would not be linear because 3, 1 are not multiples of 4, any odd numbers are not.

d) yes the man's height varies directly with his age for the ages graphed

3-3 Lesson Reading Guide**Slopes of Lines****Get Ready for the Lesson**

Read the introduction to Lesson 3-3 in your textbook.

- If you are driving uphill on a road with a 4% grade, how many feet will the road rise for every 1000 horizontal feet traveled?
- If you are driving downhill on a road with a 7% grade, how many meters will the road fall for every 500 meters traveled?

Read the Lesson

1. Which expressions can be used to represent the slope of the line containing points (x_1, y_1) and (x_2, y_2) ? Assume that no denominator is zero.

☒ A. $\frac{\Delta y}{\Delta x}$

B. $\frac{\text{horizontal run}}{\text{vertical rise}}$

☒ C. $\frac{y_2 - y_1}{x_2 - x_1}$

D. $\frac{\text{change in } x}{\text{change in } y}$

E. $\frac{y_2 - y_1}{x_1 - x_2}$

F. $\frac{y_1 - y_2}{x_1 - x_2}$

G. $\frac{x_2 - x_1}{y_2 - y_1}$

H. $\frac{y_2 - x_2}{y_1 - x_1}$

2. Match the description of a line from the first column with the description of its slope from the second column.

Type of Line**Slope**

a. a horizontal line **ii**

i. a negative number

b. a line that rises from left to right **iv**

ii. 0

c. a vertical line **iii**

iii. undefined

d. a line that falls from left to right **i**

iv. a positive number

3. Find the slope of each line.

a. a line parallel to a line with slope $\frac{3}{4}$ $\frac{3}{4}$

b. a line perpendicular to the x -axis **undefined**

c. a line perpendicular to a line with slope 5 $-\frac{1}{5}$

d. a line parallel to the x -axis **0**

e. y -axis **undefined**

Remember What You Learned

4. A good way to remember something is to explain it to someone else. Suppose your friend thinks that perpendicular lines (if neither line is vertical) have slopes that are reciprocals of each other. How could you explain to your friend that this is incorrect and give her a good way to remember the correct relationship?

if you are a positive person and your world is flipped around, then you become negative.

3-3 Study Guide and Intervention**Slopes of Lines**

Slope of a Line The slope m of a line containing two points with coordinates (x_1, y_1) and (x_2, y_2) is given by the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$, where $x_1 \neq x_2$.

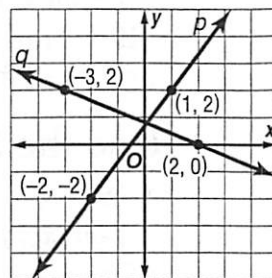
Example Find the slope of each line.

For line p , let (x_1, y_1) be $(1, 2)$ and (x_2, y_2) be $(-2, -2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-2 - 2}{-2 - 1} \text{ or } \frac{4}{3} \end{aligned}$$

For line q , let (x_1, y_1) be $(2, 0)$ and (x_2, y_2) be $(-3, 2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{2 - 0}{-3 - 2} \text{ or } -\frac{2}{5} \end{aligned}$$

**Exercises**

Determine the slope of the line that contains the given points.

1. $J(0, 0), K(-2, 8)$

$$\frac{8-0}{-2-0} = \frac{8}{-2} = -4$$

2. $R(-2, -3), S(3, -5)$

$$\frac{-5 - (-3)}{3 - (-2)} = \frac{-2}{5}$$

3. $L(1, -2), N(-6, 3)$

$$\frac{3 - (-2)}{-6 - 1} = \frac{5}{-7}$$

4. $P(-1, 2), Q(-9, 6)$

$$\frac{6 - 2}{-9 - (-1)} = \frac{4}{-8} = -\frac{1}{2}$$

5. $T(1, -2), U(6, -2)$

$$\frac{-2 - (-2)}{6 - 1} = \frac{0}{5} = 0$$

6. $V(-2, 10), W(-4, -3)$

$$\frac{-3 - 10}{-4 - (-2)} = \frac{-13}{-2} = \frac{13}{2}$$

Find the slope of each line.

7. $\overline{AB}$

$$\frac{-2 - 4}{-2 - 0} = \frac{-6}{-2} = 3$$

8. $\overline{CD}$

$$\frac{-2 - 2}{0 - (-2)} = \frac{-4}{2} = -2$$

9. $\overline{EM}$

$$\frac{2 - (-2)}{4 - 4} = \text{undefined}$$

10. $\overline{AE}$

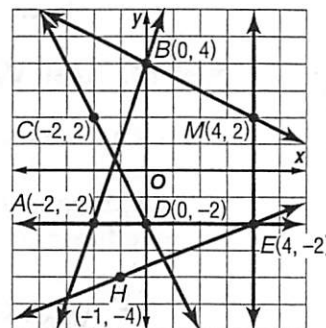
$$\frac{-2 - (-2)}{-2 - 4} = 0$$

11. $\overline{EH}$

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

12. $\overline{BM}$

$$\frac{4 - 2}{0 - 4} = \frac{2}{-4} = -\frac{1}{2}$$



3-3 Study Guide and Intervention (continued)**Slopes of Lines**

Parallel and Perpendicular Lines If you examine the slopes of pairs of parallel lines and the slopes of pairs of perpendicular lines, where neither line in each pair is vertical, you will discover the following properties.

Two lines have the same slope if and only if they are parallel.

Two lines are perpendicular if and only if the product of their slopes is -1 .

Example 1 Find the slope of a line parallel to the line containing $A(-3, 4)$ and $B(2, 5)$.

Find the slope of $\overline{AB}$. Use $(-3, 4)$ for (x_1, y_1) and use $(2, 5)$ for (x_2, y_2) .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 4}{2 - (-3)} \text{ or } \frac{1}{5}$$

The slope of any line parallel to $\overline{AB}$ must be $\frac{1}{5}$.

Example 2 Find the slope of a line perpendicular to $\overline{PQ}$ for $P(-2, -4)$ and $Q(4, 3)$.

Find the slope of $\overline{PQ}$. Use $(-2, -4)$ for (x_1, y_1) and use $(4, 3)$ for (x_2, y_2) .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-4)}{4 - (-2)} \text{ or } \frac{7}{6}$$

Since $\frac{7}{6} \cdot \left(-\frac{6}{7}\right) = -1$, the slope of any line perpendicular to $\overline{PQ}$ must be $-\frac{6}{7}$.

Exercises

Determine whether $\overline{MN}$ and $\overline{RS}$ are parallel, perpendicular, or neither.

1. $M(0, 3), N(2, 4), R(2, 1), S(8, 4)$

$$\overline{MN} \quad \frac{4-3}{2-0} = \frac{1}{2} \quad \frac{4-1}{8-2} = \frac{3}{6} = \frac{1}{2} \quad \text{parallel}$$

3. $M(-1, 3), N(4, 4), R(3, 1), S(-2, 2)$

$$\frac{4-3}{4-(-1)} = \frac{1}{5} \quad \frac{2-1}{-2-3} = -\frac{1}{5} \quad \text{neither}$$

5. $M(-2, 2), N(1, -3), R(-2, 1), S(3, 4)$

$$\frac{-3-2}{1-(-2)} = -\frac{5}{3} \quad \frac{4-1}{3-(-2)} = \frac{3}{5} \quad \text{perpendicular}$$

2. $M(-1, 3), N(0, 5), R(2, 1), S(6, -1)$

$$\frac{5-3}{0-(-1)} = 2 \quad \frac{-1-1}{6-2} = -\frac{2}{4} = -\frac{1}{2} \quad \text{perpendicular}$$

4. $M(0, -3), N(-2, -7), R(2, 1), S(0, -3)$

$$\frac{-7-(-3)}{-2-0} = 2 \quad \frac{1-1}{0-2} = 0 \quad \text{parallel}$$

6. $M(0, 0), N(2, 4), R(2, 1), S(8, 4)$

$$\frac{4-0}{2-0} = 2 \quad \frac{4-1}{8-2} = \frac{3}{6} = \frac{1}{2} \quad \text{neither}$$

Find the slope of $\overline{MN}$ and the slope of any line perpendicular to $\overline{MN}$.

7. $M(2, -4), N(-2, -1)$

$$\frac{-1-(-4)}{-2-2} = -\frac{3}{4} \quad \text{perpendicular: } \frac{4}{3}$$

8. $M(1, 3), N(-1, 5)$

$$\frac{5-3}{-1-1} = -1 \quad \text{perp: } 1$$

9. $M(4, -2), N(5, 3)$

$$\frac{3-(-2)}{5-4} = 5 \quad \text{perp: } -\frac{1}{5}$$

10. $M(2, -3), N(-4, 1)$

$$\frac{1-(-3)}{-4-2} = -\frac{2}{3} \quad \text{perp: } \frac{3}{2}$$

3-3 Skills Practice

Slopes of Lines

Determine the slope of the line that contains the given points.

1. $S(-1, 2), W(0, 4)$

$$\frac{4-2}{0-(-1)} = 2$$

3. $C(0, 1), D(3, 3)$

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

2. $G(-2, 5), H(1, -7)$

$$\frac{-7-5}{1-(-2)} = -\frac{12}{3} = -4$$

4. $J(-5, -2), K(5, -4)$

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

Find the slope of each line.

5. $\overline{NP}$

$$\frac{5-(-1)}{4-(-4)} = \frac{6}{8} = \frac{3}{4}$$

6. $\overline{TW}$

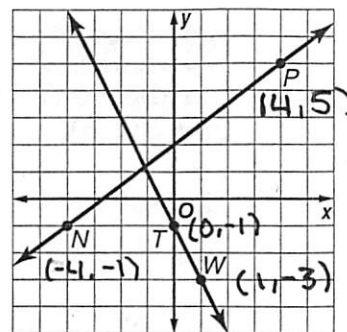
$$\frac{-3-(-1)}{1-0} = -2$$

7. a line parallel to $\overline{TW}$

$$\text{slope} = -2$$

8. a line perpendicular to $\overline{NP}$

$$\text{slope} = -\frac{4}{3}$$



Determine whether $\overline{AB}$ and $\overline{MN}$ are parallel, perpendicular, or neither.

9. $A(0, 3), B(5, -7), M(-6, 7), N(-2, -1)$

$$\frac{-7-3}{5-0} = -2 \quad \frac{-1-7}{-2-(-6)} = -2 \quad \text{parallel}$$

10. $A(-1, 4), B(2, -5), M(-3, 2), N(3, 0)$

$$\frac{-5-4}{2-(-1)} = -3 \quad \frac{0-2}{3-(-3)} = -\frac{2}{6} = -\frac{1}{3} \quad \text{neither}$$

11. $A(-2, -7), B(4, 2), M(-2, 0), N(2, 6)$

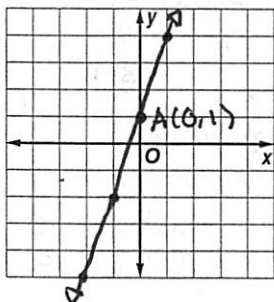
$$\frac{2-(-7)}{4-(-2)} = \frac{9}{6} = \frac{3}{2} \quad \frac{6-0}{2-(-2)} = \frac{6}{4} = \frac{3}{2} \quad \text{parallel}$$

12. $A(-4, -8), B(4, -6), M(-3, 5), N(-1, -3)$

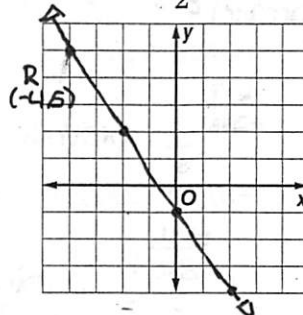
$$\frac{-6-(-8)}{4-(-4)} = \frac{2}{8} = \frac{1}{4} \quad \frac{-3-5}{-1-(-3)} = \frac{-8}{2} = -4 \quad \text{neither}$$

Graph the line that satisfies each condition.

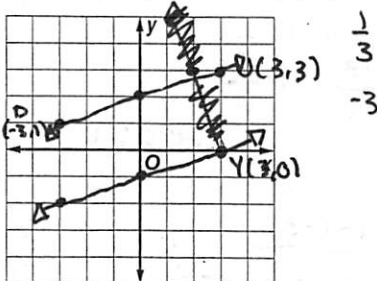
13. slope = 3, contains $A(0, 1)$



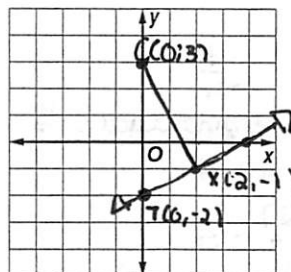
14. slope = $-\frac{3}{2}$, contains $R(-4, 5)$



15. contains $Y(3, 0)$, parallel to $\overline{DJ}$ with $D(-3, 1)$ and $J(3, 3)$



16. contains $T(0, -2)$, perpendicular to $\overline{CX}$ with $C(0, 3)$ and $X(2, -1)$



Quiz 3.1-3.3

7 1/2

page 164 evens

work

4.

6. $l \parallel m$ $m\angle 1 = 105$ find $\angle 4$

$$m\angle 1 + m\angle 2 = 180$$

$$105 + m\angle 2 = 180$$

$$m\angle 2 = 75$$

$$m\angle 2 = m\angle 4 \text{ } \& \text{ corresponding}$$

$$75 = m\angle 4$$

8. $m\angle 9 = 75$ find $\angle 5$

$$m\angle 9 = m\angle 5 \text{ } \& \text{ corresponding}$$

$$75 = m\angle 5$$

10. find $\angle 8$

$$m\angle 5 + m\angle 8 = 180$$

$$75 + m\angle 8 = 180$$

$$m\angle 8 = 105$$

12. find $\angle 12$

$$m\angle 9 + m\angle 12 = 180$$

$$75 + m\angle 12 = 180$$

$$m\angle 12 = 105$$

answers

2. alternate exterior angles

4. alternate interior angles

6. $m\angle 4 = 75$

8. $m\angle 5 = 75$

10. $m\angle 8 = 105$

12. $m\angle 12 = 105$

work

$$14. A(3, -1) B(6, 1) m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-1)}{6 - 3} = \frac{2}{3}$$

Answers

$$C(-2, -2) D(2, 4) m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{2 - (-2)} = \frac{6}{4} = \frac{3}{2}$$

= neither

14. neither

$$16. P_m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-1)}{2 - (-1)} = \frac{4}{3} \quad P_m = \frac{4}{3}$$

$$(2, 3) (-1, -1)$$

$$16. m = \frac{4}{3}$$

$$18. r_m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-1)}{-4 - (-1)} = \frac{4}{-3} = -\frac{4}{3}$$

$$(-4, 3) (1, -1) \quad R_m = \frac{3 - (-1)}{-4 - 1} = \frac{4}{-5} = -\frac{4}{5}$$

$$-\frac{4}{5} \times \frac{5}{4} = -\frac{20}{20} = -1$$

$$20. 2002 + 2004 = 4006$$

$$38122 + 731078 = 769200$$

$$769200 / 12 \text{ yrs}$$

$$8(769200) + 38122$$

$$= 6153602$$

$$20. 94474$$

8

3.3 homework

3.3 # 1-10, 15, 20, 21, 26-30

1. $P(0,4)$ $Q(4,2)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4-2}{0-4} = \frac{2}{-4} = -\frac{1}{2}$

$\boxed{m = -\frac{1}{2}}$ 2. $C(0,-3)$ $D(3,-1)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1-(-3)}{3-0} = \frac{2}{3}$

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

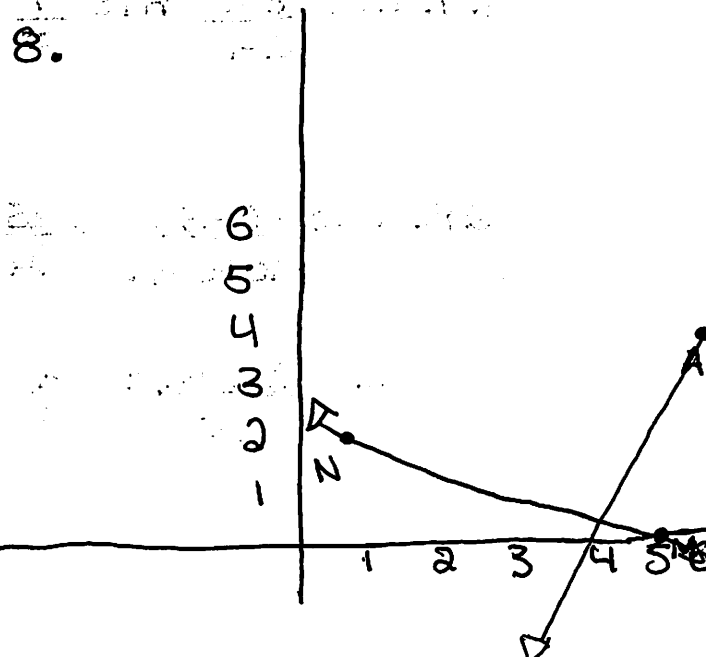
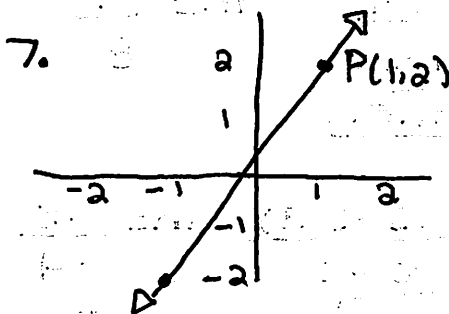
3. $8\% = \frac{8}{100} = \frac{4}{50} = \boxed{\frac{2}{25}}$

4. $-\frac{2}{25}, (-4,50), (-8,100), (10,125)$ 5. 1505 m

6. $G(15,-9)$ $H(9,-9)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-9-(-9)}{9-15} = \frac{0}{-6} = \boxed{0}$

$R(-4,-1)$ $S(3,-1)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1-(-1)}{3-(-4)} = \frac{0}{7} = \boxed{0}$

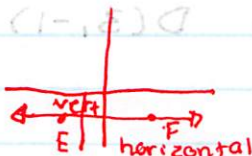
$\boxed{= \text{parallel}}$



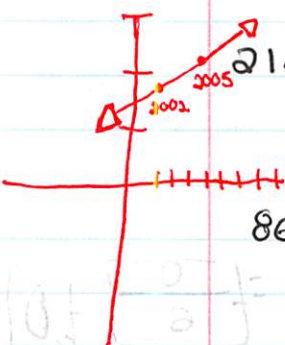
9. $A(-1, 2) B(0, -1)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-1)}{-1 - 0} = \frac{3}{-1}$

10. $P(-4, 5) Q(1, 4)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 5}{1 - (-4)} = \frac{-1}{5}$

15. undefined



20. $Y(1, 7) Z(4, 3)$ $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 3}{1 - 4} = \frac{4}{-3}$



year	2002	2005	2008	2011
pop	1949000	2209000	2469000	2729000

86 666 /year

+ 260,000

2 815 600 by 2012

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

$\frac{2209000 - 1949000}{2005 - 2002} = \frac{260000}{3 \text{ years}}$

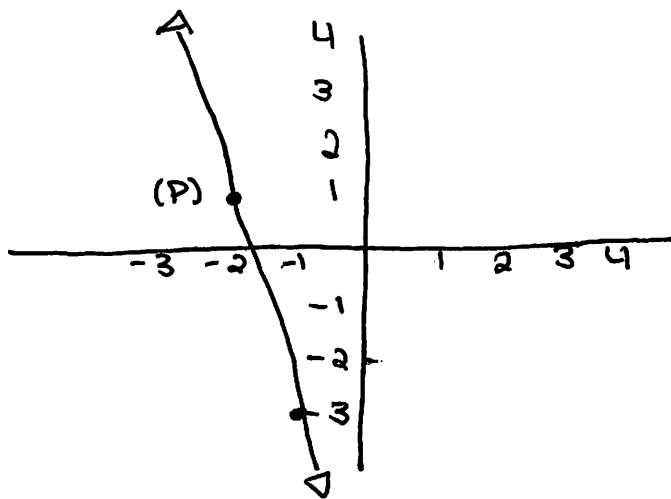
26. $m = \frac{2 - 1}{-1 - 0} = \frac{1}{-1} = -1$ $m = \frac{8 - (-1)}{-1 - (-2)} = \frac{9}{1} = 9$
= perpendicular

27. $m = \frac{8 - 1}{9 - 1} = \frac{7}{8}$ $m = \frac{8 - 1}{2 - (-6)} = \frac{7}{8}$
= parallel

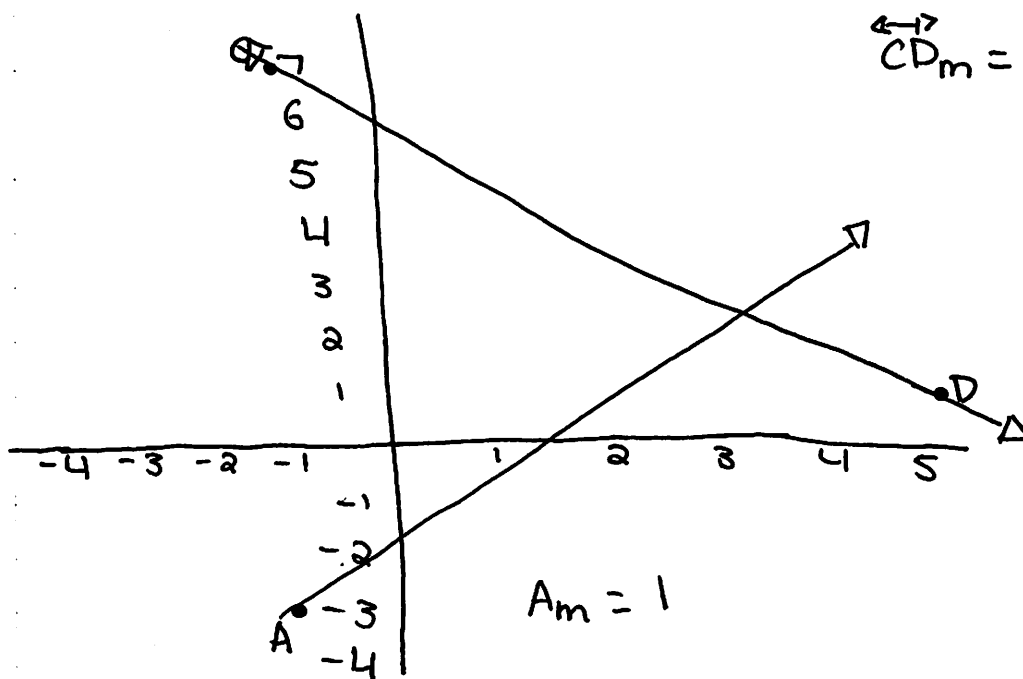
28. $m = \frac{0 - 5}{10 - (-4)} = \frac{-5}{14}$ $m = \frac{-13 - (-8)}{5 - 9} = \frac{-5}{-4} = \frac{5}{4}$
= neither

$m = \frac{0 - (-4)}{10 - 5} = \frac{4}{5}$

29. slope = -4 P(-2, 1)



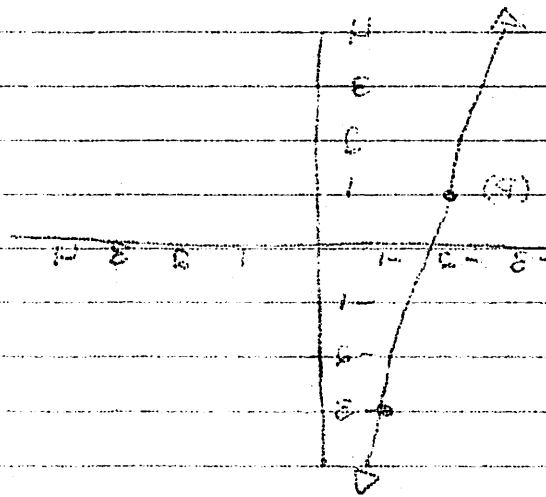
30. A(-1, -3) $\perp$ $\overleftrightarrow{CD}$ C(-1, 7) D(5, 1)



$$\overleftrightarrow{CD}_m = \frac{1-7}{5-(-1)} = \frac{-6}{6} = \boxed{-1}$$

$$A_m = 1$$

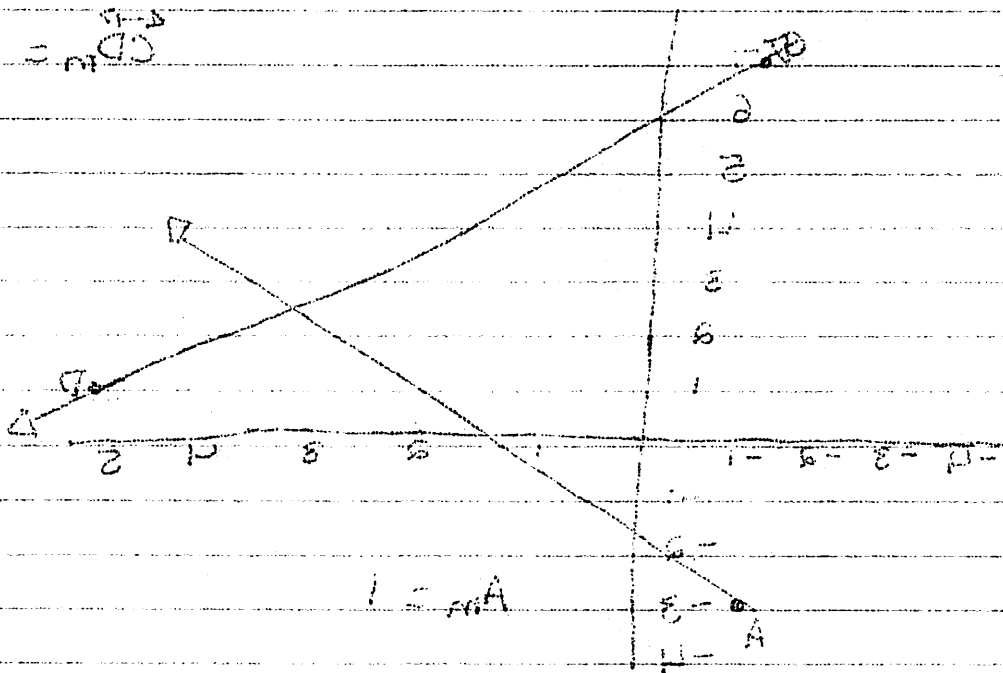
8013.98 = 2-11.9 (1.6-39)



30. A(1, 3) L(2, 1) C(1, 1) D(2, 1)

$$CD = 1 - 1 = 0$$

$$= 1 - 1 = 0$$



1 = mA

3.1 homework

sec 3.1 (17-18, 24-30, 36-38) E.C.48

17. $\overline{QR}$, $\overline{RS}$, $\overline{ST}$, $\overline{ED}$, $\overline{BC}$, $\overline{DC}$

18. $\overline{AF}$, $\overline{RS}$, $\overline{PW}$

24. $\angle 2$ and $\angle 10$ = corresponding

25. $\angle 1$ and $\angle 11$ = alternating exterior

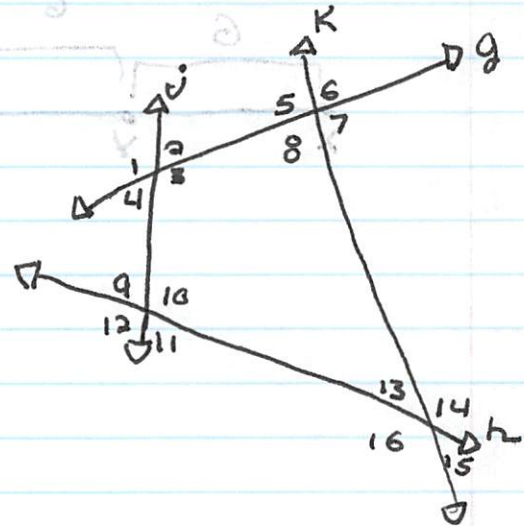
26. $\angle 5$ and $\angle 3$ = alternating interior

27. $\angle 6$ and $\angle 14$ = corresponding

28. $\angle 5$ and $\angle 15$ = alternating exterior

29. $\angle 11$ and $\angle 13$ = alternating interior

30. $\angle 8$ and $\angle 3$ = consecutive interior



36. NW = 34,000

E = 25,000

Not parallel because they are skew lines, they are not on the same plane.

These lines are parallel because they are going opposite directions, yet they will never intersect.

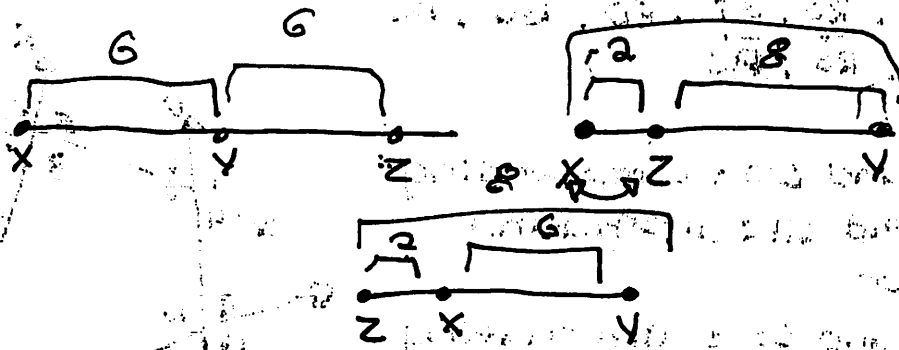
37. parallel lines - pillars at the front of the building. These lines never intersect.

38. the pillars at the front of the building.

48. music - pieces with the same tone
history - events that occur in different places at the same time.

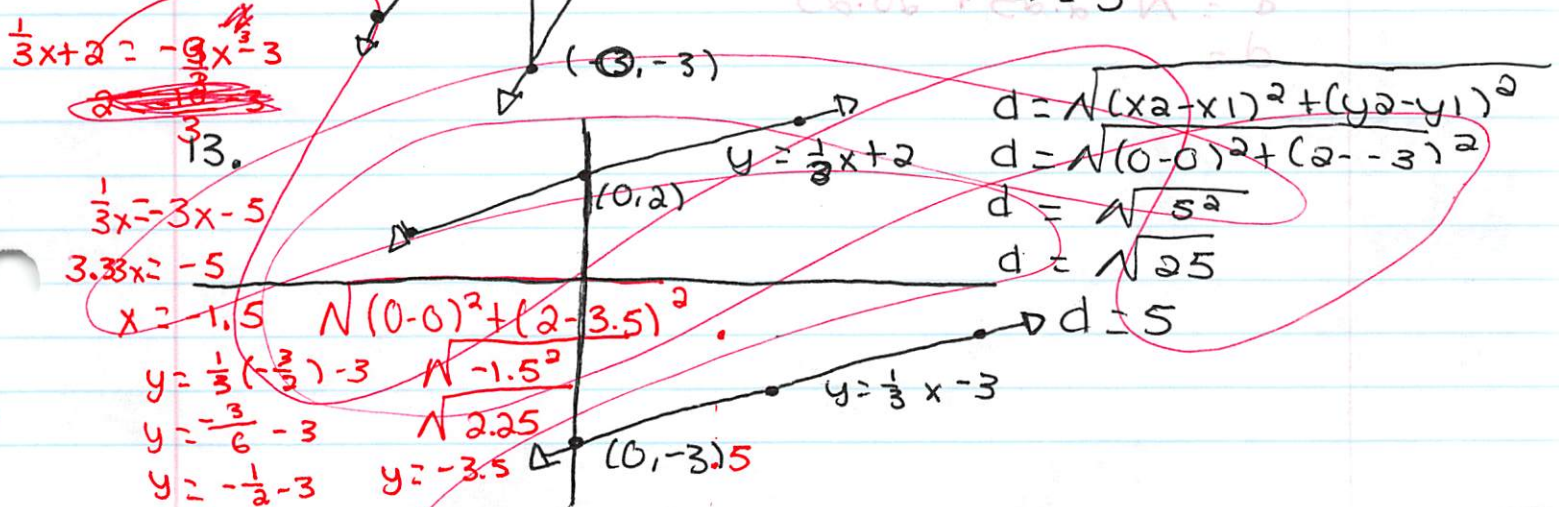
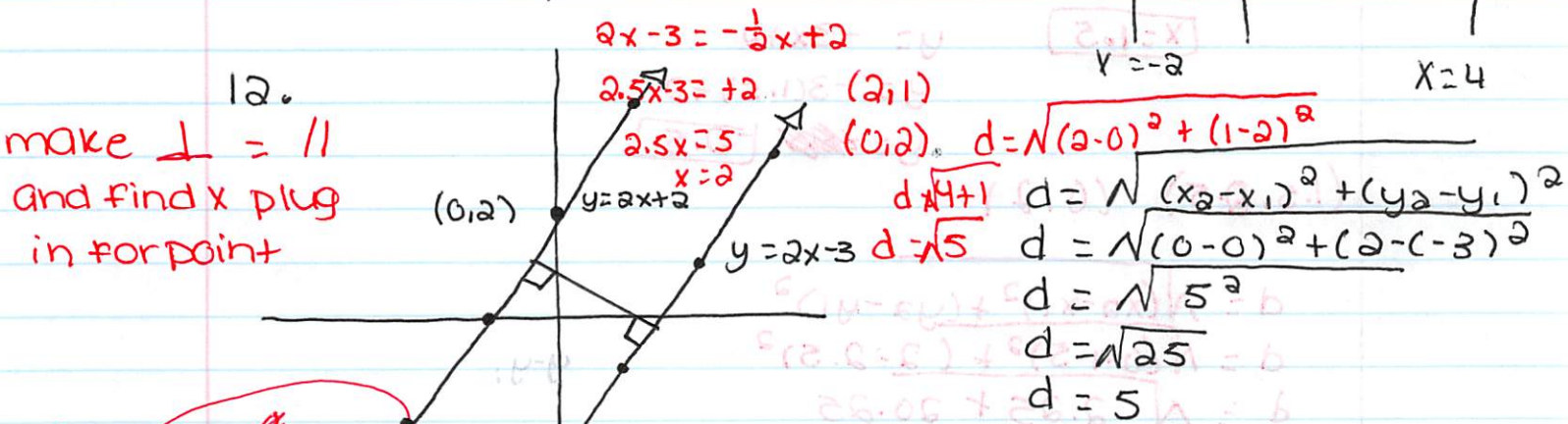
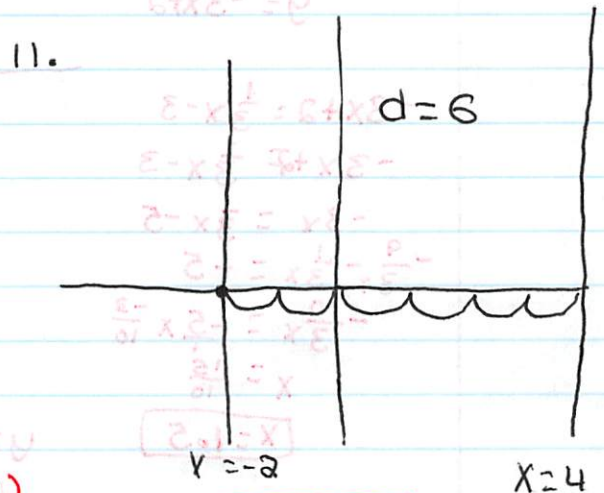
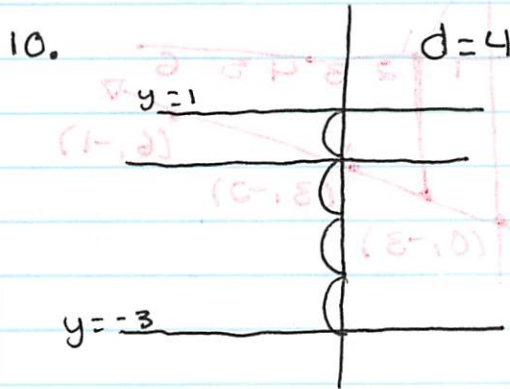
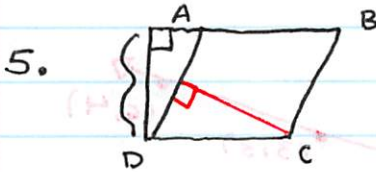
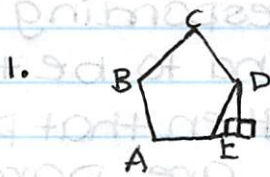
ok.

• $xy = 6$ $yz = 8$ $xz = 2$

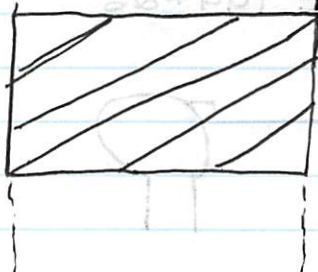


3.6 homework

Section 3.6 #1, 2, 5, 6, 10-13, Page 194 #26



194 #26



If you extend these lines and measure corresponding $\angle$'s and they are found to be the same measure, then that proves that the lines are parallel.

$$\begin{aligned} 1. y &= \frac{1}{3}x - 3 \\ 2. y &= \frac{1}{3}x + 2 \\ 3. y &= -3x - 3 \\ y &= -3x + 2 \end{aligned}$$

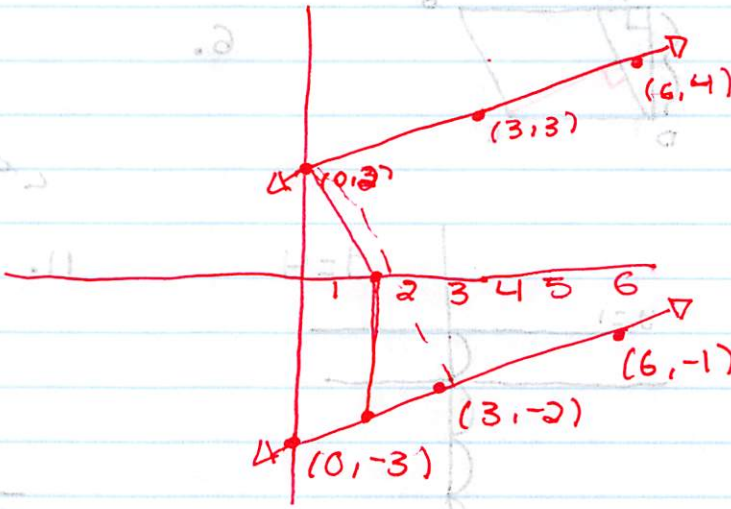
$$\begin{aligned} -3x + 2 &= \frac{1}{3}x - 3 \\ -3x + 2 &= \frac{1}{3}x - 3 \\ -3x &= \frac{1}{3}x - 5 \\ -\frac{9}{3}x - \frac{1}{3}x &= -5 \\ -\frac{10}{3}x &= -\frac{5}{3}x - \frac{3}{10} \\ x &= \frac{15}{10} \end{aligned}$$

$$x = 1.5$$

$$\begin{aligned} y &= -3x + 2 = -3(1.5) + 2 \\ y &= -4.5 + 2 \\ y &= -2.5 \end{aligned}$$

$$(1.5, 2.5) \quad (0, 2)$$

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ d &= \sqrt{(0 - 1.5)^2 + (2 - 2.5)^2} \\ d &= \sqrt{2.25 + 0.25} \\ d &= \sqrt{2.5} \end{aligned}$$



3.5 homework

section 3.5 # 28, 29

28. This ensures that the pickets will be parallel because the angles will be congruent, creating alternate interior angles. This makes the pickets parallel.

29. This guarantees the lines to be parallel because if a line is perpendicular to many lines, those lines will all be parallel ~~and~~ to each other and perpendicular to the single line.

3.2 Homework

Section 3.2 # 2.3

is. This means that the blocks will be
 parallel because the angles will be congruent
 creating alternate interior angles. This means
 the lines are parallel.
 90. This means the lines to be parallel
 because a line is perpendicular to both
 lines, those lines will all be parallel to
 each other and perpendicular to the single line.

3.4 homework

section 3.4 # 7-14, 20, 25, 30, 33

7. line ℓ (0,5) (-1,3) $b=5$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \frac{3-5}{-1-0} \quad m = \frac{-2}{-1} \quad m = 2$$

$$y = mx + b$$

$$y = 2x + 5$$

8. line k (-1,3) (0,2) $b=2$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \frac{2-3}{0-(-1)} \quad m = \frac{-1}{1} \quad m = -1$$

$$y = -x + 2$$

9. m line $\ell = 2$ ~~All~~ line $\ell = 2$

$$y = mx + b$$

$$4 = 2(4) + b$$

$$4 = 8 + b$$

$$-4 = b$$

$$y = 2x - 4$$

10. m line $\ell = 2$ $\perp$ line $\ell = -\frac{1}{2}$

$$y = mx + b$$

$$-1 = -\frac{1}{2}\left(\frac{2}{1}\right) + b$$

$$-1 = -1 + b$$

$$0 = b$$

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

$$11. U = 0.79S + 5$$

$$M = 40 + 10$$

$$12. U = 0.79(15) + 5$$

$$U = 16.85$$

he should change to the other plan because he can download more songs for less money.

$$13. m=3 \quad b=4 \quad y=3x+4$$

$$14. m=2 \quad b=8 \quad y=2x+8$$

$$20. m=-5 \quad (4,7) \quad y-7=-5(x-4)$$

$$25. K(-2,4)(0,-2) \quad b=-2$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \frac{-2 - 4}{0 - (-2)} \quad m = \frac{-6}{2} \quad m = -3 \quad y = -3x - 2$$

$$30. K = -3 \quad (-1,6)$$

$$y = mx + b$$

$$y = -3x + 3$$

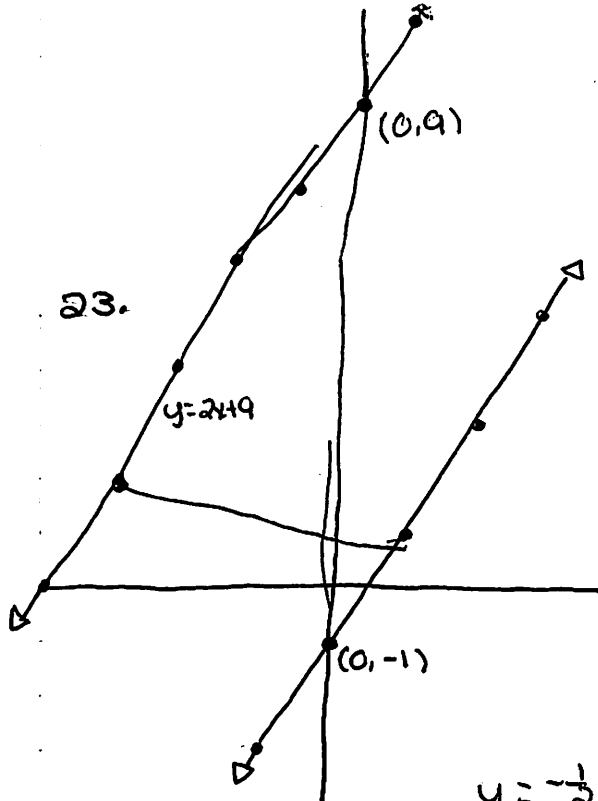
$$6 = -3(-1) + b$$

$$6 = 3 + b$$

$$3 = b$$

$$33. 750/\text{day}$$

$$y = -750x$$



$$y = 2x - 1$$

$$y = 2x + 9$$

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

$$-\frac{1}{2}x - 1 = 2x + 9$$

$$-1 = 2.5x + 9$$

$$-10 = 2.5x$$

$$-4 = x \quad (-4, 1) \quad (0, 9)$$

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

$$y = -\frac{1}{2}\left(-\frac{4}{1}\right) - 1$$

$$y = 2 - 1$$

$$y = 1$$

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

$$d = \sqrt{(0 - (-4))^2 + (9 - 1)^2}$$

$$d = \sqrt{4^2 + 8^2}$$

$$d = \sqrt{16 + 64}$$

$$d = \sqrt{80} \quad d = 5\sqrt{4}$$

$\begin{matrix} 8 & 10 \\ 4 & 2 & 5 \\ 2 \end{matrix}$

24. $y = -x + 4$
 $y = -x - 2$
 $y = x + 2$

$x + 2 = -x + 4$ $y = x + 2$
 $2x = 2$ $y = 3 + 2$
 $x = 1$ $y = 5$

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

$$d = \sqrt{(3 - 0)^2 + (5 - 4)^2}$$

$$d = \sqrt{9 + 1}$$

$$d = \sqrt{10}$$

25. $y = -x - 4$ $-x - 4 = x - 4$
 $y = -x - 4$ $0 = 2x$
 $y = x - 4$ $0 = x$
 $y = x - 4$ $(0, -4)$
 $y = 0 - 4$
 $y = -4$

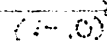
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(0 - 0)^2 + (0 - (-4))^2}$$

$$d = \sqrt{16}$$

$$d = 4$$

$-\frac{1}{1}$
 $(0, 4)$
 $(3, 5)$



$$H \approx b$$

$$O(V) = b$$

Chapter 3 Practice test

Page 195 Practice test

1. C - consecutive interior $\angle$'s

2. $m\angle 8 + m\angle 12 = 180$

$m\angle 8 + 64 = 180$

$m\angle 8 = 116$

3. $m\angle 12 = m\angle 13$

$64 = m\angle 13$

4. $m\angle 7 + m\angle 8 = 180$

$m\angle 7 + 116 = 180$

$m\angle 7 = 64$

5. $m\angle 11 + m\angle 12 = 180$

$m\angle 11 + 64 = 180$

$m\angle 11 = 116$

6. $m\angle 8 = m\angle 3$

$116 = m\angle 3$

7. $m\angle 4 + m\angle 8 = 180$

$m\angle 4 + 116 = 180$

$m\angle 4 = 64$

8. $m\angle 9 + m\angle 13 = 180$

$m\angle 9 + 64 = 180$

$m\angle 9 = 116$

9. $m\angle 5 + m\angle 9 = 180$

$m\angle 5 + 116 = 180$

$m\angle 5 = 64$

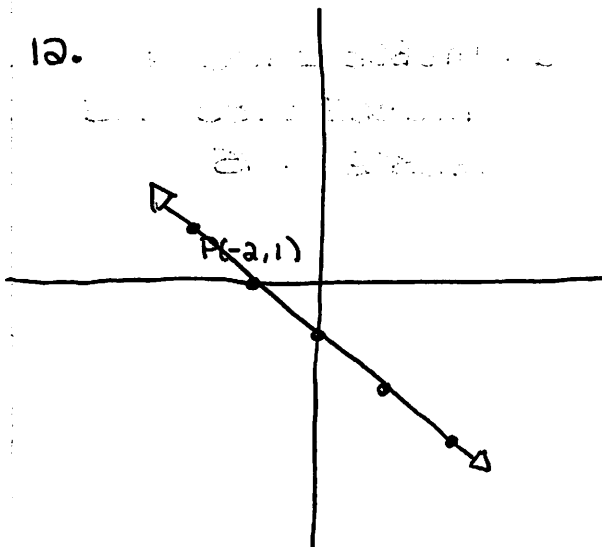
10. $m\angle 16 = m\angle 11$

$m\angle 16 = 116$

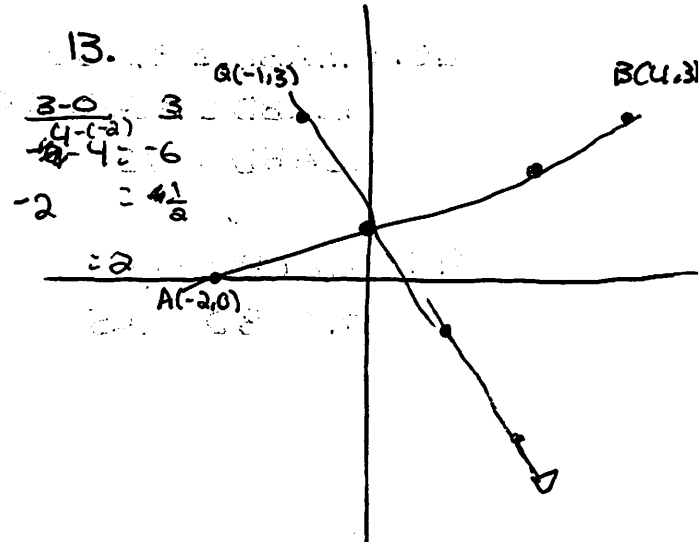
11. $m\angle 14 = m\angle 9$

$m\angle 14 = 116$

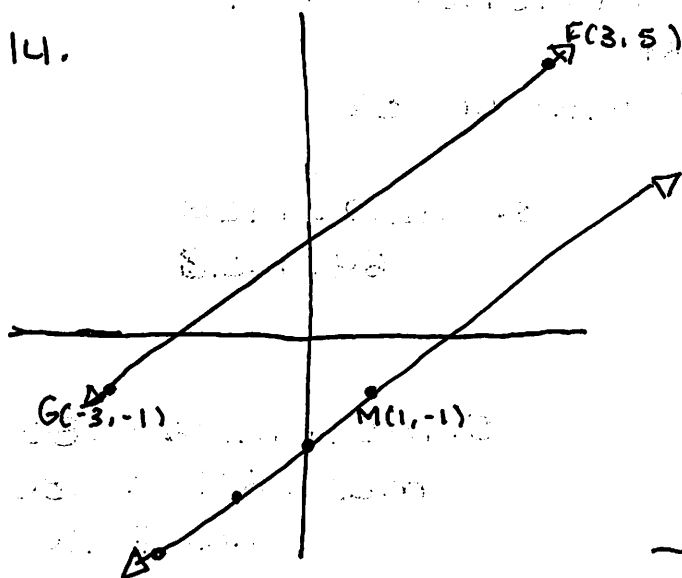
12.



13.

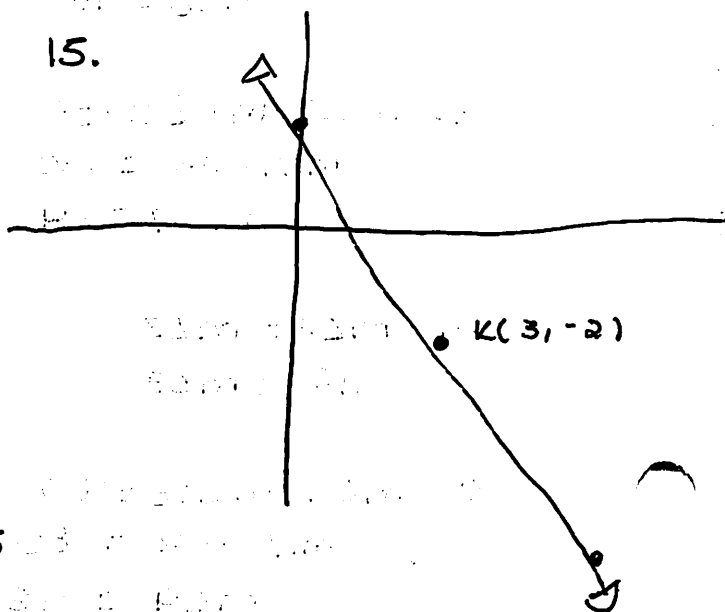


14.



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - (-1)}{3 - (-3)} = \frac{6}{6} = 1$$

15.



16. $G = \angle L \cong \angle 4$

17. $2x + 15 + 3x - 60 = 180$

$$5x + 15 = 240$$

$$5x = 225$$

$$x = 45$$

18. $y = 2x + 15$

$$y = 2(45) + 15$$

$$y = 105$$

19. $m\angle FCE = 2x + 15$

$$m\angle FCE = 2(45) + 15$$

$$m\angle FCE = 105$$

20. $m\angle ABD = 3x - 60$

$$m\angle ABD = 3(45) - 60$$

$$m\angle ABD = 75$$

21. $m\angle BCE = 180 - y$

$$m\angle BCE = 180 - 105$$

$$m\angle BCE = 75$$

22. $m\angle CBD = y$

$$m\angle CBD = 105$$

