

6.6

Name (print first and last) _____ Per _____ Date: 2/11 due 2/12

6.6 Polygons: Parallel & Perpendicular Lines

Geometry Regents 2013-2014 Ms. Lomac

SLO: I can solve for y and determine whether lines are parallel, perpendicular or neither.

(1) Vocabulary for "Distance, Graphing, PT, Slope".

$$y = mx + b$$

Slope

y-intercept

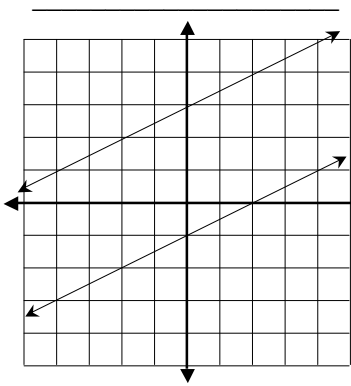
Parallel

Perpendicular

Opposite

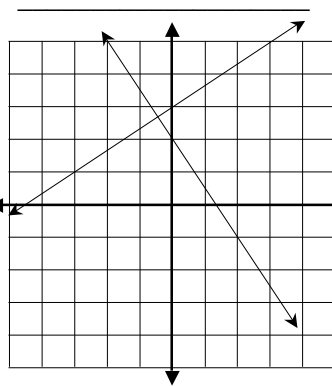
Reciprocal

(2) Notes on linear equations. Two lines can be:



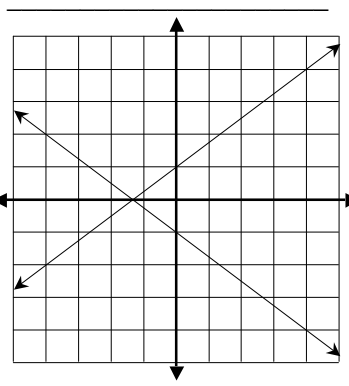
The slopes of the two lines _____

and the y-intercepts of the two lines _____



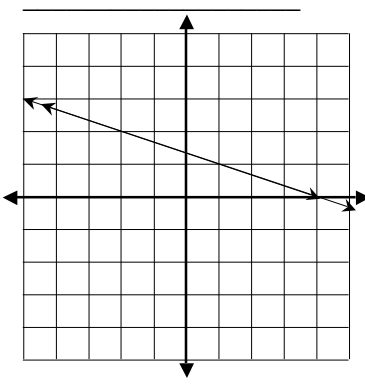
The slopes of the two lines _____

and the y-intercepts of the two lines _____



The slopes of the two lines _____

and the y-intercepts of the two lines _____



The slopes of the two lines _____

and the y-intercepts of the two lines _____

(3) How can I compare slopes and y-intercepts easily? Solve for y to get the equation in y-form.

(a) $3x - 2y = 14$

(b) $3y - x + 4 = 4x - 11$

(4) In section 7 "Regents Problems," complete 2 through 20 even problems only. The odd problems are homework.

(5) So, what if they give me a point and an equation or 2 points? If any 3 variables are given, you can find the fourth.

$$\begin{array}{c} (x,y) \\ \swarrow \quad \searrow \\ y = mx + b \\ \quad \uparrow \quad \quad \uparrow \\ \text{slope} \quad \quad \text{y-intercept} \end{array}$$

Example 1: A line parallel to $y = \frac{2}{3}x + 7$ that passes through $(6, -1)$

(a) I know that for this line, $m = \underline{\hspace{2cm}}$ and there is a point on the line such that $x = \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}}$.

(b) I need to find the value of $\underline{\hspace{2cm}}$ to write the equation for the parallel line in "y = mx + b" form.

(c) I will plug in what I know $\underline{\hspace{2cm}} = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) + \underline{\hspace{2cm}}$ and solve for what I need, which is $\underline{\hspace{2cm}}$.

(d) The equation for the parallel line that passes through $(6, -1)$ is $\underline{\hspace{10cm}}$

Example 2: A line perpendicular to $y = -4x + 1$ that passes through $(-8, 3)$

(a) I know that for this line, $m = \underline{\hspace{2cm}}$ and there is a point on the line such that $x = \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}}$.

(b) I need to find the value of $\underline{\hspace{2cm}}$ to write the equation for the perpendicular line in "y = mx + b" form.

(c) I will plug in what I know $\underline{\hspace{2cm}} = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) + \underline{\hspace{2cm}}$ and solve for what I need, which is $\underline{\hspace{2cm}}$.

(d) The equation for the perpendicular line that passes through $(-8, 3)$ is $\underline{\hspace{10cm}}$

Example 3: The perpendicular bisector of the line segment with endpoints $A(5, 11)$ and $B(-1, 13)$

(a) I know that this line must pass through the midpoint of AB which has values: $x = \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}}$.

(b) I know that the slope of segment AB is $\underline{\hspace{2cm}}$ so the slope of the perpendicular bisector is $\underline{\hspace{2cm}}$

(c) I need to find the value of $\underline{\hspace{2cm}}$ to write the equation for the perpendicular bisector in "y = mx + b" form.

(c) I will plug in what I know $\underline{\hspace{2cm}} = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) + \underline{\hspace{2cm}}$ and solve for what I need, which is $\underline{\hspace{2cm}}$.

(d) The equation for the perpendicular bisector of the line segment with endpoints

$A(5, 11)$ and $B(-1, 13)$ is $\underline{\hspace{10cm}}$

(6) In section 7 "Regents Problems," complete 22 through 38 even problems only. The odd problems are homework.

LINEAR EQUATIONS

G.G.62: PARALLEL AND PERPENDICULAR LINES

- What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?
 - $\frac{5}{3}$
 - $\frac{3}{5}$
 - $-\frac{3}{5}$
 - $-\frac{5}{3}$
- What is the slope of a line perpendicular to the line whose equation is $y = -\frac{2}{3}x - 5$?
 - $-\frac{3}{2}$
 - $-\frac{2}{3}$
 - $\frac{2}{3}$
 - $\frac{3}{2}$
- What is the slope of a line that is perpendicular to the line whose equation is $3x + 4y = 12$?
 - $\frac{3}{4}$
 - $-\frac{3}{4}$
 - $\frac{4}{3}$
 - $-\frac{4}{3}$
- What is the slope of a line perpendicular to the line whose equation is $y = 3x + 4$?
 - $\frac{1}{3}$
 - $-\frac{1}{3}$
 - 3
 - 3
- What is the slope of a line perpendicular to the line whose equation is $2y = -6x + 8$?
 - 3
 - $\frac{1}{6}$
 - $\frac{1}{3}$
 - 6
- What is the slope of a line that is perpendicular to the line whose equation is $3x + 5y = 4$?
 - $-\frac{3}{5}$
 - $\frac{3}{5}$
 - $-\frac{5}{3}$
 - $\frac{5}{3}$
- What is the slope of a line that is perpendicular to the line represented by the equation $x + 2y = 3$?
 - 2
 - 2
 - $-\frac{1}{2}$
 - $\frac{1}{2}$

- 8 What is the slope of a line perpendicular to the line whose equation is $20x - 2y = 6$?
- 1 -10
 - 2 $-\frac{1}{10}$
 - 3 10
 - 4 $\frac{1}{10}$

- 9 The slope of line ℓ is $-\frac{1}{3}$. What is an equation of a line that is perpendicular to line ℓ ?
- 1 $y + 2 = \frac{1}{3}x$
 - 2 $-2x + 6 = 6y$
 - 3 $9x - 3y = 27$
 - 4 $3x + y = 0$

- 10 Find the slope of a line perpendicular to the line whose equation is $2y - 6x = 4$.

G.G.63: PARALLEL AND PERPENDICULAR LINES

- 11 The lines $3y + 1 = 6x + 4$ and $2y + 1 = x - 9$ are
- 1 parallel
 - 2 perpendicular
 - 3 the same line
 - 4 neither parallel nor perpendicular
- 12 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?
- 1 $6y = -4x + 12$
 - 2 $2y = 3x + 6$
 - 3 $2y = -3x + 6$
 - 4 $3y = -2x + 12$

- 13 What is the equation of a line that is parallel to the line whose equation is $y = x + 2$?
- 1 $x + y = 5$
 - 2 $2x + y = -2$
 - 3 $y - x = -1$
 - 4 $y - 2x = 3$

- 14 Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?
- 1 $5y - 2x = 25$
 - 2 $5y + 2x = 10$
 - 3 $4y - 10x = 12$
 - 4 $2y + 10x = 8$

- 15 Two lines are represented by the equations $-\frac{1}{2}y = 6x + 10$ and $y = mx$. For which value of m will the lines be parallel?
- 1 -12
 - 2 -3
 - 3 3
 - 4 12

- 16 The lines represented by the equations $y + \frac{1}{2}x = 4$ and $3x + 6y = 12$ are
- 1 the same line
 - 2 parallel
 - 3 perpendicular
 - 4 neither parallel nor perpendicular

- 17 The two lines represented by the equations below are graphed on a coordinate plane.
- $$x + 6y = 12$$
- $$3(x - 2) = -y - 4$$

Which statement best describes the two lines?

- 1 The lines are parallel.
- 2 The lines are the same line.
- 3 The lines are perpendicular.
- 4 The lines intersect at an angle other than 90° .

- 18 The equation of line k is $y = \frac{1}{3}x - 2$. The equation of line m is $-2x + 6y = 18$. Lines k and m are
- 1 parallel
 - 2 perpendicular
 - 3 the same line
 - 4 neither parallel nor perpendicular

- 19 Determine whether the two lines represented by the equations $y = 2x + 3$ and $2y + x = 6$ are parallel, perpendicular, or neither. Justify your response.

- 20 Two lines are represented by the equations $x + 2y = 4$ and $4y - 2x = 12$. Determine whether these lines are parallel, perpendicular, or neither. Justify your answer.

G.G.64: PARALLEL AND PERPENDICULAR LINES

- 21 What is an equation of the line that passes through the point $(-2, 5)$ and is perpendicular to the line whose equation is $y = \frac{1}{2}x + 5$?
- 1 $y = 2x + 1$
 - 2 $y = -2x + 1$
 - 3 $y = 2x + 9$
 - 4 $y = -2x - 9$

- 22 What is an equation of the line that contains the point $(3, -1)$ and is perpendicular to the line whose equation is $y = -3x + 2$?
- 1 $y = -3x + 8$
 - 2 $y = -3x$
 - 3 $y = \frac{1}{3}x$
 - 4 $y = \frac{1}{2}x - 2$

- 23 What is an equation of the line that is perpendicular to the line whose equation is $y = \frac{3}{5}x - 2$ and that passes through the point $(3, -6)$?

- 1 $y = \frac{5}{3}x - 11$
- 2 $y = -\frac{5}{3}x + 11$
- 3 $y = -\frac{5}{3}x - 1$
- 4 $y = \frac{5}{3}x + 1$

- 24 What is the equation of the line that passes through the point $(-9, 6)$ and is perpendicular to the line $y = 3x - 5$?

- 1 $y = 3x + 21$
- 2 $y = -\frac{1}{3}x - 3$
- 3 $y = 3x + 33$
- 4 $y = -\frac{1}{3}x + 3$

- 25 Which equation represents the line that is perpendicular to $2y = x + 2$ and passes through the point $(4, 3)$?

- 1 $y = \frac{1}{2}x - 5$
- 2 $y = \frac{1}{2}x + 1$
- 3 $y = -2x + 11$
- 4 $y = -2x - 5$

- 26 Find an equation of the line passing through the point $(6, 5)$ and perpendicular to the line whose equation is $2y + 3x = 6$.

G.G.65: PARALLEL AND PERPENDICULAR LINES

- 27 What is the equation of a line that passes through the point $(-3, -11)$ and is parallel to the line whose equation is $2x - y = 4$?
- 1 $y = 2x + 5$
 - 2 $y = 2x - 5$
 - 3 $y = \frac{1}{2}x + \frac{25}{2}$
 - 4 $y = -\frac{1}{2}x - \frac{25}{2}$
- 28 What is an equation of the line that passes through the point $(7, 3)$ and is parallel to the line $4x + 2y = 10$?
- 1 $y = \frac{1}{2}x - \frac{1}{2}$
 - 2 $y = -\frac{1}{2}x + \frac{13}{2}$
 - 3 $y = 2x - 11$
 - 4 $y = -2x + 17$
- 29 What is an equation of the line that passes through the point $(-2, 3)$ and is parallel to the line whose equation is $y = \frac{3}{2}x - 4$?
- 1 $y = \frac{-2}{3}x$
 - 2 $y = \frac{-2}{3}x + \frac{5}{3}$
 - 3 $y = \frac{3}{2}x$
 - 4 $y = \frac{3}{2}x + 6$
- 30 Which line is parallel to the line whose equation is $4x + 3y = 7$ and also passes through the point $(-5, 2)$?
- 1 $4x + 3y = -26$
 - 2 $4x + 3y = -14$
 - 3 $3x + 4y = -7$
 - 4 $3x + 4y = 14$
- 31 Which equation represents the line parallel to the line whose equation is $4x + 2y = 14$ and passing through the point $(2, 2)$?
- 1 $y = -2x$
 - 2 $y = -2x + 6$
 - 3 $y = \frac{1}{2}x$
 - 4 $y = \frac{1}{2}x + 1$
- 32 What is the equation of a line passing through $(2, -1)$ and parallel to the line represented by the equation $y = 2x + 1$?
- 1 $y = -\frac{1}{2}x$
 - 2 $y = -\frac{1}{2}x + 1$
 - 3 $y = 2x - 5$
 - 4 $y = 2x - 1$
- 33 An equation of the line that passes through $(2, -1)$ and is parallel to the line $2y + 3x = 8$ is
- 1 $y = \frac{3}{2}x - 4$
 - 2 $y = \frac{3}{2}x + 4$
 - 3 $y = -\frac{3}{2}x - 2$
 - 4 $y = -\frac{3}{2}x + 2$
- 34 Which equation represents a line that is parallel to the line whose equation is $y = \frac{3}{2}x - 3$ and passes through the point $(1, 2)$?
- 1 $y = \frac{3}{2}x + \frac{1}{2}$
 - 2 $y = \frac{2}{3}x + \frac{4}{3}$
 - 3 $y = \frac{3}{2}x - 2$
 - 4 $y = -\frac{2}{3}x + \frac{8}{3}$

35 Find an equation of the line passing through the point $(5, 4)$ and parallel to the line whose equation is $2x + y = 3$.

36 Write an equation of the line that passes through the point $(6, -5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

G.G.68: PERPENDICULAR BISECTOR

37 The coordinates of the endpoints of \overline{AB} are $A(0, 0)$ and $B(0, 6)$. The equation of the perpendicular bisector of \overline{AB} is

- 1 $x = 0$
- 2 $x = 3$
- 3 $y = 0$
- 4 $y = 3$

38 Which equation represents the perpendicular bisector of \overline{AB} whose endpoints are $A(8, 2)$ and $B(0, 6)$?

- 1 $y = 2x - 4$
- 2 $y = -\frac{1}{2}x + 2$
- 3 $y = -\frac{1}{2}x + 6$
- 4 $y = 2x - 12$

39 Write an equation of the perpendicular bisector of the line segment whose endpoints are $(-1, 1)$ and $(7, -5)$. [The use of the grid below is optional]

