Geometry

Name Key ID: 1

WS 3.5 - 3.6

Date _____ Period ____

**Write the slope-intercept form of the equation of the line through the given points.**

1) through: $(-4, 3)$ and $(-3, 0)$

$m = \frac{-3}{1}$ $y = mx + b$

$0 = -3(-3) + b$

$0 = 9 + b$

$-9 = b$

$y = -3x - 9$

2) through: $(-4, -5)$ and $(0, 0)$

$m = \frac{5}{4}$ $y = mx + b$

$0 = \frac{5}{4}(0) + b$

$0 = b$

$y = \frac{5}{4}x$

**Write the slope-intercept form of the equation of the line described.**

3) through: $(-4, 0)$, parallel to $y = \frac{1}{8}x - 3$

$m = \frac{1}{8}$ $(-4, 0)$

$y = mx + b$

$0 = \frac{1}{8}(-4) + b$

$0 = -\frac{1}{2} + b$ $b = \frac{1}{2}$

$y = \frac{1}{8}x + \frac{1}{2}$

4) through: $(-3, -3)$, parallel to $y = \frac{4}{3}x - 4$

$y = mx + b$

$-3 = \frac{4}{3}(-3) + b$

$-3 = -4 + b$

$1 = b$

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

5) through: $(-4, -4)$, perp. to $y = -4$

$x = -4$

6) through: $(-5, -4)$, perp. to $y = -\frac{5}{7}x + 4$ $\perp m = \frac{7}{5}$

$y = mx + b$

$-4 = \frac{7}{5}(-5) + b$

$-4 = -7 + b$

$3 = b$

$y = \frac{7}{5}x + 3$

**Write the equation of the line that is the perpendicular bisector to the segment with the given endpoints.**

7) $(10, -10)$, $(-4, 8)$

$\left(\frac{6}{2}, \frac{-2}{2}\right) \rightarrow (3, -1)$

$m = \frac{8+10}{-4-10} = \frac{18}{-14} = \frac{-9}{7}$

$\perp m = \frac{7}{9}$

$y = mx + b$

$-1 = \frac{7}{9}(3) + b$

$-\frac{3}{3} = \frac{7}{3} + b$

$-\frac{10}{3} = b$

$y = \frac{7}{9}x - \frac{10}{3}$

8) $(-5, 8)$, $(-3, 4)$

$\left(\frac{-8}{2}, \frac{12}{2}\right)$

$(-4, 6)$

$m = \frac{4-8}{-3+5} = \frac{-4}{2} = -2$

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

$m = \frac{1}{2}$ $(-4, 6)$

$y = mx + b$

$6 = \frac{1}{2}(-4) + b$

$6 = -2 + b$

$8 = b$

$y = \frac{1}{2}x + 8$

9. Line $\ell$ has equation $y = -\frac{1}{2}x + 4$, and point $P$ has coordinates $(3, 5)$.
   a. Find the equation of line $m$ that passes through $P$ and is perpendicular to $\ell$.
   b. Find the coordinates of the intersection of $\ell$ and $m$.
   c. What is the distance from $P$ to $\ell$?

(2,3) (3,5)

a) $m = 2$ $\quad y = mx + b$

$5 = 2(3) + b$

$5 = 6 + b$

$-6 \quad -6$

$-1 = b$

$y = 2x - 1$

b) $-\frac{1}{2}x + 4 = 2x - 1$

$+\frac{1}{2}x \quad +\frac{1}{2}x$

$4 = 2.5x - 1$

$+1 \quad +1$

$\frac{5}{2.5} = \frac{2.5x}{2.5}$

$x = 2$

$y = 2(2) - 1$

$y = 4 - 1$

$y = 3$

(2,3)

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

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

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

$d = \sqrt{5}$

10. Line $p$ has equation $y = x + 3$, and line $q$ has equation $y = x - 1$.
   a. Find the equation of a line $r$ that is perpendicular to $p$ and $q$.
   b. Find the coordinates of the intersection of $p$ and $r$ and the coordinates of the intersection of $q$ and $r$.
   c. Find the distance between lines $p$ and $q$.

a) $y = -x + 1$

b) $-x + 1 = x + 3$

$+x \quad +x$

$1 = 2x + 3$

$-3 \quad -3$

$-2 = 2x$

$-1 = x$

$y = (-1) + 3$

$y = 2$

$(-1, 2)$ ← p + r

$-x + 1 = x - 1$

$+x + 1 \quad +x + 1$

$2 = 2x$

$1 = x$

$y = 1 - 1$

$y = 0$

(1,0) ← q + r

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

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

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

11. Write the equation of a horizontal line that goes through the point (2,3).

$y = 3$

12. Write the equation of a vertical line that goes through the point (-3, 5).

$x = -3$

13. Write the equation of a line whose x-intercept is 5 and whose y-intercept is 7.

(5,0) (0,7) $\quad m = \frac{7-0}{0-5} = \frac{-7}{5}$

Not necessary

$y = mx + b$

$7 = -\frac{7}{5}(0) + b$

$7 = b$

$y = -\frac{7}{5}x + 7$

14. Find the missing value for each coordinate pair.

a. (-20, -10) , (11, y) if the slope is -9/31.

$m = \frac{y+10}{11+20} = \frac{-9}{31}$ $\quad \frac{y+10}{31} = \frac{-9}{31}$

$y = -19$

B. (x, 5) , (-9, -18) if the slope is undefined.

$m = \frac{-18-5}{-9-x} = \frac{-23}{0}$

$x = -9$