$y = mx + b$

→ find slope from equation

Perpendicular?

Find the equation of a line that is perpendicular to
5x - 2y +14 = 0 and has an x-intercept = 10.

$5x - 2y + 14 = 0$

$5x^{-5x} - 2y + 14^{-14} = 0 \;\; -5x \;\; -14$

$-2y = -5x - 14$

$\dfrac{-2y}{-2} = \dfrac{-5x}{-2} \;\; \dfrac{-14}{-2}$

$y = \dfrac{5}{2}x + 7$

$M = \dfrac{5}{2}$

$\boxed{M_\perp = -\dfrac{2}{5}}$

$x\text{-intercept} = 10$

$\boxed{\begin{array}{c}(10, 0) \;\; \text{point} \\ (x_1, y_1)\end{array}}$

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

$y - 0 = -\dfrac{2}{5}(x - 10)$

multiply bracket

$y = -\dfrac{2}{5}x + \dfrac{20}{5}$

$y = -\dfrac{2}{3}x + 4$

$y^{(5)} = -\dfrac{2}{5}x + 4^{(5)}$ ↓ general.

$5y = -2x + 20$

$2x + 5y - 20 = 0$

1

Homework Solutions

1a) $2x + y - 3 = 0$
$2x + y = 3$
$y = -2x + 3$

$m = -2$
$b = 3$

b) $3x - y + 5 = 0$
$3x + 5 = y$

$m = 3$
$b = 5$

c) $4x - 3y = 0$
$\dfrac{4x}{3} = \dfrac{3y}{3}$
$\dfrac{4}{3}x = y$

$m = \dfrac{4}{3}$
$b = 0$

d) $3x - 2y - 6 = 0$
$\dfrac{3x}{2} - \dfrac{6}{2} = \dfrac{2y}{2}$
$\dfrac{3}{2}x - 3 = y$

$m = \dfrac{3}{2}$
$b = -3$

e) $3x - 2 = y$

$m = 3$
$b = -2$

f) $3(x+1) = 2(y-3)$
$3x + 3 = 2y - 6$
$3x + 3 + 6 = 2y$
$\dfrac{3x}{2} + \dfrac{9}{2} = \dfrac{2y}{2}$
$\dfrac{3x}{2} + \dfrac{9}{2} = y$

$m = \dfrac{3}{2}$
$b = \dfrac{9}{2}$

g) $\dfrac{x+y}{3}{}^{\times 3} = 2{}^{\times 3}$

$x+y = 6$

$y = -x + 6$

$m = -1$
$b = 6$

h) $\dfrac{x}{2}{}^{\times 4} - \dfrac{3y}{4}{}^{\times 4} = 1{}^{\times 4}$

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

$2x - 3y = 4$

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

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

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

$b = -\dfrac{4}{3}$

2a) $m = -\dfrac{4}{3}$, $b = 2$

Given the above information, you would use the slope y-intercept method to find the equation of the line.

b) $y = mx + b$
$y = -\dfrac{4}{3}x + 2$

3a) $(-1, 3)\ (-2, 6)$

Given the above information, we would first find "m" and then use $y - y_1 = m(x - x_1)$ to find the equation of the line.

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

$= \dfrac{6 - 3}{-2 - 1}$

$= \dfrac{3}{-1}$

$= 3$

$m = -3$
$(x_1, y_1) => (-1, 3)$

$y - y_1 = m(x - x_1)$
$y - 3 = -3(x - 1)$
$y - 3 = -3(x + 1)$
$y - 3 = -3x - 3$
$y - 3 + 3 = -3x$
$y = -3x$
$3x + y = 0$

Homework Solutions continued

4a) $m=0$, $(-3,-4)$

$y-y_1 = m(x-x_1)$
$y--4 = 0(x--3)$
$y+4 = 0x+0$
$y+4 = 0$

b) $m=3$, $b=2$

$y = mx+b$
$y = 3x+2$

$0 = 3x-y+2$

c) Perpendicular to $y=2x$ => $m=-\frac{1}{2}$
x-intercept is -3 => $(-3,0)$

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

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

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

$\frac{1}{2}x+y+\frac{3}{2} = 0$ => $1x+2y+3=0$ (mult. by 2)

d) Parallel to $3x+3y=1$, x-intercept $=-2$

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

$\hookrightarrow (-2,0)$

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

$\boxed{m=-1}$

$y-y_1 = m(x-x_1)$
$y-0 = -1(x--2)$
$y = -1(x+2)$
$y = -1x-2$

$1x+y+2=0$

e) x-intercept is $-4 \Rightarrow (-4, 0)$

$m = -2$

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

$y - 0 = -2(x - -4)$

$y = -2(x + 4)$

$y = -2x - 8$

$2x + y + 8 = 0$

f) y-intercept $= -2 \Rightarrow (0, -2)$

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

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

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

$y + 2 = \frac{1}{2}x - 0$

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

$0 = 1x - 2y - 4$ (multiply by 2)

g) $(-2, 1)$

parallel to x-axis $\Rightarrow m = 0$

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

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

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

$y - 1 = 0$

5. $(-2, 3)$

Slope is the same as $2x + y = 9$

$\hookrightarrow y = -2x + 9$

$m = -2$

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

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

$y - 3 = -2(x + 2)$

$y - 3 = -2x - 4$

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

$2x + y + 1 = 0$

6. **Side PQ**
$P(-1,3) \quad Q(3,4)$

$m_{PQ} = \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{4-3}{3--1}$

$= \boxed{\dfrac{1}{4}}$

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

$y - 4 = \dfrac{1}{4}(x - 3)$

$y - 4 = \dfrac{1}{4}x - \dfrac{3}{4}$

$0 = \dfrac{1}{4}x - y - \dfrac{3}{4} + 4$

$0 = 1x - 4y - 3 + 16$

$0 = 1x - 4y + 13$

Side RS
$R(2,0) \quad S(-2,-1)$

Side RS is parallel to PQ

$m_{RS} = \boxed{\dfrac{1}{4}}$

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

$y - 0 = \dfrac{1}{4}(x - 2)$

$y = \dfrac{1}{4}x - \dfrac{2}{4}$

$0 = \dfrac{1}{4}x - y - \dfrac{2}{4}$

$0 = 1x - 4y - 2$

Side PS
$P(-1,3) \quad S(-2,-1)$

$m_{PS} = \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{-1 - 3}{-2 - -1}$

$= \dfrac{-4}{-1}$

$= \boxed{4}$

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

$y - 3 = 4(x - -1)$

$y - 3 = 4x + 4$

$0 = 4x - y + 7$

Side QR
$Q(3,4) \quad R(2,0)$

Side QR is parallel to PS

$m_{QR} = \boxed{4}$

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

$y - 0 = 4(x - 2)$

$y = 4x - 8$

$0 = 4x - y - 8$

7. $T(-2,4)$ $Q(-6,-2)$ $S(0,-4)$

a) $T(-2,4)$

Parallel to QS $\Rightarrow m_{QS} = \dfrac{y_2 - y_1}{x_2 - x_1}$

$$m_{QS} = \dfrac{-4 - -2}{0 - -6}$$

$$= \dfrac{-2}{6}$$

$$= \dfrac{-1}{3}$$

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

$y - 4 = \dfrac{-1}{3}(x - -2)$

$y - 4 = \dfrac{-1}{3}(x + 2)$

$y - 4 = \dfrac{-1}{3}x - \dfrac{2}{3}$

$\dfrac{1}{3}x + y - 4 + \dfrac{2}{3} = 0$

$1x + 3y - 12 + 2 = 0$

$1x + 3y - 10 = 0$

b) $Q(-6,-2)$

Perpendicular to TS $\Rightarrow m_{TS} = \dfrac{y_2 - y_1}{x_2 - x_1}$

$$= \dfrac{-4 - 4}{0 - -2}$$

$$= \dfrac{-8}{2}$$

$$= -4$$

$m_\perp = \dfrac{1}{4}$

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

$y - -2 = \dfrac{1}{4}(x - -6)$

$y + 2 = \dfrac{1}{4}(x + 6)$

$y + 2 = \dfrac{1}{4}x + \dfrac{6}{4}$

$0 = \dfrac{1}{4}x - y + \dfrac{6}{4} - 2$

$0 = 1x - 4y + 6 - 8$

$0 = 1x - 4y - 2$

8. Same y-int as $3x+y=6$
$$\hookrightarrow y = -3x+6$$
$$b=6$$
or
$$(0,6)$$

Same slope as $2x-y=8$

$2x-8=y$

$m=2$

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

$y-6 = 2(x-0)$

$y-6 = 2x-0$

$0 = 2x-y+6$

9. $m = \dfrac{3}{4}$, $(-2,3)$

$$y-y_1 = m(x-x_1)$$
$$y-3 = \frac{3}{4}(x--2)$$
$$y-3 = \frac{3}{4}(x+2)$$
$$y-3 = \frac{3}{4}x + \frac{6}{4}$$
$$y = \frac{3}{4}x + \frac{6}{4} + 3$$

$$4y = 3x + 6 + 12$$
$$\frac{4y}{4} = \frac{3x+18}{4}$$
$$y = \frac{3}{4}x + \frac{9}{2}$$

$$b = \frac{9}{2}$$

Quiz Monday???

Worksheet day - Review Worksheet (Solutions on the side)
Must show work then check your solutions

#1 a c e
#2 a b
#3 a c e g i k m
#4 a e i
#5 a
#7 a g
#8 a i o
#12 a b
#14 b