



## L4 Parallel and Perpendicular Lines

## Scheduled Review

Rearrange each of the following into general form.  $Ax + By + C = 0$

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

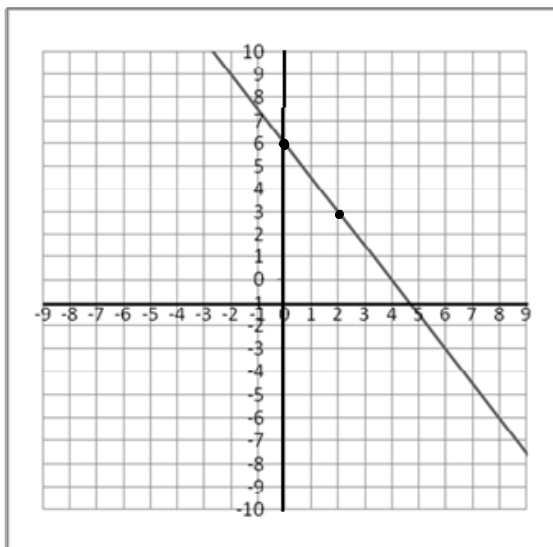
$$y - 3 = \frac{1}{4}(x + 8)$$

$$y + \frac{3}{2}x - 5 = 0 \rightarrow 3x + 2y - 10 = 0$$

$$\frac{3}{2}x + y - 5 = 0$$

$$2\left(\frac{3}{2}x + y - 5 = 0\right)$$

What is the equation of the following graph in general form?



Slope-int

$$\text{Slope: } -\frac{\text{rise}}{\text{run}} = -\frac{3}{2}$$

int: 6

$$y = mx + b$$

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

$$y + \frac{3}{2}x - 6 = 0$$

$$\frac{3}{2}x + y - 6 = 0$$

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

Before we start to make linear equations of lines involving parallel and perpendicular lines we must review last unit.

Parallel lines are lines that will never touch. This means that the slope of the two lines must be the Same.

Perpendicular lines are lines that intersect at a  $90^\circ$  angle. This means their slopes are negative reciprocal

Eg. Write an equation of a line in general form that is parallel to  $y = 2x + 5$  which also goes through  $(-2, 3)$ .

Slope point:  $y - y_1 = m(x - x_1)$

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

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

$y - 3 = 2x + 4$

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

$-2x + y - 3 - 4 = 0$   $Ax + By + C = 0$

$-2x + y - 7 = 0$  mult. by  $-1$

$2x - y + 7 = 0$

$\uparrow$   
Slope = 2

Eg Write an equation in slope y-int. form that goes through  $(6, 5)$  and is parallel to  $2x + 4y - 5 = 0$

General  $Ax + By + C = 0$

$2x + 4y - 5 = 0$

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

$y = -\frac{1}{2}x + \frac{5}{4}$  Slope int

$y = mx + b$

Slope:  $-\frac{1}{2}$  Point:  $(6, 5)$   
 $x_1 \quad y_1$

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

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

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

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

Eg Find an equation of a line that is

a) perpendicular to  $y = \frac{-2}{3}x - 5$  which also goes through (7,6) in slope  
y-int form.

Perpendicular  
Slope:  $\frac{3}{2}$

b) perpendicular to  $2x - y + 1 = 0$  which also goes through (-1,-3) in  
general form.

Use the points A(2, 3) B(0, -1) and C(6, -3) to answer the next two questions.

- a) Make an equation of a line parallel to AC which also goes through point B in general form.

① Find slope AC :  $\frac{-3-3}{6-2} = \frac{-6}{4} = -\frac{3}{2}$  has to go through (0, -1)  
 $\uparrow$   
 y int

Slope int:  $y = mx + b$

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

$$y + \frac{3}{2}x + 1 = 0$$

$$\frac{3}{2}x + y + 1 = 0$$

General  $Ax + By + C = 0$

$$\boxed{3x + 2y + 2 = 0}$$

- b) Make an equation of a line perpendicular to AB which also goes through point C in slope y-intercept form.

Homework Pg 374 #20-26 all equations must be written in slope y-intercept form as well as general form.

Use the points  $A(2, 3)$ ,  $B(0, -1)$  and  $C(6, -3)$  to answer the next two questions.

- b) Make an equation of a line perpendicular to  $AB$  which also goes through point  $C$  in slope y-intercept form.

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