

What is a function???

Chapter 6 Skills Summary

1. Skill: Determine the slope of a line and identify parallel and perpendicular lines.

Strategy: use the slope formula

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

or slope = $\frac{\text{rise}}{\text{run}}$,

if the slopes are equal then the lines are parallel;

if the slopes are negative reciprocals then the lines are perpendicular.

Examples

For the two slopes given, are the lines parallel, perpendicular or neither?

a) 4, 4

parallel
equal slopes

b) $\frac{1}{6}$, 6

neither

c) $\frac{3}{4}$, $-\frac{4}{3}$

perpendicular

3. Skill: Write the equation of a line in slope-intercept form.

Strategy: the equation of a line is $y = mx + b$, where the slope is m and the y -intercept is b .

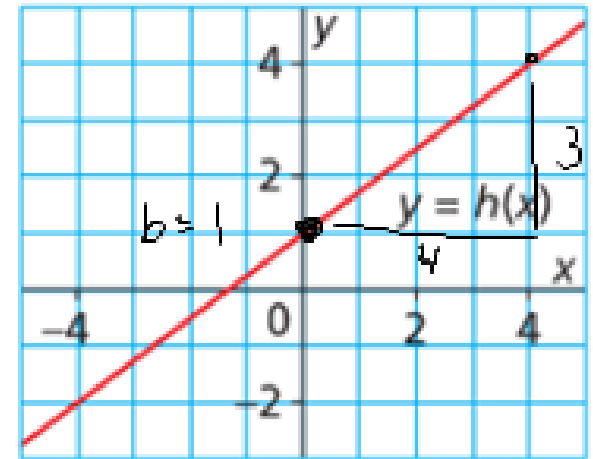
Example: Write the equation for the graph in slope-intercept form.

$$y = mx + b$$

$m \rightarrow$ slope

$b \rightarrow$ y intercept

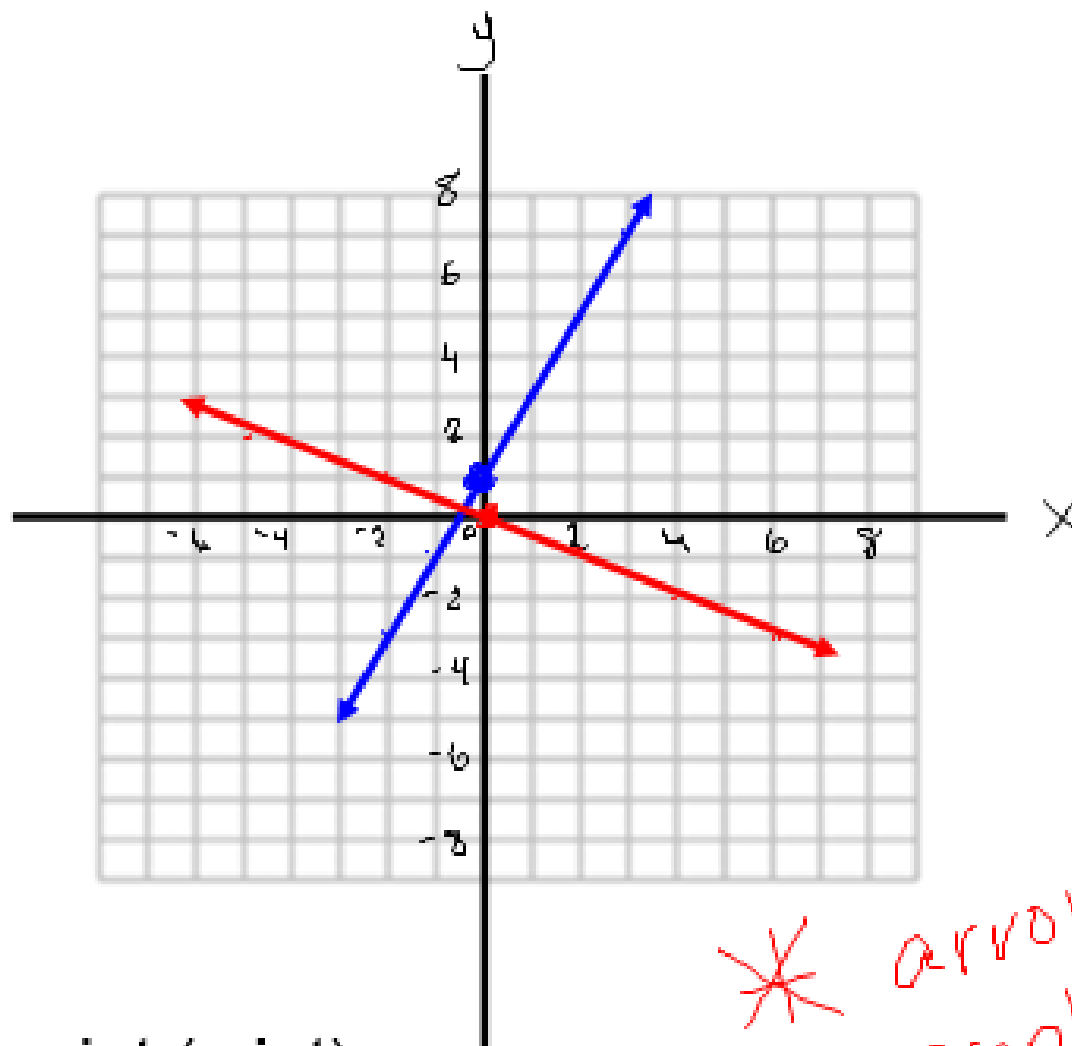
$$y = \frac{3}{4}x + 1$$



$$b = 1 \quad m = \frac{3}{4}$$

Example 2: Graph the lines: a) $y = 2x + 1$

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



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

Start with the point (y-int),
then use slope from the
point

* arrows on
graphed
lines

4. Skill: Write the equation of a line in slope-point form.

Strategy: A line with slope, m , and passing through $P(x, y)$, has equation: $y - y_1 = m(x - x_1)$

Examples

1. Write the equation of the line that has slope of -5 and passes through $P(-4, 2)$ in slope-point form.

$$y - y_1 = m(x - x_1)$$
$$(y - 2) = -5(x - (-4))$$

$$y - 2 = -5(x + 4)$$

2. Write the equation of the line that passes through $J(-7, -1)$ and $K(-5, -5)$

$$x_2, y_2 \quad y - y_1 = m(x - x_1)$$

$$m = \frac{\Delta y}{\Delta x} = \frac{-5 - (-1)}{-5 - (-7)} = \frac{-4}{2} = -2$$

equations

$$y - (-1) = -2(x - (-7)) \Rightarrow \boxed{y + 1 = -2(x + 7)}$$

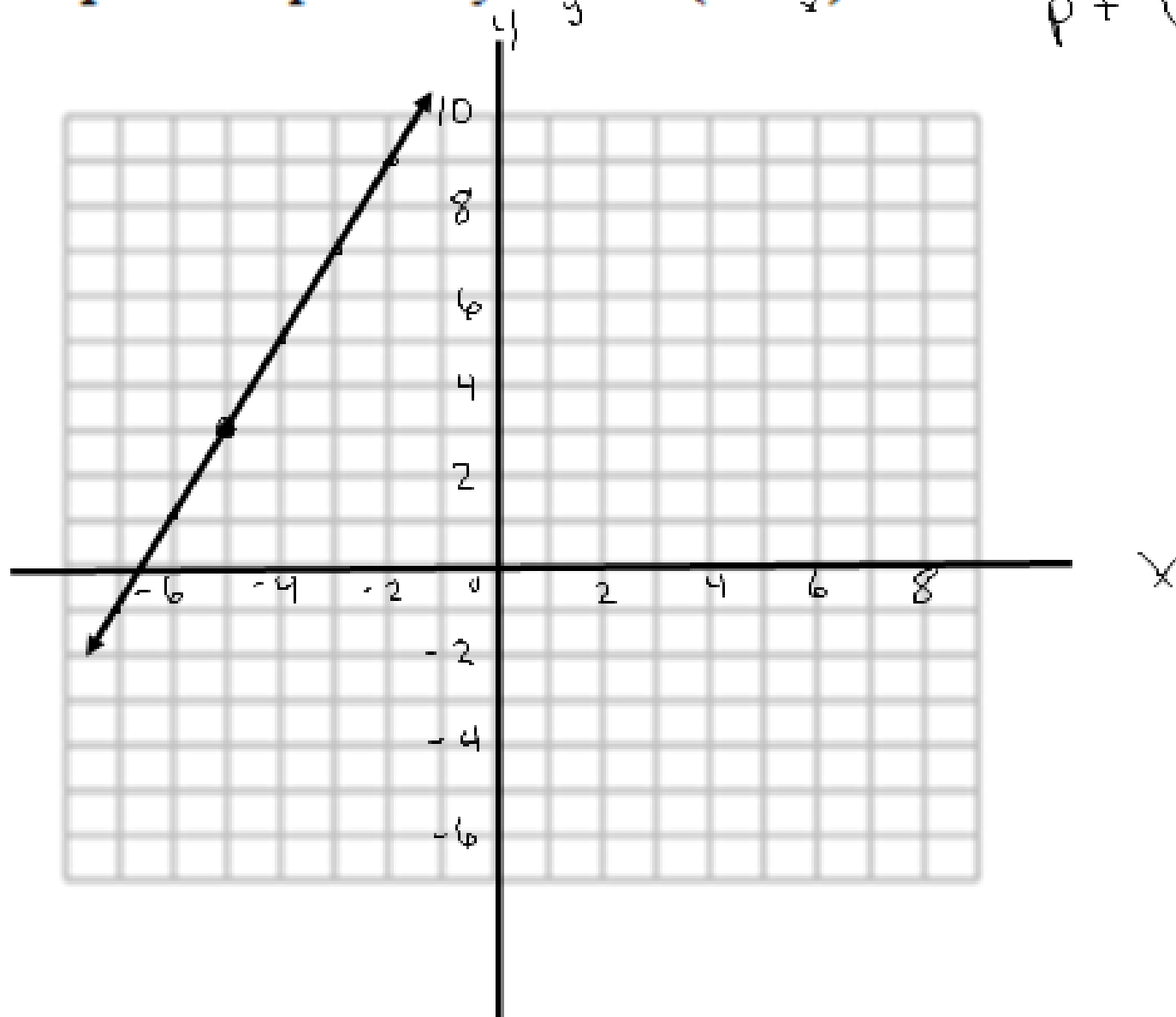
or

$$y - (-5) = -2(x - (-5)) \Rightarrow \boxed{y + 5 = -2(x + 5)}$$

Slope - point

c. Graph the equation $y - 3 = 2(x + 5)$

$$m = 2$$
$$p = (-5, 3)$$



5. Skill: Graph a linear relation in general form

Strategy: The general form of the equation is: $Ax + By + C = 0$

A → positive
→ whole #
has to be in
this order

Find the x and y intercepts and then graph the intercepts and draw a line through the points.

Example: 1. Graph the equation $3x - 2y - 24 = 0$

x int (y = 0)

$$3x - 2(0) - 24 = 0$$

$$\frac{3x}{3} = \frac{24}{3}$$

$$x = 8$$

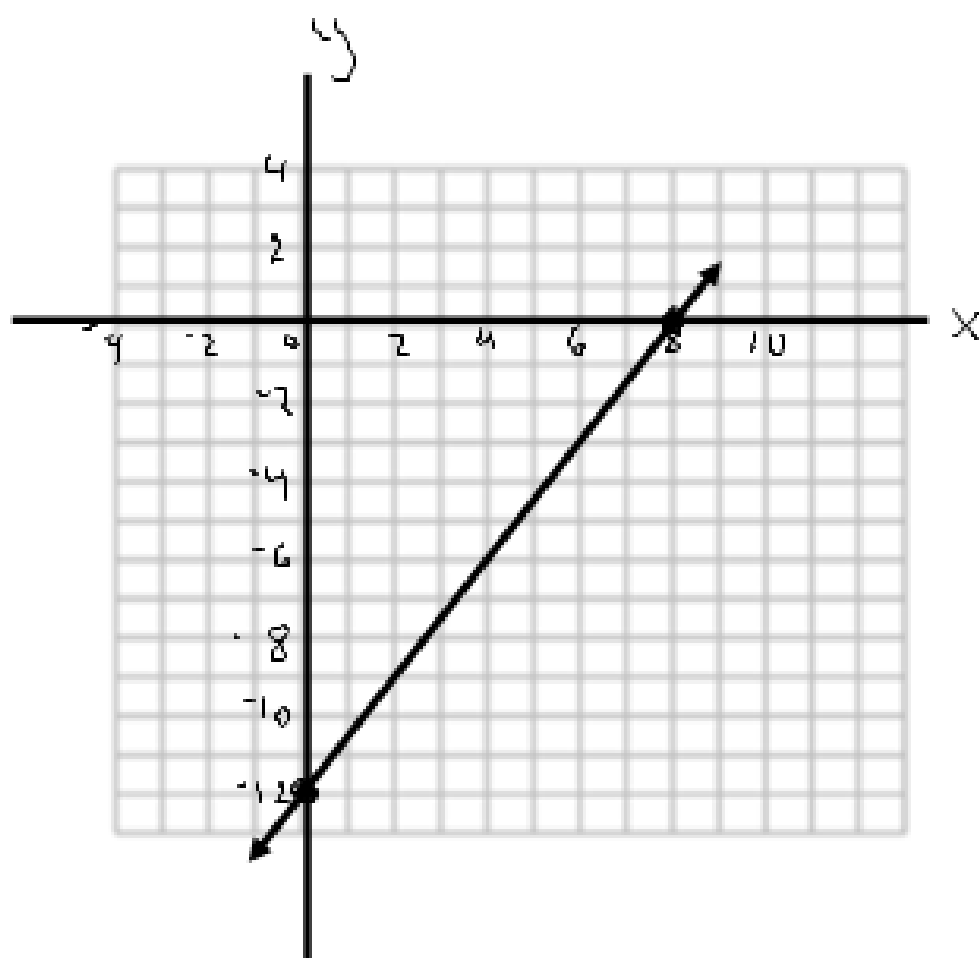
$$(8, 0)$$

y int (x = 0)

$$3(0) - 2y - 24 = 0$$

$$-2y = 24$$

$$y = -12 \quad (0, -12)$$



2. Write each equation in general form. $ax + by + c = 0$

$$4x - 11y = 88$$

$$4x - 11y - 88 = 0$$

$$y = 5x - 1$$

$$0 = 5x - y - 1$$

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Questions 17 to 24

17. Draw the line through $P(-1, 3)$ with each given slope. Write the coordinates of 3 other points on each line. How did you determine these points?

- a) 2 b) -3 c) $\frac{3}{4}$ d) $-\frac{2}{5}$

18. The coordinates of two points on two different lines are given. Are the two lines parallel, perpendicular, or neither? Justify your choice.

- a) $W(-3, 5)$, $X(8, 3)$ and $C(6, 6)$, $D(1, 8)$
 b) $J(3, -4)$, $K(9, 2)$ and $P(5, -4)$, $Q(2, -1)$
 c) $R(-3, 2)$, $S(1, -6)$ and $E(-2, 1)$, $F(-5, 7)$
 d) $G(2, -5)$, $H(2, 3)$ and $M(3, -3)$, $N(0, -3)$

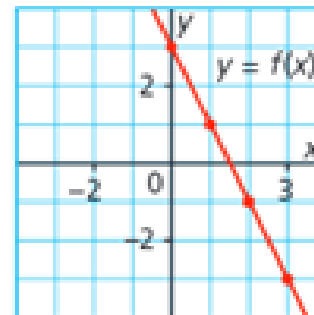
19. a) Graph these equations on the same grid without using a table of values.

- i) $y = x - 5$
 ii) $y = \frac{1}{3}x - 5$
 iii) $y = -\frac{3}{2}x - 5$
 iv) $y = -4x - 5$

b) Each equation in part a is written in the form $y = mx - 5$. When you change the value of m , how does it affect the graph?

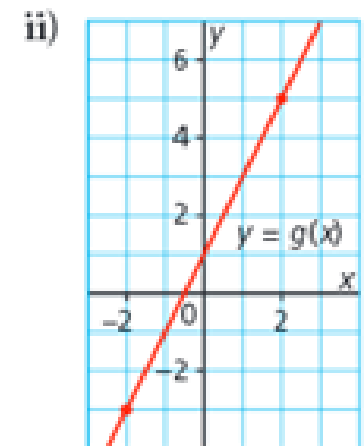
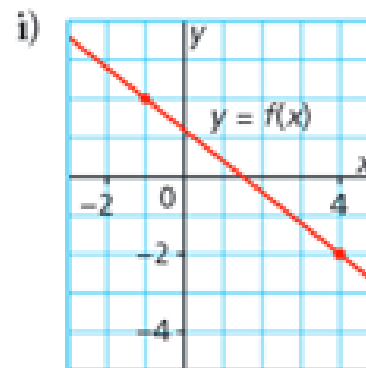
20. A student said that the equation of this line is

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



- a) What mistakes did the student make?
 b) What is the correct equation of the line?

21. a) For each line, write an equation in slope-point form.



- b) Write each equation in part a in slope-intercept form, then determine the x - and y -intercepts of each graph.