

Piecewise

Point & Slope

1. Evaluate $g(x) = \begin{cases} 2x - 1, & \text{if } x \leq 1 \\ 3x + 1, & \text{if } x > 1 \end{cases}$ when $x = 1$ and again when $x = 5$.

$$2(1) - 1 = 1$$

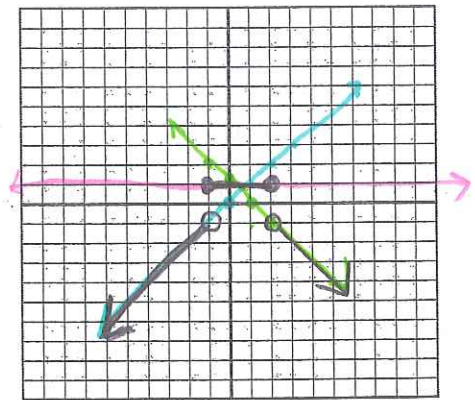
$$3(5) + 1 = 16$$

2. Graph the following function on the given domain.

$$f(x) = \begin{cases} x, & x < -1 \\ 1, & -1 \leq x \leq 2 \\ 1 - x, & x > 2 \end{cases}$$

$$\begin{aligned} y &= x \\ y &= 1 \\ y &= 1 - x \end{aligned}$$

$<$ or $>$
 \circ = open
 \leq or \geq
 \bullet = closed



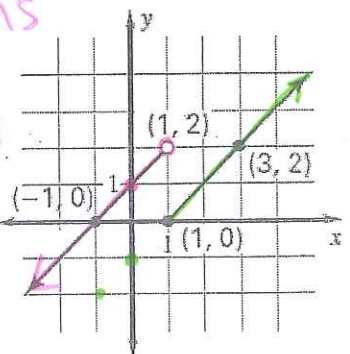
Parallel or Perp

Two Points

3. Write the piecewise function for the given graph.

① Write equations

$$f(x) = \begin{cases} x + 1, & x < 1 \\ x - 1, & x \geq 1 \end{cases}$$



Write an equation of the line that passes through (5, 4) and has a slope of -3.

(x_1, y_1) m
 $y - 4 = -3(x - 5)$
 $y - 4 = -3x + 15$
 $\quad +4$ $\quad +4$

 $y = -3x + 19$

Steps: Use $y - y_1 = m(x - x_1)$
 $m = \text{slope}$ $(x_1, y_1) = \text{point}$

- ① Write in slope & point
- ② Distribute
- ③ Solve for $y \rightarrow$ put into slope-intercept form

Write the equation of a line that passes through the point (-2, 3) and is (a) parallel and (b) perpendicular to line $y = -4x + 1$.

(x_1, y_1)
 a) $m = -4$
 $y - 3 = -4(x - (-2))$
 $y - 3 = -4x - 8$
 $y = -4x - 5$
 b) -4 $m = \frac{1}{4}$ $\rightarrow y - 3 = \frac{1}{4}x + \frac{1}{2}$
 $y - 3 = \frac{1}{4}(x - (-2))$ $y = \frac{1}{4}x + 3\frac{1}{2}$

Steps: Use $y - y_1 = m(x - x_1)$

- a) parallel = same slope
 - b) $\perp =$ opposite reciprocal slope (flip)
- ex. $\frac{1}{2}$ becomes $-\frac{2}{1}$
 $-\frac{3}{1}$ becomes $\frac{1}{3}$

Write the equation of a line that passes through the points (5, -2) and (2, 10).

(x_1, y_1) (x_2, y_2)

① $m = \frac{10 - (-2)}{2 - 5} = \frac{12}{-3} = -4$

② $y - (-2) = -4(x - 5)$
 $y + 2 = -4x + 20$
 $y = -4x + 18$

Steps:

- ① Find slope $m = \frac{y_2 - y_1}{x_2 - x_1}$
- ② Use $y - y_1 = m(x - x_1)$