Indicate which group member is taking on which of the following four roles. You will switch roles on the next recitation day.

Reader: Reads the problem to the group and makes sure everyone understands.

Reader's name: _____

Spokesperson: presents the work and asks questions to the TA.

Spokesperson's name: _____

Recorder: writes everyone's names and the group's work on the worksheet.

Recorder's name: _____

Timekeeper: keeps track of time.

Timekeeper's name: _____

1. Find the slope of the line that passes through the points $(-2, 10)$ and $(3, -5)$.

$$y = mx + b$$
$$\uparrow \qquad \uparrow$$
$$\text{slope} \quad y\text{-intercept}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 10}{3 - (-2)} = \frac{-15}{5} = -3$$

2. Find the equation of the line that passes through the points $(-2, 10)$ and $(3, -5)$.

$$y = 10 = -3 \cdot (-2) + b \quad \Rightarrow \quad 10 = 6 + b \qquad \uparrow \text{pick}$$
$$\Rightarrow \quad b = 4 \quad \Rightarrow \quad \boxed{y = -3x + 4}$$

3. A landscaping company is studying how quickly their patented lawn seed mix grows on a test lawn in April. Based on their measurements, the height of the grass t days after March 31 is $h(t) = 0.25t + 3$ inches.

   (a) How much does the grass grow every day?   so the slope $m = 0.25$ is

   Initially, at $t = 0$, $h(0) = 0.25 \cdot 0 + 3 = 3$ the grass grow /day
   $h(1) = 0.25 \cdot 1 + 3 = 3.25 \quad \Rightarrow \quad h(1) - h(0) = 3.25 - 3 = \underline{0.25}$

   (b) How tall was the grass on March 31?

   March 31 is $t = 0$: $h(0) = 0.25 \cdot 0 + 3 = 3$ inches

   (c) If they want to mow the grass when it reaches 7 inches tall, when should they mow?

   $h(t) = 7 = 0.25t + 3 \quad \Rightarrow \quad 0.25t = 4 \quad \Rightarrow \quad t = 16 \text{ days}$

   on April 16

4. Suppose $f(x) = \begin{cases} 2x - 3 & x \geq 1 \\ x^2 + 2 & x < 1 \end{cases}$ and $g(x)$ is given by the graph below right.

(a) What is $g(f(1))$? $= g(-1) = 0$

$f(1) = 2\cdot 1 - 3 = 2 - 3 = -1$

(b) What is $f(g(8))$? $= f(0) = 0^2 + 2 = 2$
$\underset{= 0}{\smile}$

(c) Solve $g(x) = 1$. $\Rightarrow$ $x = 0$

(d) Identify the x and y intercepts of $g(x)$.

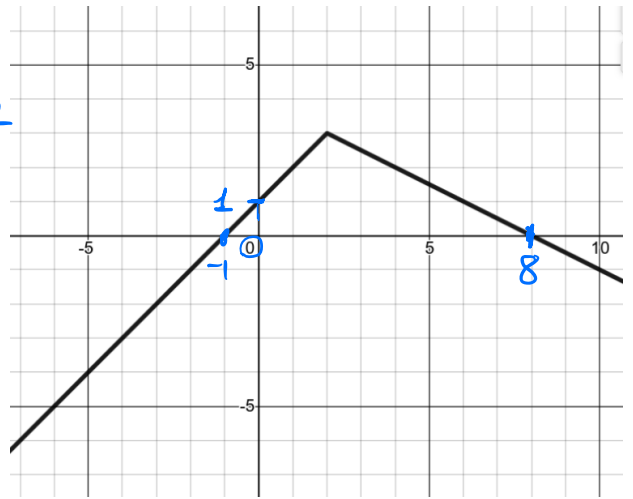x-intercepts: $x = -1$ and $x = 8$
y-intercept: $y = 1$

5. Let $f(x) = 3x^2 - 15$.

(a) Find the x-intercept(s) of $f(x)$.

$f(x) = 0 = 2x - 3$ $\Rightarrow$ $x = \dfrac{3}{2}$

(b) Find the y-intercept of $f(x)$.

$f(0) = 0^2 + 2 = 2$

6. Let $g(x) = \dfrac{1}{2x - 4}$. Find $g^{-1}(x)$

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

$\Rightarrow$ $2xy = 1 + 4x$ $\Rightarrow$ $y = f^{-1}(x) = \dfrac{1 + 4x}{2x}$