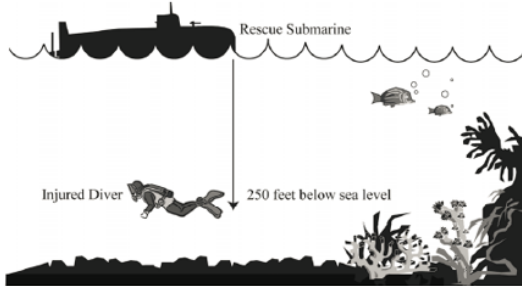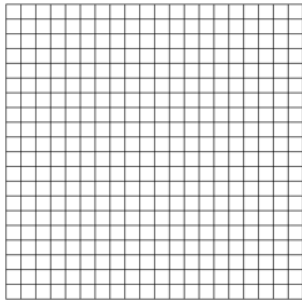## Unit 5 Day 4: Solving Systems Continued

WILL SHE SURVIVE?

You are part of the rescue team in a ship at sea. One of your divers is 250 feet below sea level, and she injured herself. She only has a 7 minute supply of air in her tank, and can only rise towards the surface at a rate of 10 feet per minute. You are sending down a rescue sub. The sub can descend at a rate of 30 feet per minute.

Rescue Submarine

Injured Diver   250 feet below sea level

WILL SHE SURVIVE? How do you know? Use mathematical reasoning to back up your answer.

Use any method to arrive at your answer (use the graph if you want).

Diver.
$$y = 10x - 250$$

Sub
$$y = -30x$$

$$-30x = 10x - 250$$
$$\underline{-10x \quad\quad -10x}$$
$$-40x = -250$$
$$\overline{-40} \quad\quad \overline{-40}$$
$$x = 6.25 \text{ min}$$

$$y = -30x$$
$$y = -30(6.25)$$
$$y = -187.5 \text{ ft}$$

$$(6.25 , -187.5)$$
$$\text{min} \quad\quad \text{ft}$$

Practice/Closure Day 4

Solve the system by substitution and graphing:

Which variable would be easier to solve for?

Together: You Try!   You Try!

a.) $\begin{cases} 2x - y = 1 \\ 4x + 6y = 10 \end{cases}$ $y = 2x - 1$ b.) $\begin{cases} x - 7y = -10 \\ 3x - 2y = 8 \end{cases}$ c.) $\begin{cases} 12x + 4 = 8y \\ -x + y = -7 \end{cases}$

$-4x \qquad -4x$

$6y = -4x + 10$

$\dfrac{6y}{6} = \dfrac{-4}{6}x + \dfrac{10}{6}$

Substitution: $y = -\frac{2}{3}x + 1.7$ Substitution: Substitution:

$2x - y = 1$

$-2x \qquad -2x$

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

$y = 2x - 1$

plug into find
y.

$4x + 6(2x - 1) = 10$ $y = 2(1) - 1$

$4x + 12x - 6 = 10$ $y = 2 - 1$

$16x - 6 = 10$ $y = 1$

$\qquad +6 \quad +6$

$\dfrac{16x}{16} = \dfrac{16}{16}$ $(1, 1)$

$x = 1$
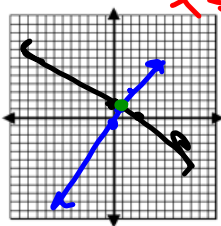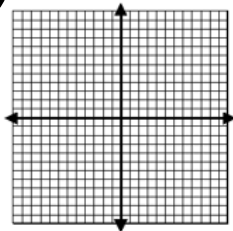
Graphing: Graphing: Graphing: