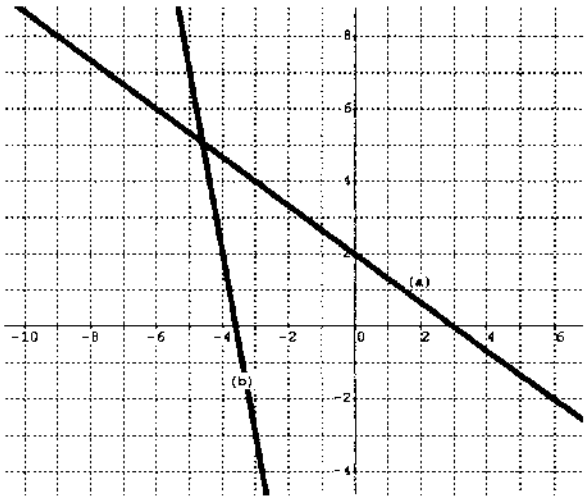
Quiz Linear Functions quiz version 1 2015.doc Name_____

1) Determine the equation of each line shown.



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

b) $y = -5x - 18$

2) Write the equation of the line with an x-intercept of $\frac{3}{2}$ and y-intercept of -6. You must show all your work to get full credit.

$(\frac{3}{2}, 0)$ $(0, -6)$

$\text{slope} = \frac{0 - -6}{\frac{3}{2} - 0} = \frac{6}{\frac{3}{2}} = 4$ (slope)

$y = 4x - 6$

3) State the domain of each function below.

a) $g(x) = \frac{|x-2|}{8}$ Domain: $\mathbb{R}$

b) $h(x) = \frac{3x-4}{(x-9)^2}$ Domain: $x \neq 9$

c) $h(x) = \frac{\sqrt{x+6}}{x}$ $x \neq 0$ $x + 6 \geq 0$ $x \geq -6$ Domain: $x \neq 0, x \geq -6$

4) It's costly to own a car given insurance, upkeep, gas, etc. We can all agree that the more you drive your car, the more money you'll spend on your car. Let's assume that the number of dollars per month it costs you to own a car is a function of the number of miles per month you drive it. Assume cost varies linearly with the distance. If you drive about 200 miles/month your cost is \$250. If you drive about 500 miles/month, your cost is \$400.

cost = f(miles)

a) Write the equation expressing cost in terms of distance.

$y = mx + b$

$y = \frac{1}{2}x + b$

$250 = \frac{1}{2}(200) + b$

$b = 150$

$\boxed{y = \frac{1}{2}x + 150}$

x = miles	y = cost
200	250
500	400

$\text{slope} = \frac{400-250}{500-200}$

$\text{slope} = \frac{1}{2}$

b) What does the y-intercept tell you about the real world?

Even if you drive 0 miles it still costs \$150 to own your car.

c) How far could you drive if you were willing to have a monthly cost of \$800?

$800 = \frac{1}{2}(x) + 150$

$650 = \frac{1}{2}x$

$x = 1300$

$\boxed{1,300 \text{ miles}}$

5) Determine if the table below contains linear data. **Show your work and provide evidence that supports your claim!!**

x	y
$\frac{1}{2}$	2
$\frac{1}{3}$	3
$\frac{1}{4}$	4

$\frac{3-2}{\frac{1}{3}-\frac{1}{2}} = \frac{1}{-\frac{1}{6}} = -6$

$\frac{4-3}{\frac{1}{4}-\frac{1}{3}} = \frac{1}{-\frac{1}{12}} = -12$

diff slopes

Linear (yes or no) No

6) Solve for x $6x^2 + x = 2$

$6x^2 + x - 2 = 0$

$(2x - 1)(3x + 2)$

$2x - 1 = 0 \quad 3x + 2 = 0$

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

BONUS QUESTION

Given that line (a) and (b) have the same x-intercept and the equation of line (a) is y=2x+2, determine a **possible** equation for line (b).
(Note: Graph **IS** drawn to scale, so your equation should be as accurate as possible.)

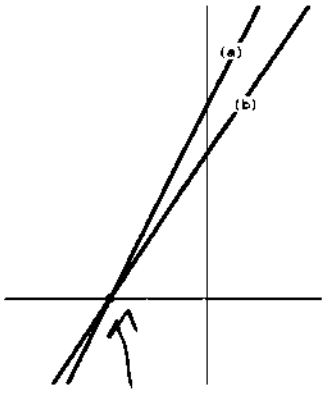
line (a) $y = 2x + 2$

$0 = 2x + 2$

$-2x = 2$

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

x-intercept



(-1, 0)

line (b)

must have same x-intercept as line (a)

$y = mx + b$

$0 = m(-1) + b$

$0 = \frac{3}{2}(-1) + b$

$b = \frac{3}{2}$

slope must be less than line (a)'s slope

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