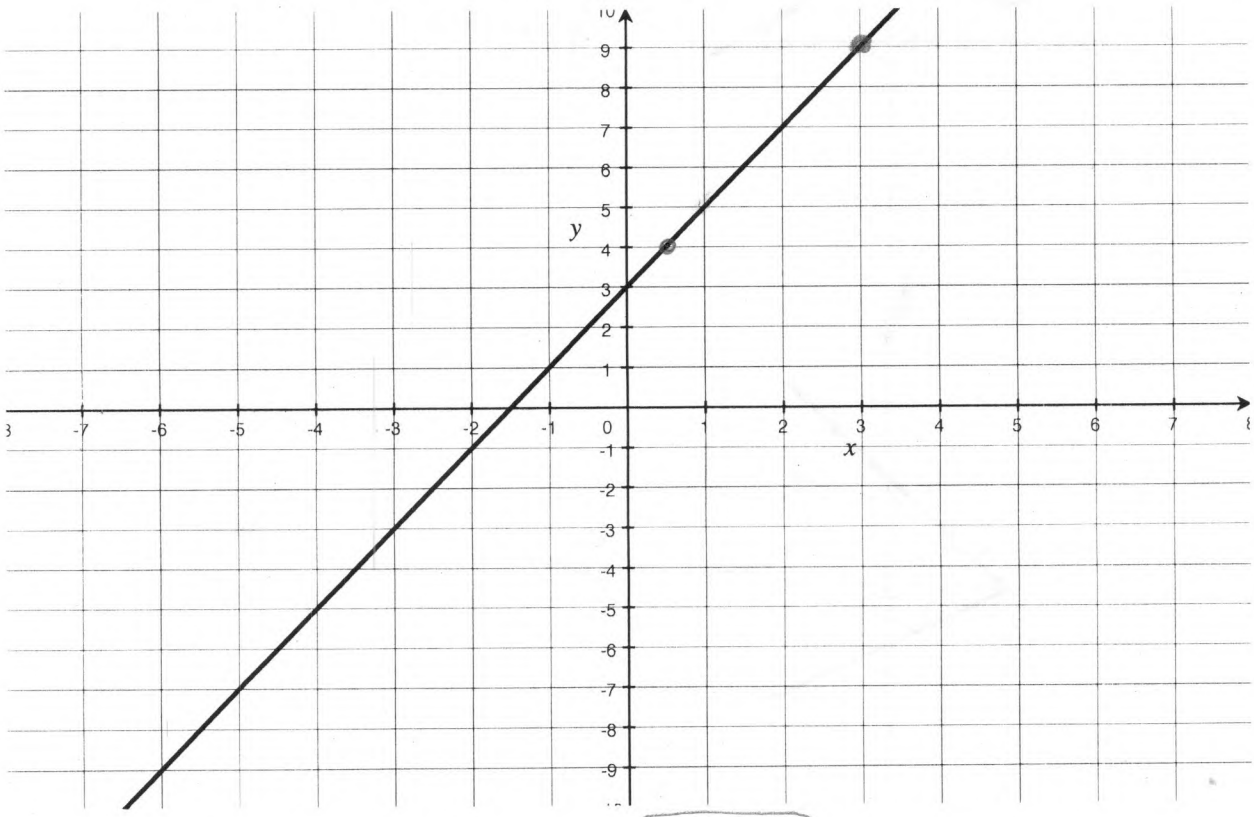
College Mathematics, Exam 3, Practice, Spring 2013 NAME: Key
Camp Lemonnier, Djibouti

Answer the following questions in the space provided. If you need more room, write "BACK," and use the back of the sheet. For full credit, show all of your work, demonstrating an understanding of material covered in our course. Reduce any fractions, and simplify any radicals. You have 50 minutes. Good luck!

1. The image shows the graph of $y = h(x)$. Answer the following questions.



a. (4 points) What is $h(3)$? $x = 3$, $\boxed{y = 9}$

b. (4 points) For what value(s) of x does $h(x) = 4$?

$y = 4$; $x = 0.5$

c. (2 points) What is the y-intercept? $b = 3$

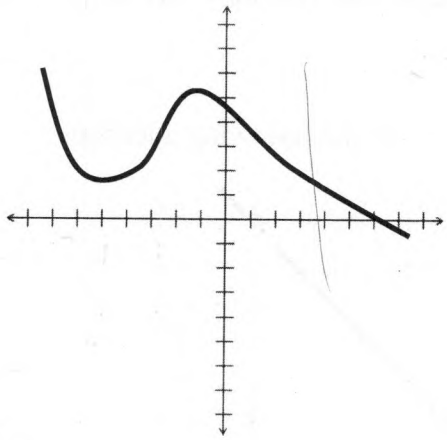
d. (2 points) What is the formula for the line in $y=mx+b$ format?

$m = \frac{2}{1} = 2$

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

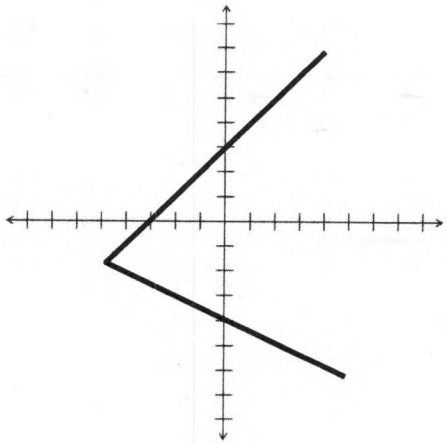
2. (4 points each). For each of the following images, determine if the graph is the graph of a function. Write either "FUNCTION" or "NOT A FUNCTION" and support your answer.

a.



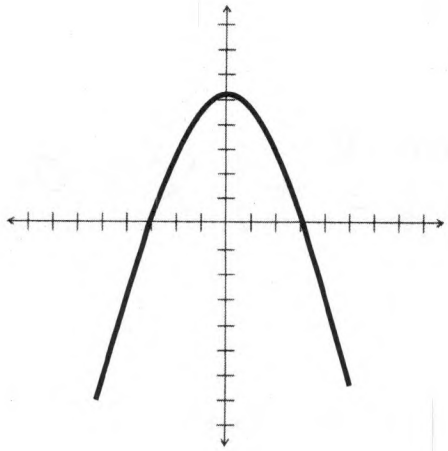
function

b.



not a function

c.



function

3. (10 points) Find the slope, x-intercept, and y-intercept for the linear function. You need not graph the function.

$3x - 5y = 15.$

solve for y:

$3x - 5y = 15$

$-3x \qquad -3x$

$\frac{-5y}{-5} = \frac{-3x + 15}{-5}$

$y = \frac{3}{5}x - 3$

$m = 3/5$ (slope)

$b = -3$ (y-int)

x-int: $y = 0$; $3x - 5(0) = 15$ $\frac{3x}{3} = \frac{15}{3}$ $x = 5$ (x-int)

4. (8 points) Find the slope of the line through the two points $(2, 3)$ and $(9, -1)$.

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 3}{9 - 2} = \frac{-4}{8} = -1/2$

5. (8 points) The function $f(x) = 8 + 38 \ln x$ models the percentage of new cellphones with cameras x years after 2002. Use the model to determine the percentage of new cellphones with cameras in 2007

5 years $\rightarrow x = 5$

$8 + 38 \ln(5) = 69\%$

6. (10 points) Solve the system of linear equations or indicate that there is no solution.

$$\begin{cases} 3x + y = 3 \\ 4x - 7y = 104 \end{cases}$$

Addition Method:

Mutiply first by 7:

$$\begin{array}{r} 21x + 7y = 21 \\ + \quad 4x - 7y = 104 \\ \hline 25x = 125 \end{array}$$

$\boxed{x = 5}$

$3(5) + y = 3$

$15 + y = 3$ $\boxed{y = -12}$

Substitution Method:

$y = 3 - 3x$

$4x - 7(3 - 3x) = 104$

$4x - 21 + 21x = 104$

$25x - 21 = 104$

$+21 \quad +21$

$25x = 125$

$\boxed{x = 5}$ $y = 3 - 3(5)$

$= 3 - 15 = -12$

$\boxed{y = -12}$

Check: $3(5) + -12 = 3$

$15 - 12 = 3$

$3 = 3$ ✓

7. (10 points) Solve the system of linear equations or indicate that there is no solution.

$$\begin{cases} 12x - 15y = 18 \\ 28x - 35y = 40 \end{cases}$$

Addition method:

mult eq 1 by -28 and eq 2 by 12:

$336x + 420x = 504$

$336x - 420x = 480$

$0 = -24$

X

no Solution

Substitution easiest:

$12x = 18 + 15y$

$x = \frac{18}{12} + \frac{15y}{12}$

$x = \frac{3}{2} + \frac{5}{4}y$

$28\left(\frac{3}{2} + \frac{5}{4}y\right) - 35y = 40$

$42 + 35y - 35y = 40$

$42 = 40$

No Solution!

$A=1 \quad B=-2 \quad C=-15$

8. Consider the quadratic function $f(x) = x^2 - 2x - 15$.

a. (2 points) Does the parabola determined by this equation open upward or downward?

Up (Ax^2, $A=1$ and is positive)

b. (3 points) Find the vertex.

$$\text{Vertex} = \frac{-b}{2a} = \frac{-\,-2}{2(1)} = \frac{2}{2} = 1 = x$$

when $x=1$, $y = 1^2 - 2(1) - 15$

$= 1 - 2 - 15 = -16$

$\boxed{(1,-16)}$

c. (3 points) Find the x-intercepts.

x-intercepts are when $y=0$:

$0 = x^2 - 2x - 15$

$(x+3)(x-5)$

$x=-3 \quad x=5$

x-intercepts: $(-3,0)$ and $(5,0)$

d. (2 points) Find the y-intercept

y-intercept is when $x=0$:

$y = 0^2 - 2(0) - 15$

$y = -15$

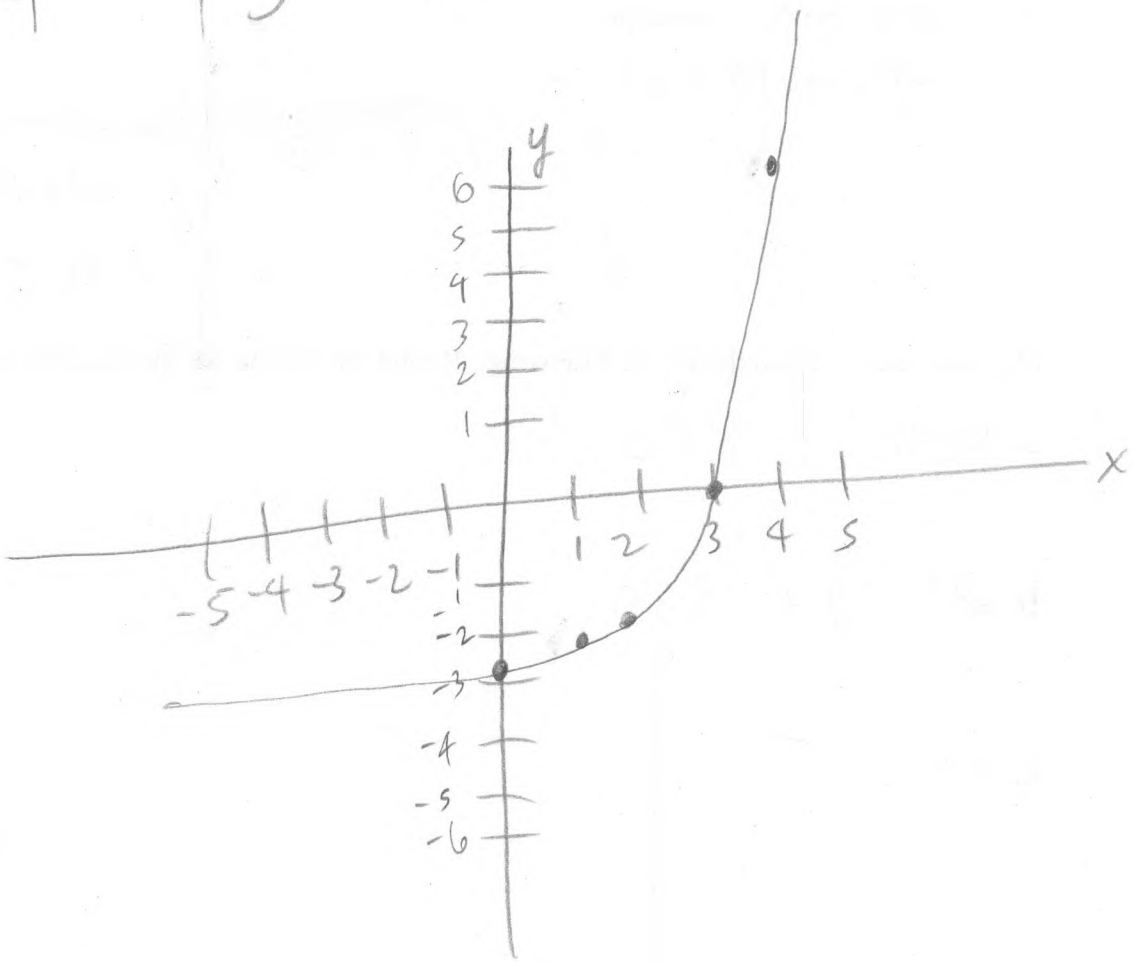
y-intercept $(0,-15)$

9. (4 points each) Approximate the following. Round answers to the thousandths place.

a. $\log 77$ 1.886

b. $e^{2.7}$ 14.880

c. $e^{\ln 7}$ 7

10. (8 points) Make a table of values. Use integers from 0 to 4, inclusive, for x values. Then graph the function. $g(x) = 3^{(x-2)} - 3$

x	$y = 3^{(x-2)} - 3$
0	$3^{(0-2)} - 3 = -2.889$
1	$3^{(1-2)} - 3 = -2.667$
2	$3^{(2-2)} - 3 = -2$
3	$3^{(3-2)} - 3 = 0$
4	$3^{(4-2)} - 3 = 6$