

QUIZ #1 @ 50 points

Write in a neat and organized fashion. Write your complete solutions on SEPARATE PAPER. You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given! Clearly label each exercise.

1. $f(x) = \begin{cases} 3x+5, & \text{if } x < 0 \\ 4x+1, & \text{if } x \geq 0 \end{cases}$

- a) Find $f(2)$
- b) Find $f(-2)$.

2. Solve the following equations:

a) $\frac{5}{6} = \frac{2u-3}{5}$

b) $\frac{x-3}{3} - \frac{x-2}{2} = \frac{4-x}{4}$

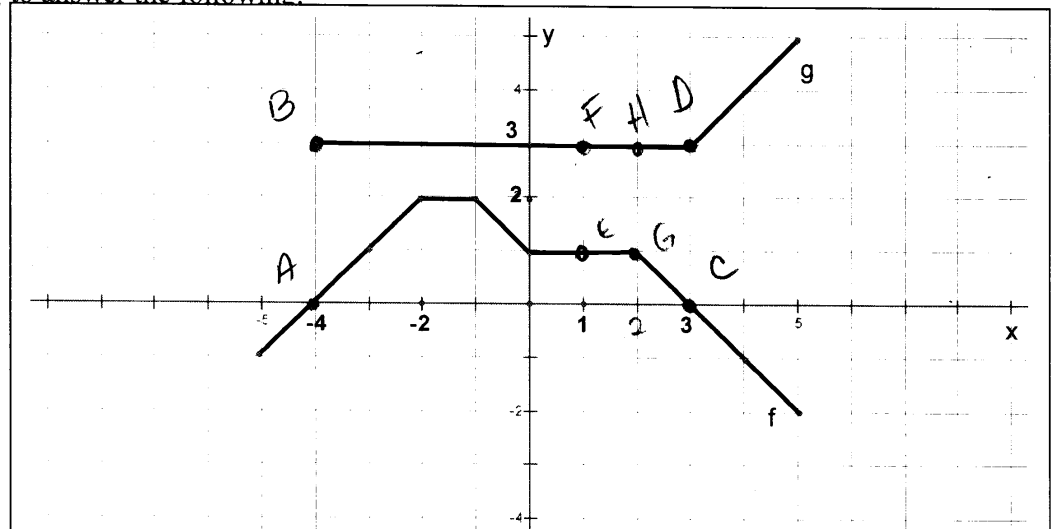
c) $A = 2lw + 2lh + 2wh$ solve for l

3. Let $f(x) = \frac{3x-1}{x-5}$. Answer the following questions:

- a) What is the domain of the function?
- b) Find $f(-1)$.
- c) Find $f(a+h)$.

4. Use the graphs of f and g to answer the following:

- a) $(f+g)(-4)$
- b) $(fg)(3)$
- c) $\left(\frac{f}{g}\right)(1)$
- d) $(f-g)(2)$



5. A company that sells radios has yearly fixed costs of \$600,000. It costs the company \$45 to produce each radio. Each radio will sell for \$65. The company's costs and revenue are modeled by the following functions:

$$C(x) = 600,000 + 45x \quad \text{- this function models the company's costs}$$

$$R(x) = 65x \quad \text{- this function models the company's revenue}$$

a) Find and interpret $(R - C)(20,000)$.

b) Find and interpret $(R - C)(40,000)$

6. Graph $7x + 2y = 14$ using the intercept method. Clearly label the axes and the intercepts.

7. Find an equation of the line that passes through the point $(-1, 2)$ and is perpendicular to $\frac{5}{18}x + \frac{1}{6}y = \frac{2}{3}$

8. The linear function $y = -0.4x + 38$ models the percentage of U.S. men, y , smoking cigarettes x years after 1980. Find the slope and describe what it means in this context.

| Quiz #1 |

$$(1) f(x) = \begin{cases} 3x+5, & x < 0 \\ 4x+1, & x \geq 0 \end{cases}$$

$$(a) f(2) = 4(2)+1 = \boxed{9}$$

$$f(-2) = 3(-2)+5 = \boxed{-1}$$

$$(2) (a) \frac{5}{6} = \frac{2u-3}{5}$$

cross-product property:

$$25 = 6(2u-3)$$

$$25 = 12u - 18$$

$$12u = 43$$

$$\boxed{u = \frac{43}{12}}$$

$$(b) \frac{4}{x-3} - \frac{6}{x-2} = \frac{3}{4-x}$$

$$\text{LCD} = 12$$

$$4(x-3) - 6(x-2) = 3(4-x)$$

$$4x - 12 - 6x + 12 = 12 - 3x$$

$$-2x = 12 - 3x$$

$$3x - 2x = 12$$

$$\boxed{x = 12}$$

$$(c) A = 2lw + 2lh + 2wh$$

for l

$$A = 2l(w+h) + 2wh$$

$$A - 2wh = 2l(w+h)$$

$$\boxed{l = \frac{A - 2wh}{2(w+h)}}$$

$$(3) f(x) = \frac{3x-1}{x-5}$$

$$(a) \text{Condition: } x-5 \neq 0$$

$$x \neq 5$$

$$\text{Domain: } \boxed{x \in \mathbb{R} \setminus \{5\}}$$

$$(b) f(-1) = \frac{3(-1)-1}{-1-5}$$

$$f(-1) = \frac{-4}{-6} = \frac{2}{3}$$

$$\boxed{f(-1) = \frac{2}{3}}$$

$$(c) f(a+h) = \frac{3(a+h)-1}{a+h-5}$$

$$\boxed{f(a+h) = \frac{3a+3h-1}{a+h-5}}$$

$$(4) (f+g)(-4) = f(-4) + g(-4)$$

$$= 0 + 3 \quad \begin{matrix} \text{(point} \\ \text{A, B)} \\ \text{on graph} \end{matrix}$$

$$= 3$$

$$b) (fg)(3) = f(3)g(3)$$

$$= 0(3) = 0 \quad \begin{matrix} \text{(points} \\ \text{C, D)} \end{matrix}$$

$$c) \left(\frac{f}{g}\right)(1) = \frac{f(1)}{g(1)} = \frac{1}{3}$$

(points E, F)

$$d) (f-g)(2) = f(2) - g(2)$$

$$= 1 - 3 = -2 \quad \begin{matrix} \text{(G} \\ \text{H)} \end{matrix}$$

$$(5) C(x) = 600,000 + 45x$$

$$R(x) = 65x$$

$$(R-C)(x) = R(x) - C(x)$$

$$= 65x - (600,000 + 45x)$$

$$= 65x - 600,000 - 45x$$

$$= 20x - 600,000$$

$$a) (R-C)(20,000) =$$

$$= 20(20,000) - 600,000$$

$$= -200,000$$

If the company produces and sells 20,000 radios, it will have a loss of 200,000 dollars.

$$b) (R-C)(40,000) =$$

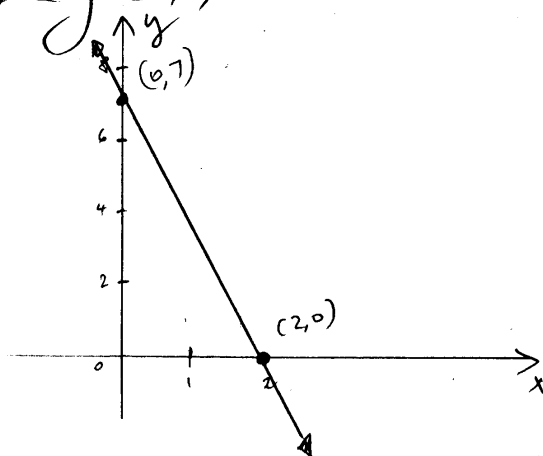
$$= 20(40,000) - 600,000$$

$$= 200,000$$

If the company produces and sells 40,000 radios, it will have a profit of 200,000 dollars.

$$(6) 7x + 2y = 14$$

x	y
0	7
2	0



(7) line passes through $(-1, 2)$ and is \perp to $\frac{5}{18}x + \frac{1}{6}y = \frac{2}{3}$

Need the slope.

Find, first, the slope of the given line:

$$\frac{5}{18}x + \frac{1}{6}y = \frac{2}{3}$$

$$\frac{1}{6}y = -\frac{5}{18}x + \frac{2}{3} \quad | \cdot 6$$

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

$$m = -\frac{5}{3}$$

$$\text{Then, } m_{\perp} = \frac{3}{5}$$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = \frac{3}{5}(x + 1)$$

(8) $m = -0.4$ % men per year
It shows the rate at which the percentage of men smoking decreases per year.