

Name Solution (1 POINT)

Total Possible Points = 200 Points

Note: Show all work. Unless a problem is marked with an asterisk (*), use a calculator only to check.

When asked for the equation of a line, the equation should be given in slope-intercept form.

1. If $S = 2\pi rh + 2\pi r^2$

Evaluate S if $r = 5$ cm, and $h = 2$ cm

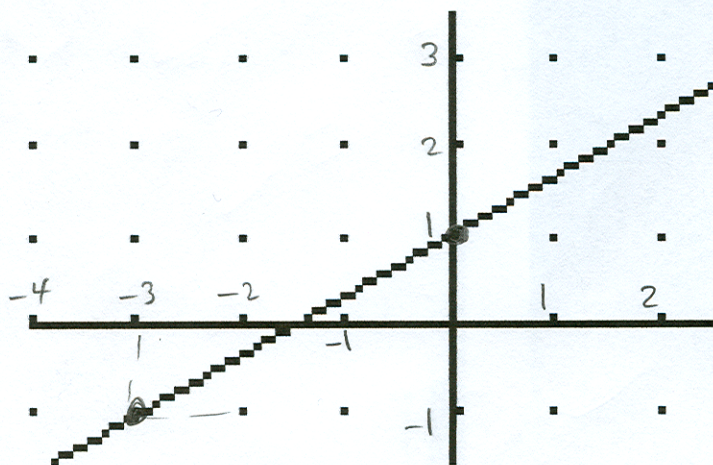
(5 points)

$$S = 2\pi(5)(2) + 2\pi(5)^2 =$$

$$S = 20\pi + 50\pi = 70\pi \text{ cm}^2$$

2. Find the equation of the line shown below on the graph. (Must Show Procedure)

(10 points)



$(-3, -1)$
 $(0, 1)$

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

$b = 1$

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

*3 Simplify: $\left(\frac{x^{-3}y^7z^{-2}}{x^{-5}yz^4}\right)^3$

(Assume no variables are equal to zero.)

(8 points)

$$(x^2y^6z^{-6})^3 = x^6y^{18}z^{-18}$$

$$= \frac{x^6y^{18}}{z^{18}}$$

(Must Show Procedure)

*4. Evaluate with your calculator and answer the following

(10 points)

a. $\frac{-8 \pm \sqrt{8^2 - 4(3)(2)}}{2(3)}$ $\rightarrow -0.279$
 $\rightarrow -2.39$

b. $5332.01(1 + \frac{0.035}{12})^{12(8)}$ Assume this is a calculation involving money.

$\$ 7052.07$

5. Write an equation of the line that passes through (1, 4) and is parallel to the line passing through the points (3, -6) and (-1, 2).

(10 points)

$m = \frac{2 - -6}{-1 - 3} = \frac{8}{-4} = -2$

$4 = -2(1) + b$

$4 = -2 + b$

$6 = b$

$y = -2x + 6$

*6. If $y = -2x^3 + 3x + 10$ use your calculator

(10 points)

a) Find the x-intercept

$(2, 0)$

b) Find the y-intercept

$(0, 10)$

7. For each representation of a relation below, write "N" if it is not a function and "F" if it is a function. (10 points)

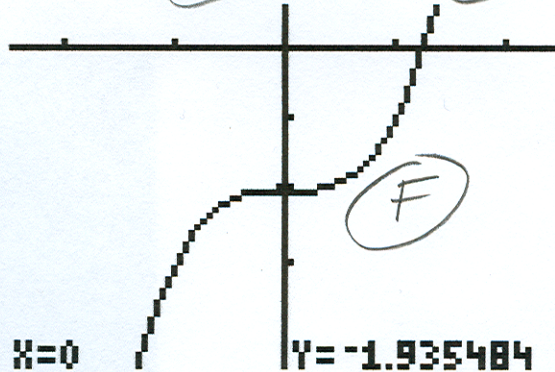
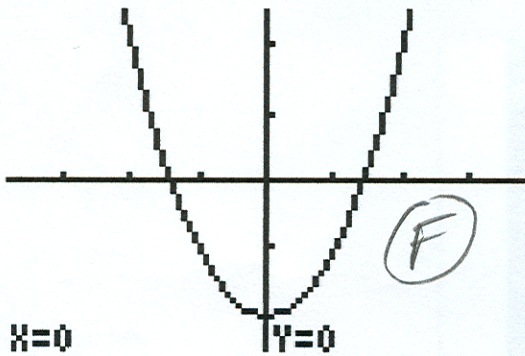
Relation a		Relation b		Relation c		Relation d	
x	y	x	y	x	y	x	y
1	1	1	4	2	0	1	0
2	2	2	3	2	2	2	2
3	2	3	2	-6	-8	3	2
4	5	2	1	4	9	4	3

(F)

(N)

(N)

(F)



8. Let $g(x) = -2x^2 + 7x + 7$ and $f(x) = 4x - 17$ (9 points)

a. Find $f(4) = 4(4) - 17 = -1$

b. Find $g(-3) = -2(-3)^2 + 7(-3) + 7 = -32$

c. Find x when $f(x) = 6$

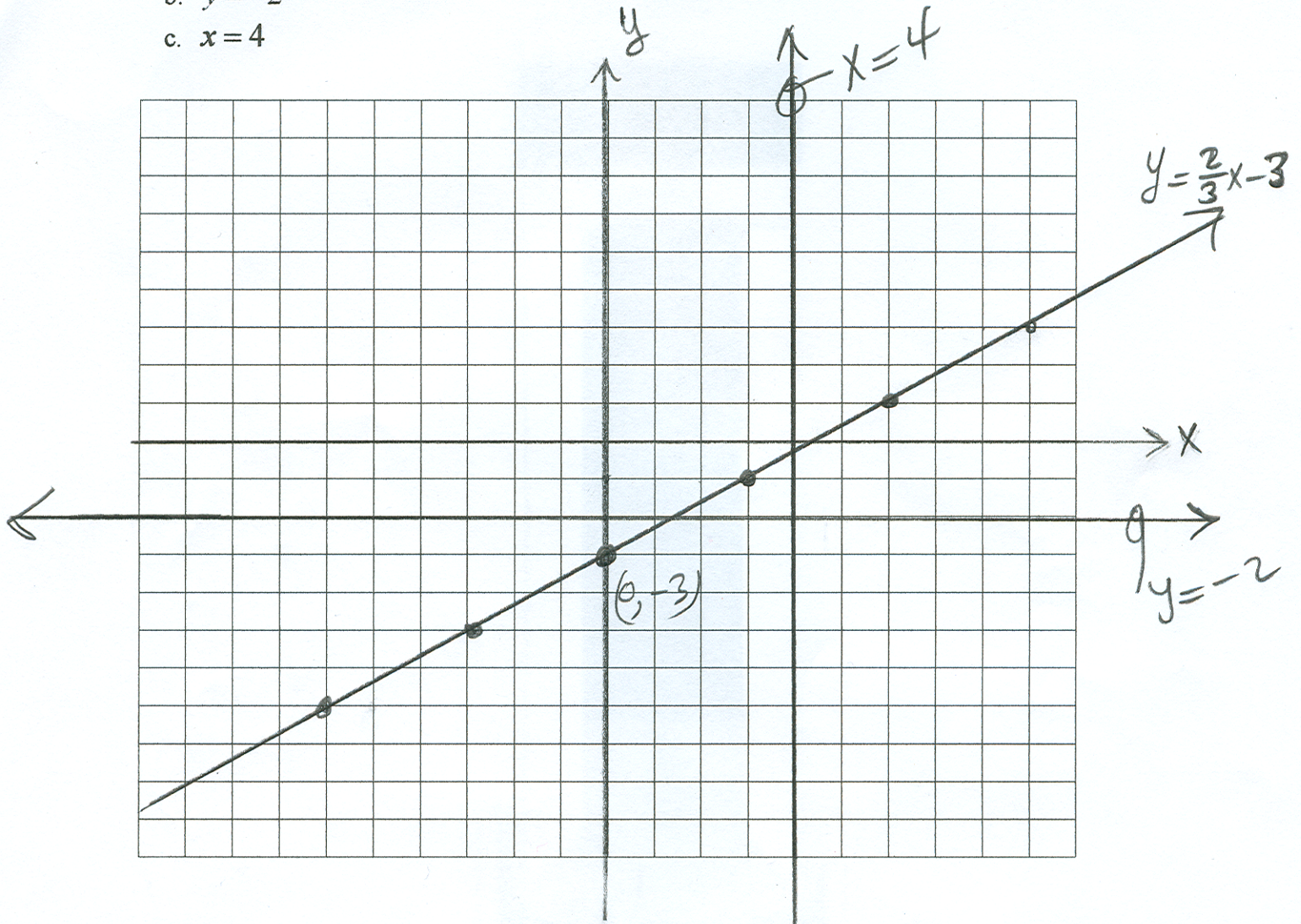
$$\begin{array}{r} 6 = 4x - 17 \\ +17 \quad +17 \\ \hline 23 = 4x \\ x = \frac{23}{4} \end{array}$$

9. On the graph below, graph the lines given in the xy -plane. Draw an appropriate axis and label the graph with an appropriate scale. Label each graph with the appropriate letter, a, b, or c. (10 points)

a. $y = \frac{2}{3}x - 3$ \longrightarrow

b. $y = -2$

c. $x = 4$



10. Find the equation of a line passing through $(-9, -3)$ and $(4, 10)$ (10 points)
(Must Show Procedure)

$$m = \frac{10 - (-3)}{4 - (-9)} = \frac{13}{13} = 1$$

$$10 = 1(4) + b \Rightarrow \boxed{b = 6}$$

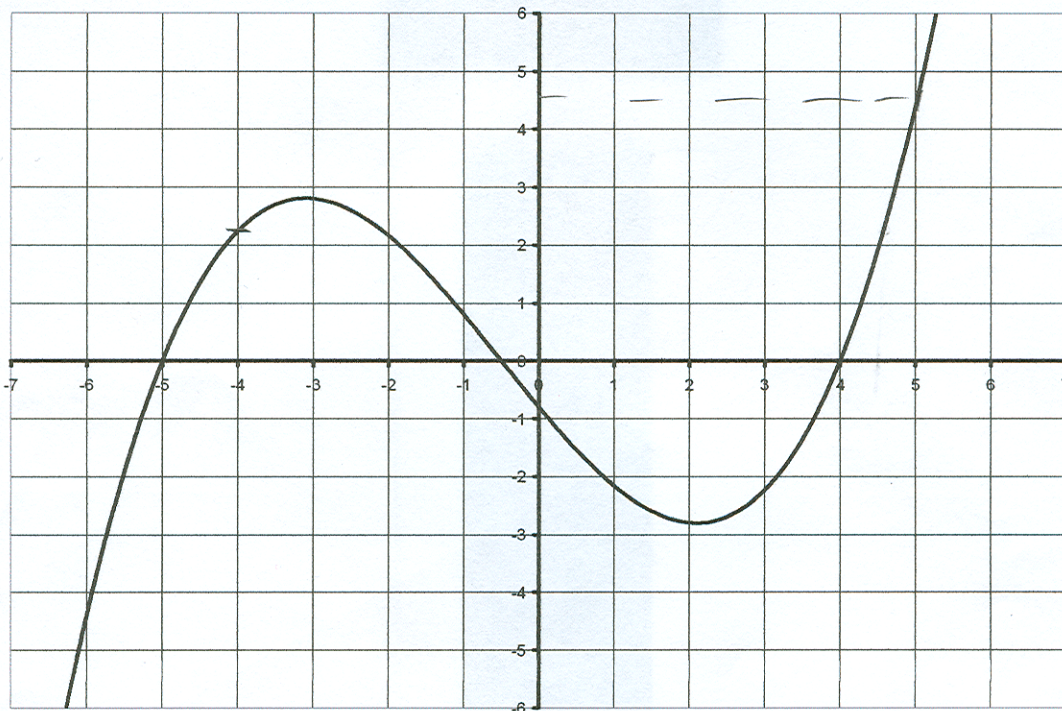
$$\boxed{y = 1x + 6}$$

11. The graph below is a graph of $f(x)$.

(10 points)

a. Find the approximate value of $f(-4) \approx 2.3$ or 2.4

b. Find the approximate values of x so that $f(x) \approx 4.5 \Rightarrow x = 5$



12. Find the equation of a line perpendicular to $y = -4x + 7$

and passing through $(-4, -2)$ (Must Show Procedure)

(10 points)

$$m_{\perp} = \frac{1}{4}$$

$$y = mx + b$$

$$-2 = \frac{1}{4}(-4) + b$$

$$y = \frac{1}{4}x - 1$$

$$-2 = -1 + b \Rightarrow b = -1$$

13. Find the equation of a line parallel to $-2x - 5y = 10$ and passing through $(4, -2)$

(Must Show Procedure)

(10 points)

$$5y = -2x - 10$$

$$y = -\frac{2}{5}x - 2$$

$$-2 = -\frac{2}{5}(4) + b$$

$$-2 + \frac{8}{5} = b$$

$$-\frac{2}{5} = b$$

$$y = -\frac{2}{5}x - \frac{2}{5}$$

14. Simplify: (Assume no variables are equal to zero.) (Must Show Procedure) (9 points)

a. $\frac{24x^{-5}y^{-8}z^2}{3xy^{-5}}$

$$= 8x^{-6}y^{-3}z^2$$

$$= \frac{8z^2}{x^6y^3}$$

b. $(3yz^{-2})^{-3} = 3^{-3}y^{-3}z^6$

$$= \frac{z^6}{3^3y^3} = \frac{z^6}{27y^3}$$

c. $\left(\frac{15x^4y^{-7}}{10x^{-2}y^{-4}}\right)^{-3} = \left(\frac{3x^6y^{-3}}{2}\right)^{-3}$

$$= \frac{8x^{-18}y^9}{27} = \frac{8y^9}{27x^{18}}$$

15. The monthly fees for a condo association can be modeled by the following formula:

$f(x) = 42x + 100$ where x is the number of years since the condo association was built in 1990. (Must Show Procedure) (12 points)

*a. What were the monthly fees in 2002? $x = 2002 - 1990 = 12$

$$f(12) = 42(12) + 100 = \$604.00$$

b. Determine the year when the monthly fees were \$478?

$$478 = 42x + 100 \Rightarrow x = 9$$

$$\begin{array}{r} 478 = 42x + 100 \\ -100 \\ \hline 378 = 42x \end{array}$$

Year 1999

c. Interpret the slope as a rate of change.

Every year the condo association fee increases by \$42.

(12 points)

16. Solve the following algebraically

$$\left(\frac{3-5x}{5} = \frac{1}{2}x+7\right)^{10} \text{ Multiply by 10}$$

(Must Show Procedure)

$$\begin{array}{r} 6 - 10x = 5x + 70 \\ -70 + 10x \quad +10x \quad -70 \end{array}$$

$$-64 = 15x \Rightarrow x = \frac{-64}{15}$$

(12 points)

17. Solve algebraically. Show all steps

$$-1 \text{ a) } \begin{cases} x - y = -4 \\ 3x - y = 2 \end{cases}$$

$$(3, 7)$$

$$-x + y = 4$$

$$3x - y = 2$$

$$2x = 6$$

$$x = 3$$

$$x - y = -4$$

$$3 - y = -4$$

$$3 + 4 = y$$

$$y = 7$$

(16 points)

(Must Show Procedure)

18. Solve the following inequalities. Write your answer in interval notation.

$$\text{a) } 6\left(-\frac{5}{2}x + \frac{1}{3} \leq 2\right) 6$$

$$-\frac{30x}{2} + \frac{6}{3} \leq 12$$

$$-15x + 2 \leq 12$$

$$-15x \leq 10$$

$$x \geq \frac{10}{-15}$$

$$\left[-\frac{2}{3}, \infty\right)$$

$$x \geq -\frac{2}{3}$$

$$\text{b) } 3.1(3 - 2x) \leq -2.9x$$

$$9.3 - 6.2x \leq -2.9x$$

$$+ 6.2x \quad + 6.2x$$

$$9.3 \leq 3.3x$$

$$\frac{31}{11} \leq x$$

$$\left[\frac{31}{11}, \infty\right)$$

(16 points)

(Must Show Procedure)

19. In 1990 a bus company had 30 busses; in 1995 the company had 345 busses. Let $f(t)$ represents the number of busses t years after 1990. Assume $f(t)$ is a linear function.

- a. Find the slope of $f(t)$, and state what the slope represents in terms of the story?

$(0, 30)$ $m = \frac{345 - 30}{5 - 0} = \frac{315}{5} = 63$

$(5, 345)$ Every 5 years the company adds 63 Busses.

- b. Use your slope and one ordered pair to write the equation for $f(t)$.

$$f(t) = 63t + 30$$

- c. Predict the number of busses in the year 2007.

$$2007 - 1990 = 17$$

$$f(17) = 63(17) + 30 = \boxed{1101 \text{ Busses}}$$

- d. Determine the year when number of busses will be 1290.

$$1290 = 63t + 30$$

$$20 = t \Rightarrow 1990 + 20 = \boxed{2010} \text{ Year}$$