Math 51   Ch. 7 Practice Test   Name: _____
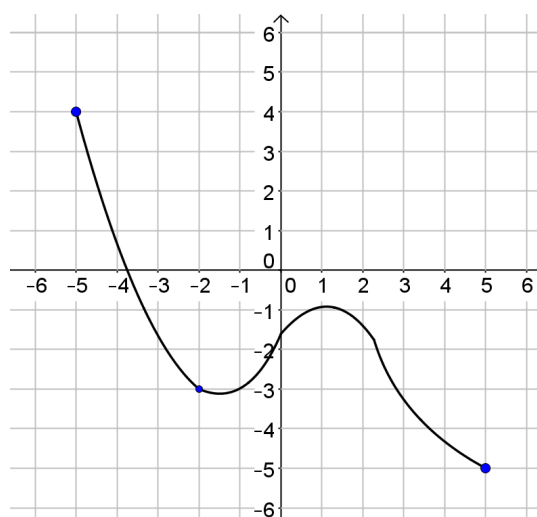
Double check your solutions! Use Algebraic Notation AND
Show All of Your Work. No Assistance or Collaboration! You
may <u>not</u> leave to use the restroom.

Use the graph of f below to answer questions 1 − 3.

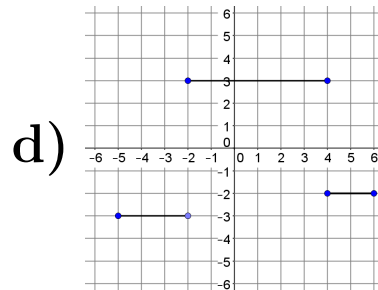1. (3 points) Determine the domain of f.   1. _____
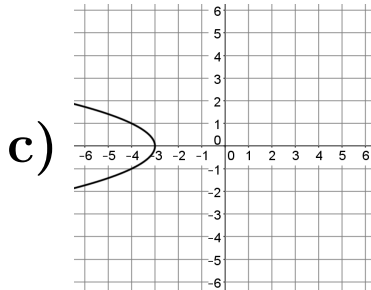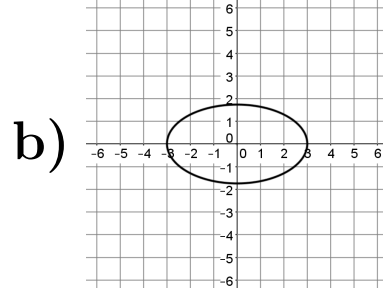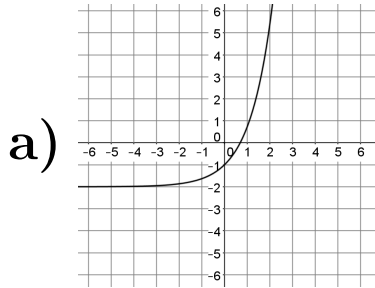
   Use either interval notation or set-builder notation.

2. (3 points) Determine the range of f.   2. _____

   Use either interval notation or set-builder notation.

3. (3 points) What value is $f(-2)$ equal to?   3. _____

4. (3 points) Which of the following is a graph of a function? _____

a)

b)

c)

d)

For questions 5 and 6, use the function given by:

$$f(x) = \begin{cases} -4 - x^2, & \text{for all } x \leq 0 \\ 1, & \text{for all } 0 < x \leq 4 \\ 4 + x, & \text{for all } x > 4 \end{cases}$$

5. (2 points) What value is $f(-2)$ equal to?

5. _____

6. (2 points) What value is $f(1)$ equal to?

6. _____

7. Jilly paid $99 for her new phone at Horizon Wireless. Her monthly service fee is $75 because she is on facebook and twitter alot and she thinks she needs the extra data minutes.

(a) (2 points) What linear function models the cost $C(t)$ for t months of service?

(a) ‾‾‾‾‾‾‾‾

(b) (2 points) Use your function to determine the amount of time it will take for total cost to reach $924.

(b) ‾‾‾‾‾‾‾‾

8. When Jilly rents an economy car for one day and drives it for 100 miles, the cost is $50. If she drives it for 250 miles, the cost is $95. Assume a linear relationship exists between the cost $C(m)$, to rent the car for one day and the number of miles m, that Jilly drives the rental car.

(a) (3 points) What linear function models the cost $C(m)$ for a one day rental in which Jilly drives the car for m miles?

(a) _____

(b) (2 points) How much will it cost to drive the car 350 miles?

(b) _____

9. (3 points) The height h, in feet, of a water balloon t seconds after having been launched from a 80 foot high rooftop, is given by

$$h(t) = {}^-16t^2 + 64t + 80$$

What is the domain of the function?   9. _____

10. (3 points) The value V of Teresa's tablet pc t years after purchase is given by

$$V(t) = 600 - 75t$$

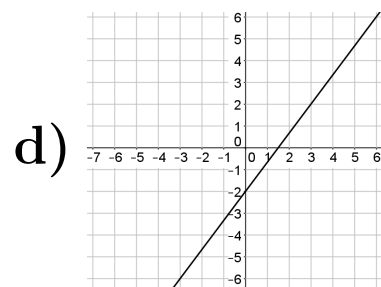What is the domain of this function?   10. _____
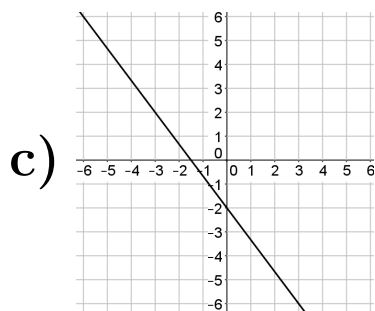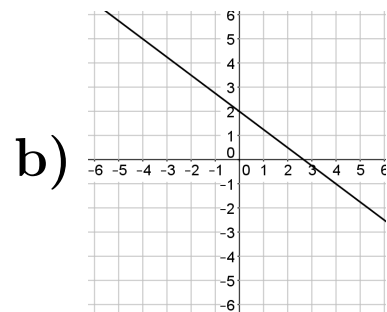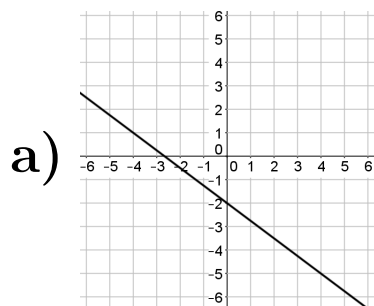
11. (3 points) Identify the type of function: $g(x) = \dfrac{2x - 1}{x - 1}$

    a)   quadratic   b) rational function

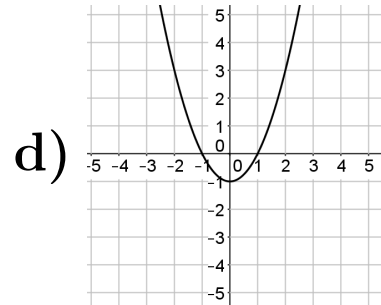   c)   linear function   d) absolute value function
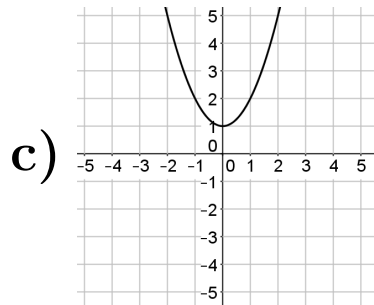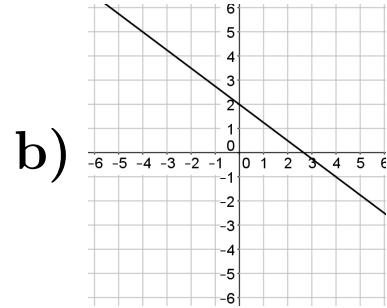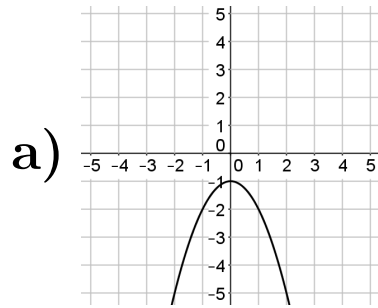
11. _____

12. (3 points)   Which graph represents $f(x) = -\dfrac{3}{4}x - 2$?

12. _____

a)

b)

c)

d)

13. (3 points)   Which graph represents $f(x) = x^2 + 1$?

13. _____

a)

b)

c)

d)

14. Assume $g(x) = -\dfrac{1}{x-3}$ and $h(x) = x^2 - 25$

   (a) (3 points) Find $(g+h)(4)$ (a) _____

   (b) (3 points) Find the domain of h.   (b) _____

   (c) (3 points) Find the domain of g/h (c) _____

   (d) (1 point) Find $g(2)$

14. Assume $g(x) = -\dfrac{1}{x-3}$ and $h(x) = x^2 - 25$

(a) (3 points) Find $(g+h)(4)$

(a) $\boxed{-10}$

$= g(4) + h(4)$

$= \left(-\dfrac{1}{4-3}\right) + \left(4^2 - 25\right) = -\dfrac{1}{1} + 16 - 25 = -1 + 16 - 25$

(b) (3 points) Find the domain of h.

(b) $\boxed{\mathbb{R}}$

h is a polynomial

polynomials have domain all real numbers

Key

(c) (3 points) Find the domain of g/h

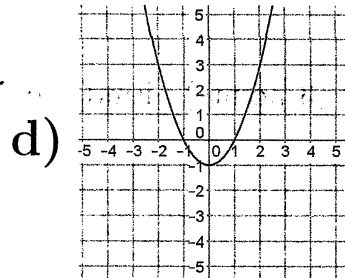(c) $\boxed{\{x \mid x \neq 3, \pm 5\}}$

(d) (1 point) Find $g(2)$

$g(2) = -\dfrac{1}{2-3}$

$= \dfrac{-1}{2-3}$

$= \dfrac{-1}{-1} = \boxed{1}$

$\mathrm{dom}(g) = \{x \mid x \neq 3\}$

$\mathrm{dom}(h) = \mathbb{R}$

$h = 0$ when $x^2 - 25 = 0$, or

$(x-5)(x+5) = 0$, or

$(x-5) = 0$ or $x+5 = 0$

$x = 5$ or $x = -5$

13. (3 points)   Which graph represents $f(x) = x^2 + 1$?

13. | C |

a)

b)

c)

d)
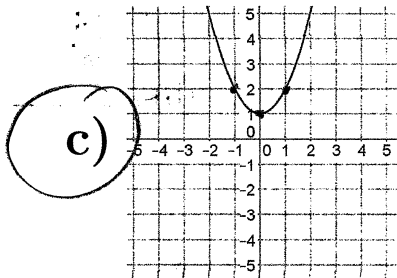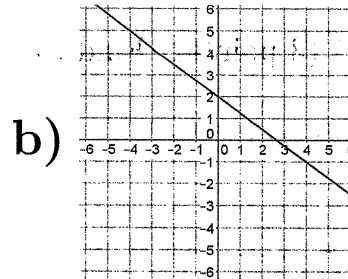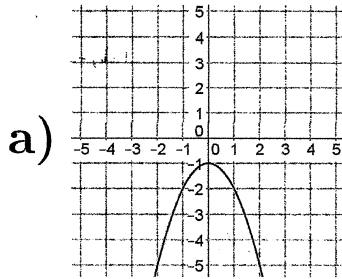
$$ f(x) = x^2 + 1 $$ Key

x	y	(x, y)
-1	2	(-1, 2)
0	1	(0, 1)
1	2	(1, 2)

11. (3 points) Identify the type of function: $g(x) = \dfrac{2x - 1}{x - 1}$

    a)   quadratic   b) rational function

    c)   linear function   d) absolute value function

11. **b**

12. (3 points) Which graph represents $f(x) = -\dfrac{3}{4}x - 2$?
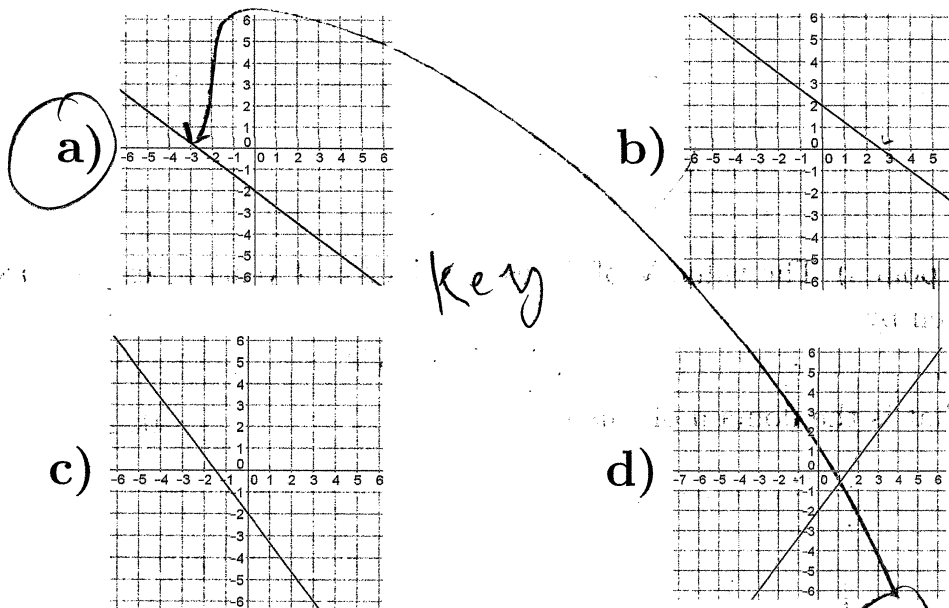
12. **a**

a)   b)

Key

c)   d)

$x = -8/3$ or $-2\,^2/_3$ when $y = 0$.

X-int

$y = -\dfrac{3}{4}x - 2$

$0 = -\dfrac{3}{4}x - 2$

$0 + 2 = -\dfrac{3}{4}x$

$2 = -\dfrac{3}{4}x$

$-\dfrac{3}{4}x = 2$

$-\dfrac{4}{3} \cdot -\dfrac{3}{4}x = -\dfrac{4}{3} \cdot \dfrac{2}{1}$
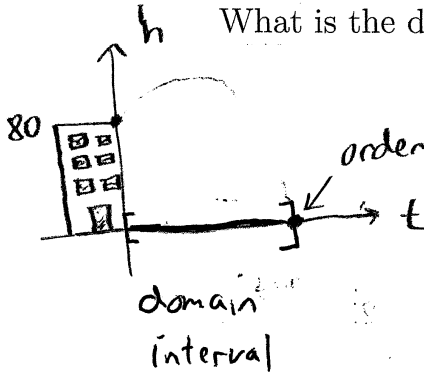
$x = -8/3$

y-int: $(0, -2)$

9. (3 points) The height h, in feet, of a water balloon t seconds after having been launched from a 80 foot high rooftop, is given by

$$h(t) = -16t^2 + 64t + 80$$

$\{t \mid 0 \le t \le 5\}$

$[0,5]$

9.

What is the domain of the function?

ordered pair $(t,h) = (?, 0\text{ ft})$

$h(t) = -16t^2 + 64t + 80$

$0 = -16t^2 + 64t + 80$

$0 = -16(t^2 - 4t - 5)$

$0 = -16(t+1)(t-5)$

Zero $\Longrightarrow$ product theorem

$-16(t+1)(t-5) = 0$

$-16 \ne 0$ or $t+1 = 0$ or $t - 5 = 0$

$-1\ -1$ $\qquad +5\ +5$

$t = -1$ or $t = 5$

10. (3 points) The value V of Teresa's tablet pc t years after purchase is given by

$$V(t) = 600 - 75t$$ but t cannot be negative

What is the domain of this function?

10. _____

We know the domain is a set t values. We also know t cannot be negative AND value cannot be negative, or equivalently, that $t \ge 0$ AND $V \ge 0$. The 2nd inequality is equivalent to

$600 - 75t \ge 0$ (add 75t to both sides now)

$600 \ge 75t$

$75t \le 600$

Key

$\dfrac{75t}{75} \le \dfrac{600}{75}$

$t \le 8$. So, t must be greater than or equal to zero And less than or equal 8. So, $\text{dom}(V) = \{t \mid 0 \le t \le 8\}$ or $= [0,8]$

8. When Jilly rents an economy car for one day and drives it for 100 miles, the cost is $50. If she drives it for 250 miles, the cost is $95. Assume a linear relationship exists between the cost $C(m)$, to rent the car for one day and the number of miles m, that Jilly drives the rental car.

(a) (3 points) What linear function models the cost $C(m)$ for a one day rental in which Jilly drives the car for m miles?
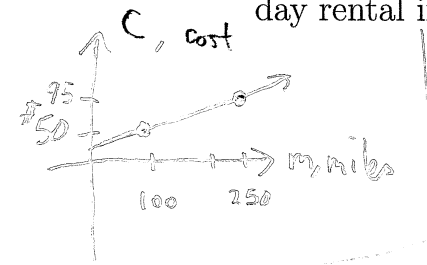
$$(a) \quad \boxed{C(m) = \frac{3}{10}m + 20}$$

Given Instead of having ordered pairs (x,y) we have ordered pairs (m,c). We are given the 2 ordered pairs $(100 \text{ miles}, \$50)$ and $(m,c) = (250 \text{ miles}, \$95)$. We are asked to find the eqn of the line that goes through the 2 given points.

① Slope $= \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{95 - 50}{250 - 100} = \dfrac{45}{150} = \dfrac{45 \div 15}{150 \div 15} = \dfrac{3}{10}$ Key

② use $y - y_1 = m(x - x_1)$ and $m = \frac{3}{10}$ and $(x_1, y_1) = (100 \text{ miles}, \$50)$

$y - 50 = \frac{3}{10}(x - 100)$

(solve for y now)

$y - 50 = \frac{3}{10}x - \frac{300}{10}$

$y - 50 = \frac{3}{10}x - 30$

add 50

$y = \frac{3}{10}x - 30 + 50$

$y = \frac{3}{10}x + 20$ now, replace x with m (miles)

$C = \frac{3}{10}m + 20$ and replace y with C (cost)

(b) (2 points) How much will it cost to drive the car 350 miles?

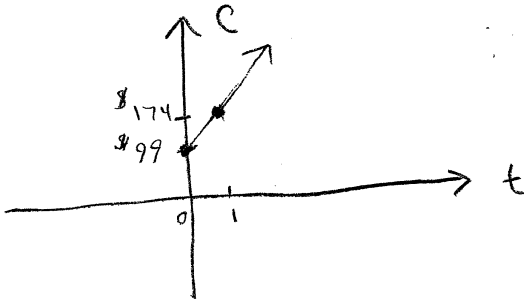$$(b) \quad \boxed{\$125}$$

$$C(350) = \frac{3}{10} \cdot (\overset{35}{350}) + 20$$

$$= 3 \cdot 35 + 20$$

$$= 105 + 20 = \$125$$

7. Jilly paid $99 for her new phone at Horizon Wireless. Her monthly service fee is $75 because she is on facebook and twitter alot and she thinks she needs the extra data minutes.

(a) (2 points) What linear function models the cost $C(t)$ for t months of service?

(a) _____

$$\text{total Cost} = \left(\begin{array}{c} \text{Price of} \\ \text{the} \\ \text{phone} \end{array}\right) + \left(\begin{array}{c} \text{cost of} \\ t \text{ months} \\ \text{of service} \end{array}\right)$$

$$C(t) = {}^\$99 + {}^\$75t$$

Key

(b) (2 points) Use your function to determine the amount of time it will take for total cost to reach $924.

(b) $\boxed{11 \text{ months}}$

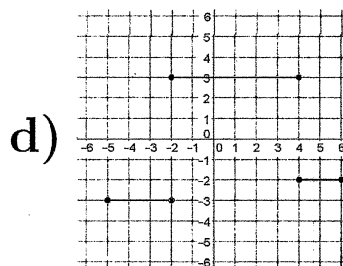$$924 = 99 + 75t$$
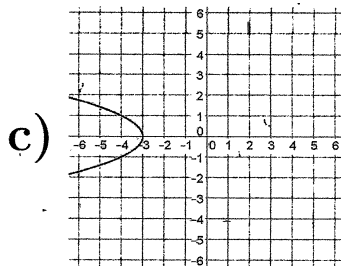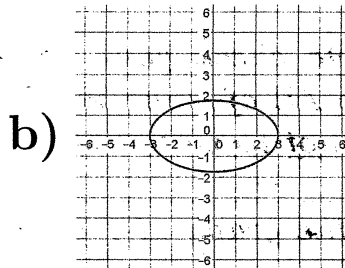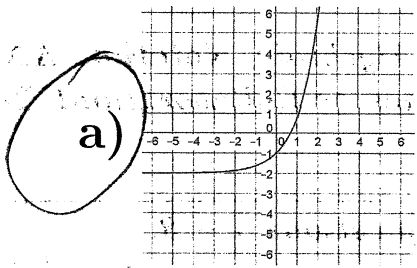
$$924 - 99 = 75t$$

$$825 = 75t$$

$$75t = 825$$

$$\frac{75t}{75} = \frac{825}{75}$$

$$t = 11$$

After 11 months of service, Jilly has given the phone company $924.

4. (3 points) Which of the following is a graph of a function? $\boxed{a}$

a)

b)

Key

c)

d)

For questions 5 and 6, use the function given by:

$$f(x) = \begin{cases} -4 - x^2, & \text{for all } x \leq 0 \\ 1, & \text{for all } 0 < x \leq 4 \\ 4 + x, & \text{for all } x > 4 \end{cases}$$

5. (2 points) What value is $f(-2)$ equal to?   5. $\boxed{-8}$
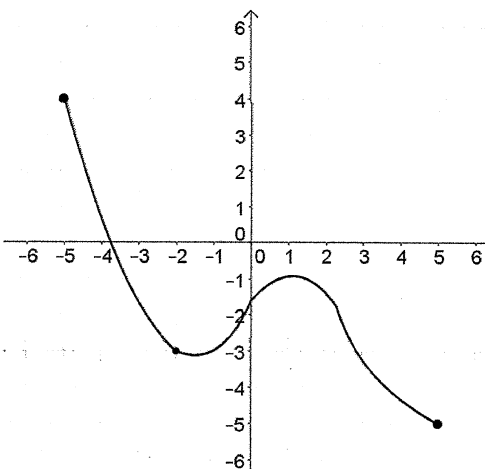
$$f(-2) = -4 - (-2)^2 = -4 - (-2)(-2) = -4 - 4 = -8$$

6. (2 points) What value is $f(1)$ equal to?   6. $\boxed{1}$

$$f(1) = 1$$

Math 51   Ch. 7 Test   Name: _Key_____

Double check your solutions! Use Algebraic Notation AND Show All of Your Work. No Assistance or Collaboration! You may __not__ leave to use the restroom.

Use the graph of f below to answer questions 1 – 3.

1. (3 points) Determine the domain of f.

   Use either interval notation or set-builder notation.

   1. $[-5, 5]$ or $\{x \mid -5 \leq x \leq 5\}$

2. (3 points) Determine the range of f.

   Use either interval notation or set-builder notation.

   2. $[-5, 4]$ or $\{y \mid -5 \leq y \leq 4\}$

3. (3 points) What value is $f(-2)$ equal to?

   3. -3