Unit 5 Practice Test: Functions
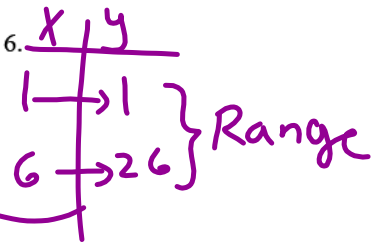
1) Let f be a function such that $f(x) = 5x - 4$ is defined on the domain $1 \le x \le 6$.
   a. Identify the range for this function

    1. $1 \le f(x) \le 6$ 3. $-\infty \le f(x) \le 26$

    2. $26 \le f(x) \le 1$ 4. $1 \le f(x) \le 26$ ⟵ (circled)

(handwritten)
x	y
1 →	1
6 →	26

}Range

   b. Which statement is always true about this function?

    1. $f(x) < 0$ ~~(crossed out)~~   3. if $x < 1$, $f(x) < 0$ (circled)

    2. $f(x) > 0$ ~~(crossed out)~~   4. if $x > 1$, $f(x) < 0$

2) Answer the following questions for the table below

    a. $f(0) =$ __10__   b. x when f(x) is = 6: __4__

    c. Rate of change from x=2 to x=6: _____

$$\text{Slope } m = \frac{\Delta y}{\Delta x} = \frac{9-6}{2-4} = \frac{3}{-2}$$

    e. If included in the table, which ordered pair, (-2, 12) or (2, -12), would result in a relation that is no longer a function? Explain your answer.

$(2, -12)$ will result to have no function

x	$h(x)$
0 →	10
2	9
4 ⟵	6
6	3
-2	12
2	-12

3) Evaluate each expression below given that $f(x) = 3x + 2$ and $g(x) = x^2$
   Use two different ways to show the answer:

    a. $f(-3)$ b. $g(4) =$

$$f(-3) = 3(-3) + 2$$
$$= -9 + 2$$
$$= -7$$

$$g(4) = (4)^2 = 16$$

4) Samantha is babysitting during weekends. She charges 3 dollars initial fees and 5 dollars for every hour she babysits. Using the function E(h) = 5h + 3 will determine how much M-Money Samantha makes for working h-hours. (6 pts)
   a. Calculate and Interpret E(10)

$$E(10) = 5(10) + 3 = 53$$ { meaning for 10 hours, ~~you~~ she earns $53

   b. Samantha is babysitting to buy an I-phone case that she likes, the case is $118. Determine how many hours Samantha would need to work in order to buy the case.

$$118 = 5h + 3$$
$$\frac{115 = 5h}{5}$$

$h = 23$ hours to earn $118

5) Consider the following piecewise function given by the formula

$$f(x) = \begin{cases} 1 - 2x & -4 \le x \le -1 \\ x^2 & -1 < x \le 3 \end{cases}$$

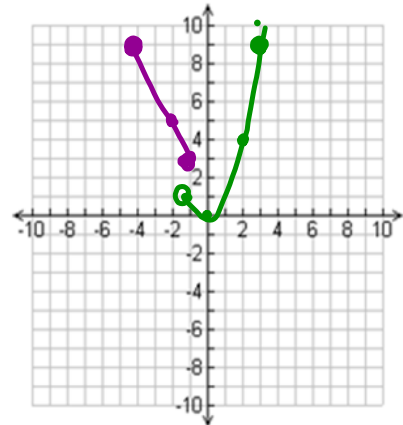a. Evaluate $f(-1) = 3$

b. Identify all x values for which $f(x) = 9$ ⟨X=3⟩

$y = 1 - 2x$

x	y
-4	9
-2	5
-1	3

$y = x^2$

x	y
-1	1
2	4
3	9

6) A cell phone company charges $30 dollars a month for 800 text messages or less. If a family text more 800 messages and up to 1200 messages, the company charges $50. If they text more than 1200 messages and up to 1800 messages, the bill jumps to $80. This scenario can be presented by a function for which x is the number of text messages and f(x) is the cost at the end of the month.

a. Graph this function on the provided grid.
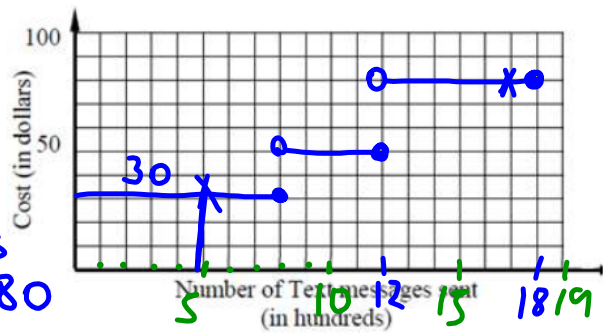
b. How much would you have to pay if you used:

500 text messages __$30__

1700 text messages __$80__

c. Interpret $f(1400, 80)$.

1400 texts, the cost is $80

Step

d. Identify the domain and range.

$0 \le x \le 1800$ $y = \{30, 50, 80\}$

Cost (in dollars) — Number of Text messages sent (in hundreds)

7) The accompanying graph is a sketch of the function $y = f(x)$

a. Identify the domain. $-3 \le x \le 4$

b. Identify the range. $-2 \le y \le 7$

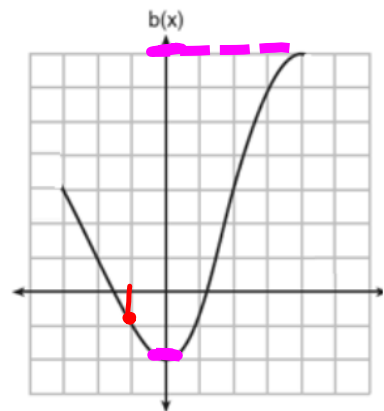c. Evaluate $f(-1) = -1$

d. Identify the y intercept. -2

e. Identify the Maximum 7   the Minimum. -2

f. Find the Average rate of change from $x = -2$ to $x = 2$ $m = \dfrac{\Delta y}{\Delta x}$

$(-2, 1)$

$(2, 3)$

$m = \dfrac{1 - 3}{-3 - 2} = \dfrac{-2}{-4} = \dfrac{1}{2}$

b(x)

Review Questions:

1) Which expression is equal to $(x + 3)^2$? *[handwritten: → y₁]*

    1. $x^2 + 6$
    2. $x^2 + 9$
    3. $x^2 + 6x + 9$
    4. $x^2 + 3x + 9$

2) Solve for x: $6(x - 2) - 4x = 16$

    1. 2   3. 7
    2. 12   **4.** 14

3) Which value of x is in the solution set of the inequality $-2x + 5 > 17$?

[handwritten: $-2x > 12$, $\frac{-2}{-2} \quad \frac{12}{-2}$, $x < -6$]

    1. −8   3. −6
    2. −4   4. 12

4) Which linear equation represents the data in the accompanying table?

    1. $d = 1.50c$
    2. $d = 1.50c + 20.00$
    3. $d = 20.00c + 1.50$
    4. $d = 21.50c$

c	d
0	20.00
1	21.50
2	23.00
3	24.50

5) What is the value of the y-coordinate of the solution to the system of equations $2x + y = 8$ and $x - 3y = -3$?

    g. −2   **3.** 2
    h. 3   4. −3

[handwritten:
$$\begin{cases} 2x + y = 8 \\ -2(x - 3y = -3) \end{cases}$$
$$+\begin{cases} 2x + y = 8 \\ -2x + 6y = 6 \end{cases} \Rightarrow 7y = 14$$
$$y = 2$$
]

1) A. What is the range of the graph below?

    1. $[0, 1]$ and $[4, \infty)$
    2. $[-3, 1]$ and $[4, \infty)$
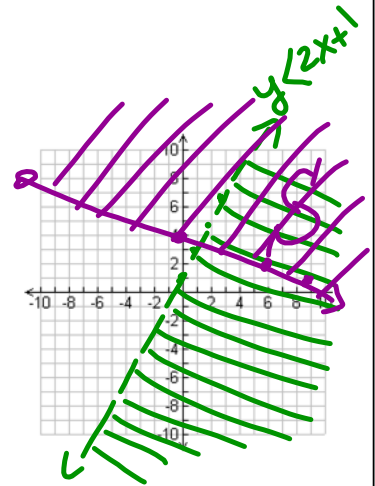   3. $[-3, 1)$ and $(4, \infty)$
    4. $[-3, \infty)$

    B. What is the minimum?

    1. $x = 0$ **3.** $y = -3$
    2. $x = 4$ 4. $y = 4$

6) Which point is in the solution set of the following system of inequalities?

$$y < 2x + 1$$
$$y \geq -\frac{1}{3}x + 4$$

    1. $(5, 0)$
    2. $(6, 6)$
    3. $(-2, 1)$
    4. $(1, 9)$

[handwritten graph with labels: $y < 2x + 1$]

7) Find the value of $x^2 - 2y + 1$ if $x = 2$ and $y = -3$.

    1. −1   *[handwritten: $(2)^2 - 2(-3) + 1$]*
    2. 7   9
    4. 11

8) Which sentence illustrates the associative property?

    1. $xy = yx$ **3.** $x(yz) = (xy)z$
    2. $x(y + z) = xy + xz$ 4. $1(xy) = xy$
    [handwritten: Distributive]

9) Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$.

    1. $2x^2 + 10x - 17$ 3. $8x^2 + 10x - 17$
    2. $2x^2 - 6x - 4$ **4.** $-2x^2 + 6x + 4$

[handwritten:
$$(3x^2 + 8x - 7) - (5x^2 + 2x - 11)$$
$$3x^2 + 8x - 7 - 5x^2 - 2x + 11$$
$$-2x^2 + 6x + 4$$
]