

Math 111 Solutions to Practice Quiz

1. (6pts) A function consists of three things. List them:

(a) Domain

(b) Range

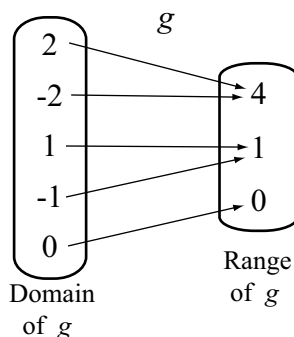
(c) Rule

2. (4pts each) True or False

(a) If  $f$  is a function with domain  $\mathbb{R}$ , then  $f(a + b) = f(a) + f(b)$  where  $a$  and  $b$  are any real numbers.

**False.**

(b) The following diagram represents a function.



**True.**

3. (10pts) Consider the following subset of the real numbers

$$(-\infty, -4] \cup (-3, -1] \cup [3, 6] \cup (8, 10).$$

Circle the numbers from the following list which lie in the subset of the real numbers above.

$$\boxed{-100}, \quad \boxed{-4}, \quad -3, \quad \boxed{-2}, \quad 0, \quad \boxed{\pi}, \quad 10, \quad 13, \quad \frac{13}{2}, \quad \boxed{\frac{-3}{2}}$$

4. (10pts) Consider the function  $f$  with domain  $\{-2, 1, 2\}$  and rule  $f(x) = 2x^2 + 10$ . Compute the following:

(a)  $f(-2) = 18$

(b)  $f(0)$  is undefined

(c)  $f(1) = 12$

(d)  $f(2) = 18$

What is the range of  $f$  ?      The range of  $f$  is  $\{12, 18\}$ .

5. (10pts) Suppose  $g$  is a function with domain  $\mathbb{R}$  and rule  $g(x) = 3x^2 - 7x + 2$ . Compute the difference quotient

$$\frac{g(x+h) - g(x)}{h}$$

[Be sure to simplify your answer.]

**Solution:**

$$\begin{aligned} \frac{g(x+h) - g(x)}{h} &= \frac{3(x+h)^2 - 7(x+h) + 2 - (3x^2 - 7x + 2)}{h} \\ &= \frac{3(x+h)(x+h) - 7x - 7h + 2 - 3x^2 + 7x - 2}{h} \\ &= \frac{3(x^2 + 2xh + h^2) - 7x - 7h + 2 - 3x^2 + 7x - 2}{h} \\ &= \frac{3x^2 + 6xh + 3h^2 - 7x - 7h + 2 - 3x^2 + 7x - 2}{h} = \frac{6xh + 3h^2 - 7h}{h} \\ &= \frac{h(6x + 3h - 7)}{h} = 6x + 3h - 7. \end{aligned}$$