

Answers

Instructions: Show all steps that lead to your solution. Check your answer on the blog.

Section 3-8

Definitions:

- Function
- Domain
- Range

SKILLS TO KNOW:

- Graph a function over a given domain.
- Evaluate a function at a given input, for example, find $f(2)$ if $f(x) = x + 3$
- Evaluate composite functions, for example find $f(g(3))$ if $f(x) = x + 3$ and $g(x) = 2x - 5$.
- Determine the range of a function over a given domain.
- Determine the domain of a function by finding the places where it "blows up" (becomes undefined).

1. Given that $f(x) = -3x^2 + 10$ and $g(x) = |x - 4| - 6$, find the following:

(A) $f(-2) = -2$ (B) $f(4) = -38$ (C) $f(0) = 10$

(D) $g(-6) = 4$ (E) $g(4) = -6$ (F) $g(0) = -2$

(G) $g(f(3)) = 15$ (H) $f(g(-2)) = 10$ (I) $g(g(g(-2))) = 0$

(J) $(f+g)(2) = -6$ (K) $(f-g)(3) = -12$ (L) $(f \cdot g)(-2) = 0$

(M) $(f/g)(4) = \frac{19}{3}$ (N) $f(2g(-3)) = -2$

2. Find the domain of each function.

(A) $f(x) = \sqrt{3x-2}$

(B) $g(x) = \frac{2}{(x-1)(x+4)}$

(C) $h(x) = \frac{\sqrt{3-x}}{x^2-25}$

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

$\{\text{All Reals except } 1 \text{ and } -4\}$

$\{x: x \leq 3, x \neq -5\}$

(you do not need to state that $x \neq 5$)

3. Find the range of $F(x) = |1-x|$ over the domain $D = \{-2, -1, 0, 1, 2\}$

x	$f(x)$
-2	3
-1	2
0	1
1	0
2	1

$\{0, 1, 2, 3\}$

(no repeats)

1-2: Suppose $f(x) = \frac{x}{2}$, $g(x) = x-3$, and $h(x) = \sqrt{x}$. Find a real-number value or an expression in x for each of the following. If no real value can be found, say so.

1. a. $h(f(72)) = 6$

b. $h(f(50)) = 5$

c. $h(f(x)) = \sqrt{\frac{x}{2}}$

d. $f(f(x)) = \frac{x}{4}$

2. a. $g(h(9)) = 0$

b. $g(h(3)) = \sqrt{3}-3$

c. $g(h(x)) = \sqrt{x}-3$

d. $g(g(x)) = x-6$

Section 3-9

Definitions:

- linear function
- constant function
- rate of change

SKILLS TO KNOW:

- Determine the equation of a linear function based on given information, for example either the slope and a point or two points.
- Evaluate functions after finding the equation of the function.
- Solve word problems by creating a linear function and evaluating it according to the problem.

1. Find an equation of the linear function f for the given information and find $f(-10)$ for each.

(A) $f(0) = 3$ and $f(x)$ decreases by 2 when x increases by 3.

$$b = 3 \\ \text{or} \\ (0, 3)$$

$$m = -\frac{2}{3}$$

$$f(x) = -\frac{2}{3}x + 3$$

$$f(-10) = 9\frac{2}{3} \text{ or } \frac{29}{3}$$

(B) $f(4) = -5$ and $f(-3) = 3$
 $(4, -5)$ $(-3, 3)$

$$f(x) = -\frac{8}{7}x - \frac{3}{7}$$

$$f(-10) = 11$$

2. Suppose the number of hours an algebra student studies and the grade on a test is a linear function. A student who spent 1 hour studying earned a 76. A student who spent 3 hours earned an 88.

(A) Find a linear function using the given information. Think about the input and output first.

$$f(\text{hours}) = \text{grade}$$

$$f(1) = 76$$

$$f(3) = 88$$

$$\text{so... } f(x) = 6x - 70$$

(B) What score would a student who studied for 4 hours earn?

$$f(4) = 94 \quad \text{That student would earn a 94\%}.$$

(C) How many hours would a student need to study to earn a grade of 80?

$$80 = 6x + 70$$

$$x = \frac{5}{3} = 1\frac{2}{3} \text{ hr} \rightarrow 1 \text{ hr, } 40 \text{ min}$$

They would need to study for 1 hr + 40 min to get an 80%.

ONLY
Accelerated

Section 3-10

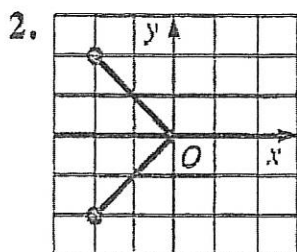
Definitions:

- relation
- function
- vertical lines test

SKILLS TO KNOW:

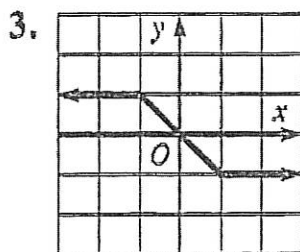
- Determine if a relation is a function by inspecting the ordered pairs or using the vertical line test on a graph of the function.
- Find the domain of a relation, graph it, and determine if it is a function.

2-4: Give the domain and range of each function shown. Then state whether it is a function or not.



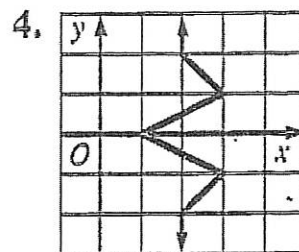
$$D = \{x: -2 \leq x \leq 0\}$$

$$R = \{y: -2 \leq y \leq 2\}$$



$$D = \{\text{all reals}\}$$

$$R = \{y: -2 \leq y \leq 2\}$$

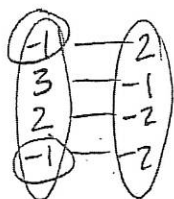


$$D = \{x: -1 \leq x \leq 3\}$$

$$R = \{y: -2 \leq y \leq 2\}$$

9-10: Determine if each relation is a function. If not, state why.

9. $\{(-1, 2), (3, -1), (2, -2), (-1, -2)\}$



$$-1 \rightarrow 2$$

$$\rightarrow -2$$

Repeated
x value!

NOT a function!

10. $\{(1, 3), (3, -1), (1, -1), (-2, -1)\}$

$$1 \rightarrow 3$$

$$\rightarrow -1$$

Repeated
x value

NOT a function!