

1. If $f(x) = kx^2$, and $f(2) = 12$, then k equals
 A) 1 B) 2 C) 3 D) 4

$$\begin{aligned} f(2) &= k(2)^2 \\ 12 &= k(4) \\ 3 &= k \end{aligned}$$

C

2. If $f(x) = 3x + 4$, find $f(-4)$

$$f(-4) = 3(-4) + 4$$

$$f(-4) = -12 + 4$$

$$f(-4) = -8$$

3. If $f(x) = 3x + 2$ and $g(x) = x - 3$, evaluate $f(g(x))$.

$$f(x) = 3x + 2$$

$$f(x - 3) = 3(x - 3) + 2$$

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

$$f(x - 3) = 3x - 7$$

4. Using the functions $f(x) = 3x$ and $g(x) = x - 4$, demonstrate that the composition of these functions is not commutative.

$$f(x) = 3x$$

$$g(x) = x - 4$$

$$f(x - 4) = 3(x - 4)$$

$$g(3x) = 3x - 4$$

$$f(x - 4) = 3x - 12$$

$$f(g(x)) = 3x - 12 \quad \neq \quad g(f(x)) = 3x - 4$$

5. Given the function rule $f(x) = x + 9$, find the range corresponding to the domain, $\{-3, 4, 6, 8\}$.

x	$x + 9$	$f(x)$
-3	-3+9	6
4	4+9	13
6	6+9	15
8	8+9	17

The range is $\{6, 13, 15, 17\}$

6. A caricaturist sets up an easel at a craft fair and quickly sketches portraits. The function below determines the amount of money, Q , she will receive at the end of the day after sketching m people. Given the function $Q(m) = 8m - 15$:

(a) Find $Q(3)$ and explain its meaning in the context of the problem.

$Q(3)$ represents the amount of money after she sketches 3 people.

$$Q(3) = 8(3) - 15$$

$$= 24 - 15$$

$$= 9 \quad \text{She earns \$9 from sketching 3 people}$$

(b) Find m when $Q(m) = 41$ and explain its meaning in the context of the problem.

$Q(m) = 41$ represents the amount of money the caricaturist earns from sketching m people. She earns \$41.

$$41 = 8m - 15$$

$$+15 \quad +15$$

$$\underline{56 = 8m}$$

$$\underline{8 \quad 8}$$

$$7 = m \quad \text{She sketched 7 people and earned \$41.}$$

7. A company produces tote bags. The annual fixed costs for producing the bags are \$12,000 in addition to the variable costs which are \$3 per tote bag.

(a) Write a function $C(b)$ that describes the total cost, C , of producing b bags.

$$C(b) = 12,000 + 3b$$

$C(b)$: total expenditures

b : # of bags

(b) Find the cost of producing 625 tote bags.

$$C(625) = 12,000 + 3(625)$$

$$= 12,000 + 1875$$

$$= 13,875$$

The company spends \$13,875 in order to produce 625 totes

(c) Find how many tote bags can be produced with an annual budget of \$14,223.

$$14,223 = 12,000 + 3b$$

$$\underline{-12,000 \quad -12,000}$$

$$\underline{2223 = 3b}$$

$$\underline{3 \quad 3}$$

$$741 = b$$

The company can make 741 totes with \$14,223.

8. $f(0) = 3$, $f(1) = 5$, $d = 2$ explicit: $f(n) = 5 + 2(n - 1) \rightarrow f(n) = 2n + 3$

recursive: $f(n) = f(n - 1) + 2$

I. $f(n) = 2n + 3$ -- yes

II. $f(n) = 5n - 3$ -- no

III. $f(n) = f(n - 1) + 2$ where $f(0) = 3$ -- yes

d) I and III

9. $26 - 10 = 16 \div 2 = 8 \leftarrow d$

$$a_n = -6 + 8(n - 1)$$

or

$$a_n = 8n - 14$$

n	1	2	3	4	5
a_n	-6	2	10	18	26

10. 2.75, 5.5, 8.25, 11, 13.75 ($d = 2.75$)