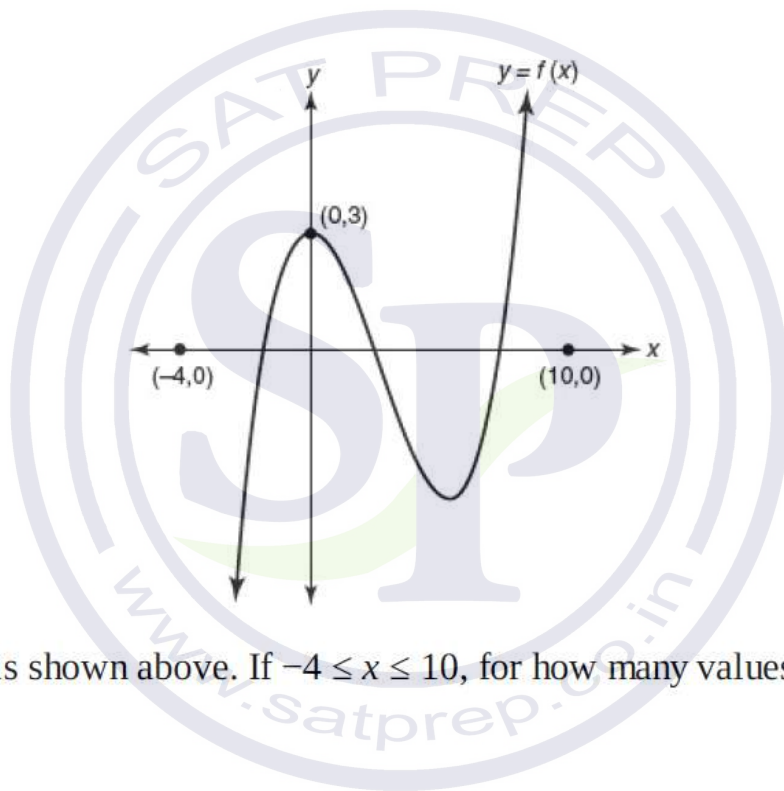


SATPREP**Assignment : Linear Function**

1. If the function f is defined by $f(x) = 3x + 2$, and if $f(a) = 17$, what is the value of a ?
(A) 5
(B) 9
(C) 10
(D) 11
2. A function f is defined such that $f(1) = 2$, $f(2) = 5$, and $f(n) = f(n - 1) - f(n - 2)$ for all integer values of n greater than 2. What is the value of $f(4)$?
(A) -8
(B) -2
(C) 2
(D) 8



3. The graph of $y = f(x)$ is shown above. If $-4 \leq x \leq 10$, for how many values of x does $f(x) = 2$?
(A) None
(B) One
(C) Two
(D) Three
4. If function f is defined by $f(x) = 5x + 3$, then which expression represents $2f(x) - 3$?
(A) $10x - 3$
(B) $10x + 3$
(C) $10x$
(D) 3
5. If the function k is defined by $k(h) = (h + 1)^2$, then $k(x - 2) =$
(A) $x^2 - x$
(B) $x^2 - 2x$

- (C) $x^2 - 2x + 1$
 (D) $x^2 + 2x - 1$

| | | | | | |
|--------|---|---|---|---|---|
| x | 1 | 2 | 3 | 4 | 5 |
| $f(x)$ | 3 | 4 | 5 | 6 | 7 |

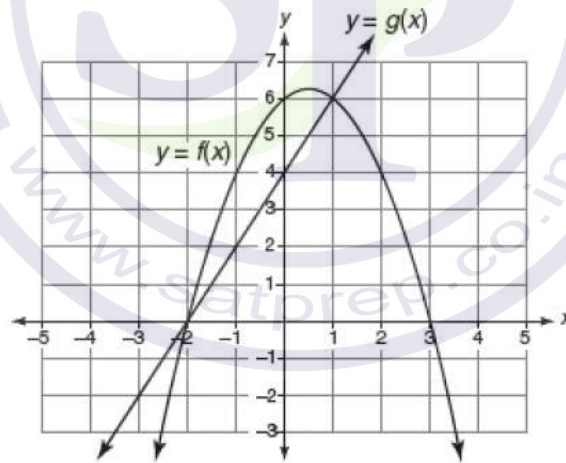
| | | | | | |
|--------|---|---|---|----|----|
| x | 3 | 4 | 5 | 6 | 7 |
| $g(x)$ | 4 | 6 | 8 | 10 | 12 |

6. The accompanying tables define functions f and g . What is $g(f(3))$?

- (A) 4
 (B) 6
 (C) 8
 (D) 10

7. In 2014, the United States Postal Service charged \$0.48 to mail a first-class letter weighing up to 1 oz. and \$0.21 for each additional ounce. Based on these rates, which function would determine the cost, in dollars, $c(z)$, of mailing a first-class letter weighing z ounces where z is an integer greater than 1?

- (A) $c(z) = 0.48z + 0.21$
 (B) $c(z) = 0.21z + 0.48$
 (C) $c(z) = 0.48(z - 1) + 0.21$
 (D) $c(z) = 0.21(z - 1) + 0.48$



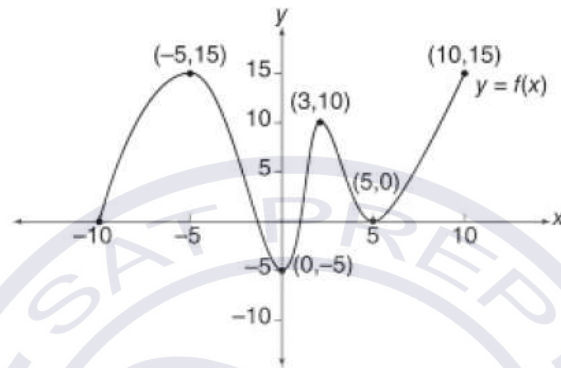
8. Based on the graphs of functions f and g shown in the accompanying figure, for which values of x between -3 and 3 is $f(x) \geq g(x)$?

- I. $-2 \leq x \leq 0$
 II. $0 \leq x \leq 1$
 III. $1 \leq x \leq 3$
- (A) I only
 (B) II only
 (C) III only
 (D) I and II

- $f(2n) = 4f(n)$ for all integers n
- $f(3) = 9$

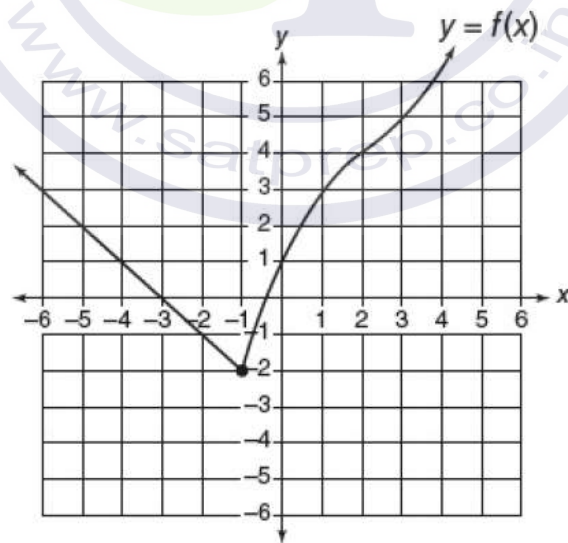
9. If function f satisfies the above two conditions for all positive integers n , which equation could represent function f ?

- (A) $f(n) = 9$
- (B) $f(n) = n^2$
- (C) $f(n) = 3n$
- (D) $f(n) = 2n + 3$



10. If in the accompanying figure (p, q) lies on the graph of $y = f(x)$ and $0 \leq p \leq 5$, which of the following represents the set of corresponding values of q ?

- (A) $-5 \leq q \leq 15$
- (B) $-5 \leq q \leq 10$
- (C) $-5 \leq q \leq 5$
- (D) $5 \leq q \leq 10$



11. The accompanying figure shows the graph of $y = f(x)$. If function g is defined by $g(x) = f(x + 4)$, then $g(-1)$ could be

- (A) -2
- (B) 3
- (C) 4
- (D) 5

| x | $f(x)$ | $g(x)$ |
|-----|--------|--------|
| 1 | 2 | 3 |
| 2 | 4 | 5 |
| 3 | 5 | 1 |
| 4 | 3 | 2 |
| 5 | 1 | 4 |

Questions 12–13 refer to the accompanying table, which gives the values of functions f and g for integer values of x from 1 to 5, inclusive.

12. According to the table, if $f(5) = p$, what is the value of $g(p)$?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

13. Function h is defined by $h(x) = 2f(x) - 1$, where function f is defined in the accompanying table. What is the value of $g(k)$ when $h(k) = 5$?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

| x | 0 | 1 | 4 | 5 |
|--------|----|---|---|---|
| $f(x)$ | -2 | 5 | 0 | 2 |

| x | 0 | 2 | 3 | -4 |
|--------|---|----|---|----|
| $g(x)$ | 2 | -1 | 1 | 5 |

14. Some values of functions f and g are given by the tables above. What is the value of $g(f(5))$?

- (A) -1
- (B) 1
- (C) 2
- (D) 5

15. In 2012, a retail chain of fast food restaurants had 68 restaurants in California and started to expand nationally by adding 9 new restaurants each year thereafter. At this rate, which of the following functions f represent the number of restaurants there will be in this retail chain n years after 2012 assuming none of these restaurants close?

- (A) $f(n) = 2,012 + 9n$
- (B) $f(n) = 9 + 68n$
- (C) $f(n) = 68 + 9(n - 2,012)$
- (D) $f(n) = 68 + 9n$

16. According to market research, the number of magazine subscriptions that can be sold can be estimated using the function

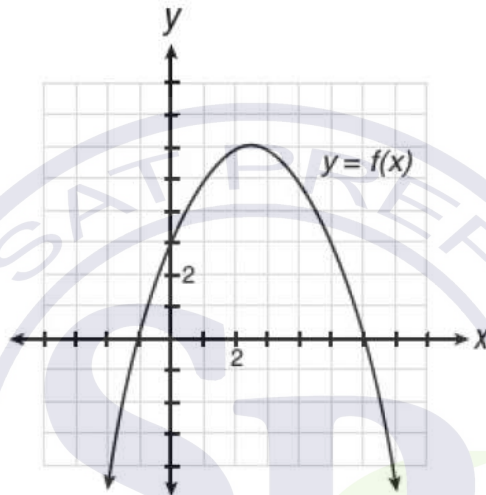
$$n(p) = \frac{5,000}{4p - k},$$

where n is the number of thousands of subscriptions sold, p is the price in dollars for each individual subscription, and k is some constant. If 250,000 subscriptions were sold at \$15 for each subscription, how many subscriptions could be sold if the price were set at \$20 for each subscription?

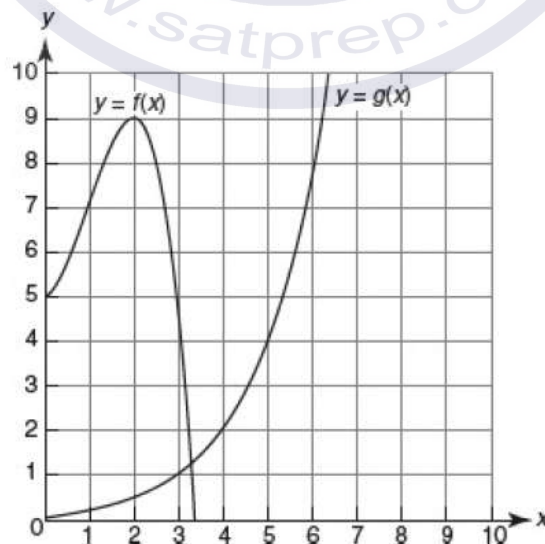
- (A) 50,000
- (B) 75,000
- (C) 100,000
- (D) 125,000

Grid-In

- Let h be the function defined by $h(x) = x + 4^x$. What is the value of $h\left(-\frac{1}{2}\right)$?

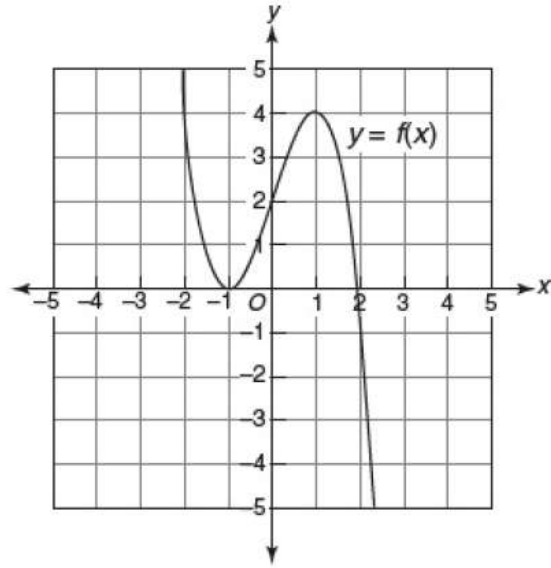


- The above figure shows the graph of $y = f(x)$ where c is a nonzero constant. If $f(w + 1.7) = 0$ and $w > 0$, what is a possible value of w ?
- Let the function f be defined by $f(x) = x^2 + 12$. If n is a positive number such that $f(3n) = 3f(n)$, what is the value of n ?

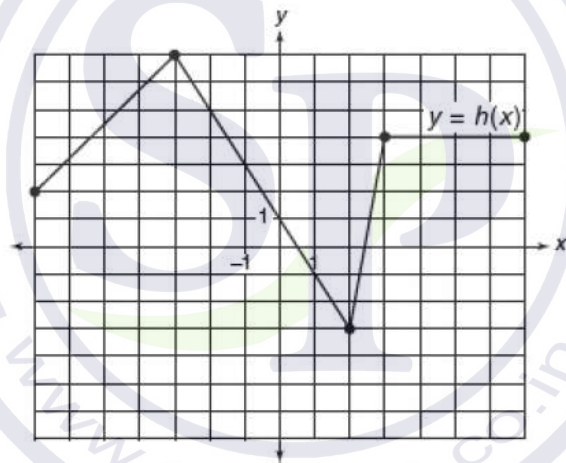


- Let the functions f and g be defined by the graphs in the accompanying diagram. What is the value of $f(g(3))$?

Questions 5 and 6 Let the function f be defined by the graph below.



5. What is the integer value of $2f(-1) + 3f(1)$?
6. If n represents the number of different values of x for which $f(x) = 2$ and m represents the number of different values of x for which $f(x) = 4$, what is the value of mn ?
7. Let g be the function defined by $g(x) = x - 1$. If $\frac{1}{2}g(c) = 4$, what is the value of $g(2c)$?



8. The figure above shows the graph of function h . If function f is defined by $f(x) = h(2x) + 1$, what is the value of $f(-1)$?