

SATPREP

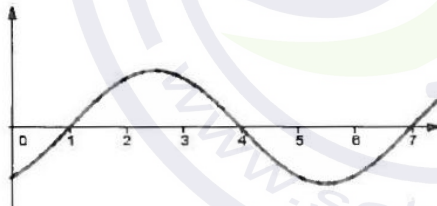
Assignment : *Function*

Easy

1. If $f(x) = \frac{x+3}{x}$ and $g(x) = x^2 - 10$, what is the difference between $f(x)$ and $g(x)$ when $x = 3$?
2. If $f(x) = 2x - 1$ and $g(x) = \sqrt{x^2 - 8}$, what is the value of $f(g(3))$?
 - a) 1
 - b) 3
 - c) 5
 - d) 7



3. If $f(x) = \sqrt{x^2 + \frac{1}{2}}$ for all real values of x , which of the following is NOT a possible value of $f(x)$?
- 0
 - 1
 - $\frac{2}{3}$
 - 5
4. If $f(x) = x^{-1} + x + x^2$, at which of the following values of x is $f(x)$ undefined?
- 1
 - 0
 - 1
 - 2
5. The number of water lilies in a pond has doubled every four years since $t = 0$. This relation is given by $y = (x)2^{t/4}$, where t is in number of years, y is the number of water lilies in the pond at time t , and x is the original number of water lilies. If there were 600 water lilies in this pond 8 years after $t = 0$, then what was the original number of water lilies?
- 100
 - 150
 - 180
 - 200



6. According to the graph above of the function f , what are the values of x where $f(x)$ is negative?
- $1 < x < 4$
 - $0 < x < 1$ or $4 < x < 7$
 - $x < 1$ or $x > 7$
 - $1 < x < 4$ or $7 < x$
7. The amount of money, in dollars, earned from a school fundraiser by selling x cookies is given by $A(x) = 1.5x - 80$. How many cookies must the event sell in order to raise 220 dollars?

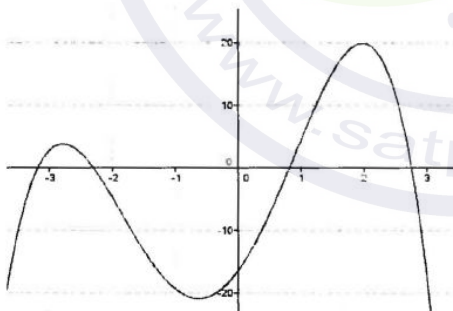
8. If $g(x) = 5x - 10$, then at what value of x does the graph of $g(x)$ cross the x -axis?
- 6
 - 3
 - 0
 - 2

$$p(x) = \frac{17}{200}x^2 - 8x + c$$

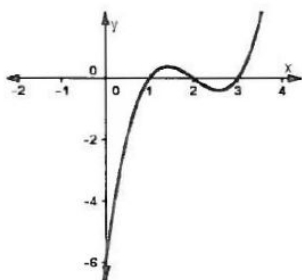
9. The function above calculates the profit, in dollars, from growing and selling x units of corn. c is a constant. If 200 units were sold for a total profit of \$1,400, what is the value of c ?
- 400
 - 200
 - 200
 - 400

x	1	2	3	4
y	1	4	7	9

10. The table above represents a relationship between x and y . Which of the following linear equations describes the relationship?
- $y = 4x - 1$
 - $y = 3x + 1$
 - $y = 3x - 2$
 - $y = -3x + 4$



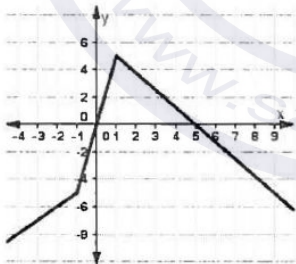
11. The figure above shows the graph of $y = f(x)$. For what value of x in this interval does the function f have its highest value between $x = -3$ to $x = 3$? $\text{\textcircled{B}}$
- 1
 - 0
 - 1
 - 2



18. The graph of $y = f(x)$ is shown above. If $f(3) = a$, which of the following could be the value of $f(a)$?
- a) -2
 - b) -4
 - c) -6
 - d) 2

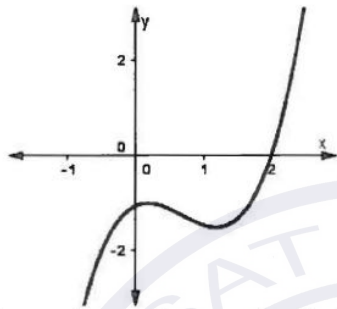
$$f(x) = \sqrt{x^2 - 1}$$

19. Which of the following values of x makes $f(x)$ undefined?
- a) -2
 - b) 0
 - c) 2
 - d) 1
20. At what value(s) of x does the function $f(x) = x^2 - 9$ cross the x -axis?
- a) 0 only
 - b) 3 only
 - c) -3 only
 - d) -3 and 3

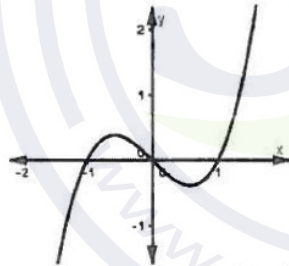


21. $f(x)$ is graphed in the figure above. For what values of x does $f(x)$ have a negative slope?
- a) $x > -1$
 - b) $-1 < x < 1$
 - c) $x > 1$
 - d) $0 < x$

22. The number of births in a local hospital in 1885, the year it was founded, was 15. After 1885, the number of births has doubled every 15 years. The number of births in the hospital can be found by the equation $N = 150 \times 2^{t/15}$ where N is the number of births and t is the number of years since 1885. In what year would the annual birthrate in the hospital reach 3840?



23. The figure above shows the graph of $g(x)$. At what value(s) of x does $g(x)$ equal 0?
- a) 0
 - b) -1
 - c) 2
 - d) -2



24. The figure above shows the graph of $y = f(x)$. If the function g is defined by $g(x) = f\left(\frac{x}{3}\right) - 2$, what is the value of $g(3)$?
- a) -2
 - b) -1
 - c) 0
 - d) 1

25. The maximum height of a rock thrown upward with an initial velocity of v feet per second is $h + \frac{v^2}{64}$ feet, where h is the initial height, in feet. If the rock is thrown upward with velocity of 16 feet per second from a height of 10 feet, what is the maximum height, in feet, of the trajectory?

x	0	1	2	4
$f(x)$	-5	-3	-1	3


26. The table above shows input values as x and the output values of the linear function $f(x)$. Which of the following is the expression for $f(x)$?
- $f(x) = \frac{1}{2}x - 5$
 - $f(x) = -\frac{1}{2}x - 5$
 - $f(x) = 2x - 5$
 - $f(x) = -2x - 5$

x	1	2	3	4	5
$f(x)$	-2	1	6	13	22

27. Some pairs of input and output values of the function f are shown above. The function h is defined by $h(x) = f(2x - 1)$. What is the value of $h(3)$?

28. If $f(x) = x^2 - 1$ and $g(x) = \frac{1}{x}$, write the expression $f(g(x))$ in terms of x .

- $\frac{(1+x)(1-x)}{x^2}$
- $\frac{(1+x)}{x^2}$
- $\frac{(1-x)}{x^2}$
- $\frac{1}{x^2}$

29. The domain of the function $y = \frac{x-2}{(x-1)(x+3)}$ consists of all real numbers except? 

- $x \neq 1$
- $x \neq 2$
- $x \neq 1, x \neq 2, \text{ and } x \neq -3$
- $x \neq 1 \text{ and } x \neq -3$

30. The graph of $h(x)$ is a line. If $h(-2) = 7$ and $h(4) = 3$, then an equation of $h(x)$ is

- a) $\frac{2}{3}x - \frac{17}{3}$
- b) $-\frac{2}{3}x + \frac{17}{3}$
- c) $\frac{2}{3}x + \frac{17}{3}$
- d) $-\frac{3}{2}x + \frac{17}{3}$

31. If $f\left(\frac{3x}{x-4}\right) = x^2 + x + 1$, what is the value of $f(5)$?

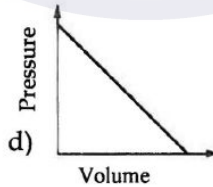
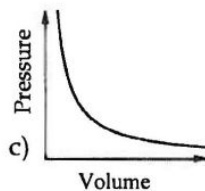
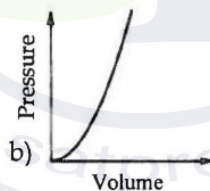
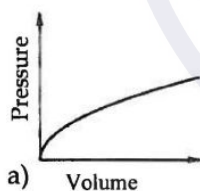
- a) 18
- b) 55
- c) 100
- d) 111

Hard

Questions 32 – 33 refer to the following information:

Boyle's law says that when all other factors are constant, the pressure of a gas decreases as the volume of that gas increases and vice versa. Therefore, the relationship of the pressure and volume of a gas, according to Boyle's law, is inversely proportional when the temperature remains unchanged.

32. According to Boyle's law, which of the following graphs represents the relationship between the pressure and volume of a gas if temperature is constant?



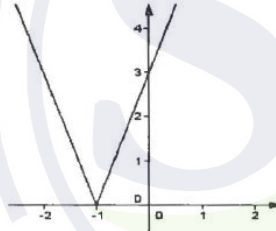
33. Assume that a gas has a volume of 20 liters and a pressure of 5 atmospheres initially. After some force is applied, the pressure becomes 8 atmospheres. According to Boyle's law, what is the final volume, in liters, of this gas? (Atmosphere (atm) is a unit of pressure.)
- a) 24.5
 - b) 18.5
 - c) 15.5
 - d) 12.5

34. Which of the following is the graph of $y = |-3x+3|$?

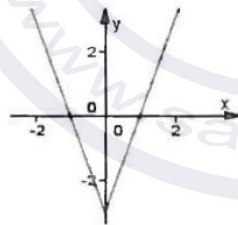
a)



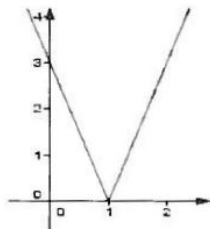
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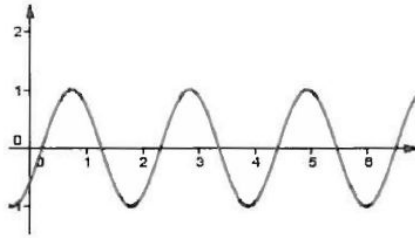


c)



d)





35. According to the graph shown above, how many distinct positive values of x are there on the graph when $y = 0.5$?

a) 4
b) 5
c) 6
d) 7

36. Let the function g be defined by: $g(x) = 2x + 1$. If $\frac{1}{3}g(x^2) = 1$, what could be the value of x ?

a) 0
b) 1
c) 2
d) 3

37. Let the function f be defined by $f(x) = x^2 + 28$. If $f(3y) = 2f(y)$, what is the one possible value of y ?

a) -1
b) 1
c) 2
d) -3

38. The monthly cost of renting an apartment increases every year by 5%. John paid \$600 per month this year on his rental. What is the monthly cost for John's rental n years from now?

a) 600×0.05^n
b) $600 \times 1.05 \times n$
c) 600×1.05^n
d) $600^n \times 1.05$

39. The value of one particular copy machine decreases by 15 percent each year. If a new machine was purchased at \$20,000, how many years from the date of purchase will the value of this machine be approaching to \$12,200?

- a) One
- b) Two
- c) Three
- d) Four

40. If $f(x) = \frac{x-1}{x+2}$ and $f(g(x)) = \frac{1}{x}$, then which of the following could be $g(x)$?

- a) $\frac{2+x}{1-x}$
- b) $\frac{x+2}{x-1}$
- c) $(x+1)(x+2)$
- d) $\frac{x-2}{x-1}$

41. The table below shows some coordinate pairs on the graph of $g(x)$. Which of the following could be $g(x)$?

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

- a) $(x^2 + 1)(2x + 2)$
- b) $(x^2 - 1)(2x - 3)$
- c) $(x + 1)(x + 3)$
- d) $(x + 1)(x - 3)$

42. If $f(x) = x + 7$ and $f(g(2)) = 3$, which of the following functions could be $g(x)$?

- a) $x - 6$
- b) $x + 6$
- c) $3x - 1$
- d) $2x - 1$

43. If $f(x + 1) = x^2 - 1$, then $f(x) = ?$

- a) $x^2 - 2x + 1$
- b) $x^2 + 2x + 1$
- c) $x^2 - 2x$
- d) $x^2 + 2x$