

## SATPREP

### Assignment : *Polynomial*

#### *Easy*

1. What is the remainder when  $2x^4 - 3x^3 + 4x^2 - 5x + 6$  is divided by  $x - 3$ ?
  - a) 108
  - b) 96
  - c) 87
  - d) 75
2. If  $(x + 1)$  is a factor of  $3x^6 + kx^5 - 4x^3 + 1$ , what is the value of  $k$ ?
  - a) 8
  - b) 6
  - c) 5
  - d) 3
3. If  $3x + 6$  is a divisor of  $3x^3 + 5x^2 - 4x + d$  with a remainder of 0, what is the value of  $d$ ?
  - a) 8
  - b) 4
  - c) -4
  - d) -8

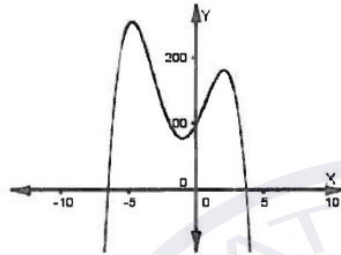
4. If  $(x + 2)$  is a factor of  $x^6 - 3x^4 + 2x^3 - x + d$ , what is the value of  $d$ ?
- 14
  - 14
  - 2
  - 2
5. If  $x - 2$  divides  $2x^3 - 4k^3x^2 + 16x - 32$  with a remainder of 0, what is the value of  $k$ ?
- 2.2
  - 0.33
  - 1
  - 2

**Medium**

6. If two roots of the equation  $2x^3 - mx^2 + nx - m = 0$  are 3 and 5, what is the third root?
- $-\frac{4}{7}$
  - $-\frac{4}{7}$
  - 1
  - $\frac{4}{7}$
7. If the  $f(x) = x^5 + bx^4 + cx^3 + dx^2 + ex + k$ ,  $f(-1) = 0$ , and  $f(3) = 0$ , then  $f(x)$  is divisible by
- $x - 1$
  - $x + 3$
  - $x^2 + 3x + 2$
  - $x^2 - 2x - 3$
8. If  $-2$  and  $4$  are both zeros of the polynomial  $f(x)$ , then a factor of  $f(x)$  could be
- $x - 2$
  - $x^2 - 2x - 8$
  - $x^2 + 2x + 8$
  - $x + 4$

9. Which of the following is the sum of the roots of  $6x^3 + 4x^2 - 3x = 0$  ?

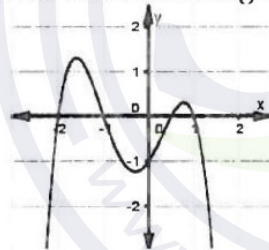
- a)  $-\frac{1}{2}$
- b)  $\frac{1}{2}$
- c)  $-\frac{2}{3}$
- d)  $\frac{2}{3}$



10. The graph above represents the function  $y = -x^4 - 5x^3 + 14x^2 + 40x + c$ . Which of the following could be the value of  $c$ ?

- a) -100
- b) -7
- c) 3
- d) 100


Questions 11 – 12 refer to the following information:



The function  $f(x) = -x^4 - \frac{3}{2}x^3 + 2x^2 + \frac{3}{2}x - 1$  is graphed in the  $xy$ -plane above.

11. If  $c$  is a constant such that the equation  $f(x) = c$  has four real solutions, which of the following could NOT be the value of  $c$ ?

- a) 1
- b) 0
- c)  $-\frac{1}{2}$
- d) -1

12. How many real solutions are there if  $f(x) = x$ ? 

- a) 1
- b) 2
- c) 3
- d) 4

13. The length of a rectangular piece of cardboard is 15 inches longer than its width. If a 5-inch square is cut from each corner of the cardboard, and the remaining piece is folded up to form a box, the volume of the box is 2,250 cubic inches. Find the sum of the length and the width, in inches, of the original cardboard.

**Hard**

14. A polynomial  $P(x)$  has a remainder of 4 when divided by  $(x + 1)$  and a remainder of 7 when divided by  $(x - 2)$ .

What will be the remainder when  $P(x)$  is divided by  $(x + 1)(x - 2)$ ?

- a)  $x + 5$
- b)  $x + 7$
- c)  $x - 4$
- d)  $x - 2$

15. If  $i$  is a root of  $3x^4 - 2x^3 + 5x^2 + 4x - 15 = 0$ , what is the product of all real roots of the equation?

- a) 0
- b)  $-3$
- c)  $-5$
- d) 5

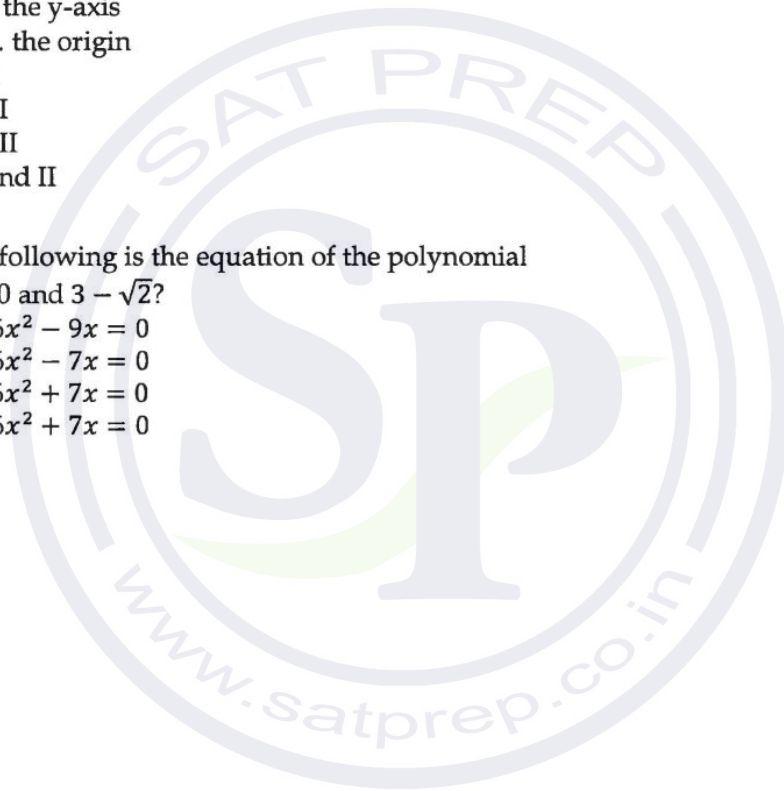
16. The graph of  $2y^4 - x^2 + 11 = 0$  is symmetric with respect to which of the following?

- I. the x-axis
- II. the y-axis
- III. the origin

- a) only I
- b) only II
- c) only III
- d) I, II, and III

17. Which of the following is the equation of the polynomial with roots at 0 and  $3 - \sqrt{2}$ ?

- a)  $x^3 + 6x^2 - 9x = 0$
- b)  $x^3 - 6x^2 - 7x = 0$
- c)  $x^3 + 6x^2 + 7x = 0$
- d)  $x^3 - 6x^2 + 7x = 0$



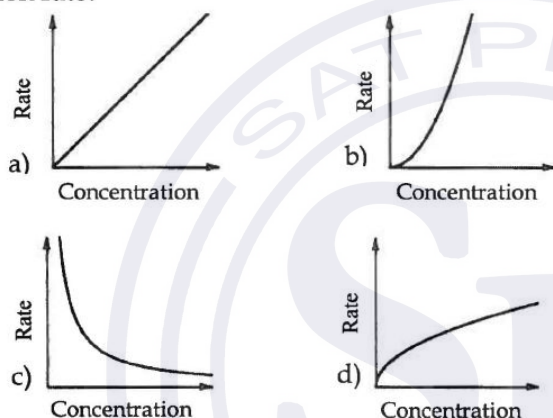
Questions 18 – 19 refer to the following information:

In chemistry, a chemical reaction proceeds at a rate dependent on the concentration of its reactant. For reactant A, the rate of a reaction is defined as:

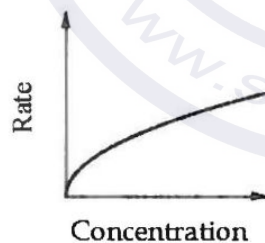
$$\text{Rate} = k [A]^n$$

$k$  is a constant and  $[A]$  is the concentration of A. The order of reaction of a reactant A is the exponent  $n$  to which its concentration term in the rate equation is raised.

18. When  $n$  is equal to  $-1$ , It is called an order  $(-1)$  with respect to reactant A. Which of the following graphs depicts an order  $(-1)$  with respect to concentration A and reaction rate?



19. If the graph below shows the reaction rate versus the concentration of reactant A, what is the most likely order of reactant A?



- a) 1<sup>st</sup> order
- b) 2<sup>nd</sup> order
- c)  $\frac{1}{2}$  order
- d) 0<sup>th</sup> order