SATPREP

Assignment : *Polynomial*

1. The polynomial $x^3 - 2x^2 - 9x + 18$ is equivalent to

    (A) $(x - 9)(x - 2)^2$
    (B) $(x - 2)(x - 3)(x + 3)$
    (C) $(x + 3)(x - 2)^2$
    (D) $(x - 2)(x + 2)(x - 3)$

2. When resistors R^1 and R^2 are connected in a parallel electric circuit, the total resistance is

    $\dfrac{1}{\dfrac{1}{R_1} + \dfrac{1}{R_2}}$. This fraction is equivalent to

    (A) $R_1 + R_2$
    (B) $\dfrac{R_1 + R_2}{R_1 R_2}$
    (C) $\dfrac{R_1}{R_2} + \dfrac{R_2}{R_1}$
    (D) $\dfrac{R_1 R_2}{R_1 + R_2}$

3. In how many different points does the graph of the function $f(x) = x^3 - 2x^2 + x - 2$ intersect the x-axis?

    (A) 0
    (B) 1
    (C) 2
    (D) 3

$$\frac{x^2 + 9x - 22}{x^2 - 121} \div (2 - x)$$

4. The expression above is equivalent to

    (A) $x - 11$
    (B) $\dfrac{1}{x - 11}$
    (C) $11 - x$
    (D) $\dfrac{1}{11 - x}$

5. If $p(x)$ is a polynomial function and $p(4) = 0$, then which statement is true?

    (A) $x + 4$ is a factor of $p(x)$.
    (B) $x - 4$ is a factor of $p(x)$.
    (C) The greatest power of x in $p(x)$ is 4.
    (D) $p(x)$ is divisible by 4.

$$\left(\frac{9}{4}x^2 - 1\right) - \left(\frac{3}{2}x - 1\right)^2$$

6. The expression above is equivalent to

   (A) $3x - 2$
   (B) $-3x$
   (C) $\frac{3}{4}x - 2$
   (D) 0

$$\frac{\frac{x - y}{y}}{y^{-1} - x^{-1}}$$

7. The expression above is equivalent to
   (A) x
   (B) y
   (C) $\frac{1}{y}$
   (D) $-\frac{x}{y}$

$$f(x) = 3x^3 - 5x^2 - 48x + 80$$

8. If the zeros of function f defined above are represented by r, s, and t, what is the value of the sum $r + s + t$?

   (A) $\frac{3}{5}$
   (B) $\frac{5}{3}$
   (C) $\frac{17}{3}$
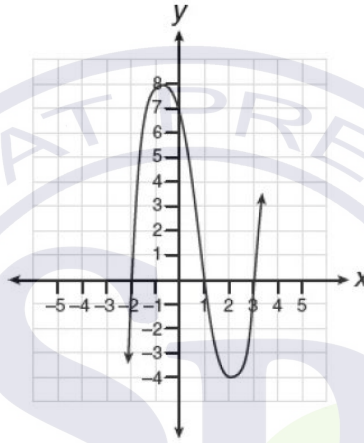   (D) 8

$$\frac{y^3 + 3y^2 - y - 3}{y^2 + 4y + 3}$$

9. The expression above is equivalent to

   (A) $y - 1$
   (B) $y + 1$
   (C) $\frac{y - 1}{y + 3}$
   (D) $y^2 - 1$

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

10. Several values of x, and the corresponding values for polynomial functions f and g are shown in the table above. Which of the following statements is true?

    I. $f(0) + g(0) = 0$
   II. $f(x)$ is divisible by $x + 2$
  III. $g(x)$ is divisible by $x + 3$

   (A) I, II, and III
   (B) I and II, only
   (C) II and III, only
   (D) I and III, only

11. Which equation(s) represent(s) the graph above?

    I. $y = (x + 2)(x^2 - 4x - 12)$
   II. $y = (x - 3)(x^2 + x - 2)$
  III. $y = (x - 1)(x^2 - 5x - 6)$

   (A) I only
   (B) II only
   (C) I and II
   (D) II and III

12. Which of the following functions have zeros -1, 1, and 4?

   (A) $f(x) = (x - 4)(1 + x^2)$
   (B) $f(x) = (x + 4)(1 - x^2)$
   (C) $f(x) = (x - 1)(x^2 - 3x - 4)$
   (D) $f(x) = (x - 1)(x^2 + 3x - 4)$

$$\left(\frac{10x^2y}{x^2 + xy}\right) \times \left(\frac{(x + y)^2}{2xy}\right) \div \left(\frac{x^2 - y^2}{y^2}\right)$$
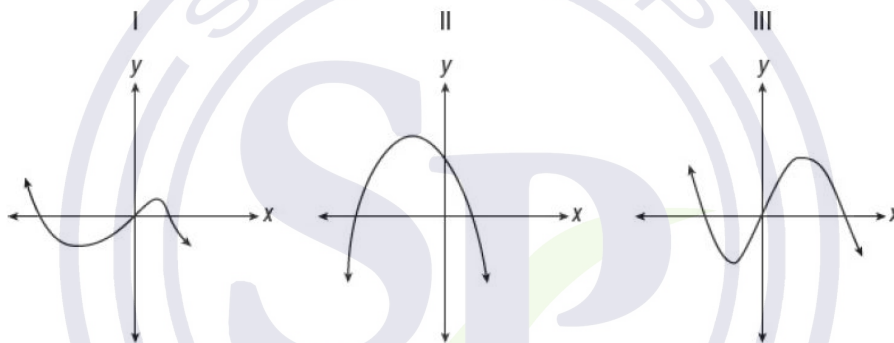
13. Which of the following is equivalent to the expression above?

(A) $\dfrac{5y^2}{x-y}$

(B) $\dfrac{y^2}{x-y}$

(C) $\dfrac{xy}{x-y}$

(D) $\dfrac{x+y}{xy}$

$$f(x) = (2 - 3x)(x + 3) + 4(x^2 - 6)$$
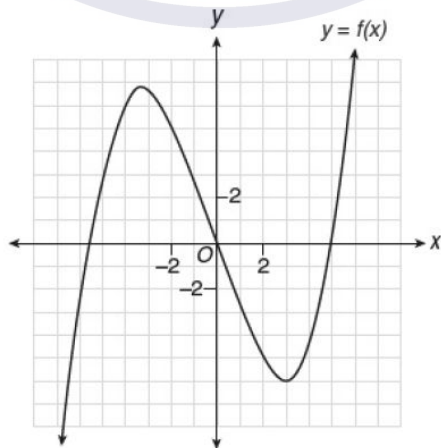
14. What is the sum of the zeros of function f defined by the equation above?

    (A) 3
    (B) 6
    (C) 7
    (D) 11

15. A polynomial function contains the factors x, $x - 2$, and $x + 5$. Which of the graph(s) above could represent the graph of this function?

    (A) I only
    (B) II only
    (C) III only
    (D) I and III

$y = f(x)$

16–18 The graph of polynomial function *f* is shown above.

16. What is the greatest integer value of *k* for which $f(x) = k$ has exactly 3 real solutions?

    (A) –5
    (B) 0
    (C) 6
    (D) 7

17. What is the best estimate of the remainder when $f(x)$ is divided by $x + 3$?

    (A) –6.0
    (B) 0
    (C) 6.5
    (D) It cannot be determined.

18. What is the maximum number of points a circle whose center is at the origin can intersect the graph of $y = f(x)$?

    (A) 2
    (B) 3
    (C) 4
    (D) 6

$$(y^2 + ky - 3)(y - 4) = y^3 + by^2 + 5y + 12$$

19. In the equation above, *k* is a nonzero constant. If the equation is true for all values of *y*, what is the value of *k*?

    (A) $\frac{1}{2}$
    (B) –2
    (C) 4
    (D) 6

$$\frac{16a^4 - 81b^4}{8a^3 + 12a^2b + 18ab^2 + 27b^3}$$

20. Which of the following expressions is equivalent to the expression above?

    (A) $4a^2b + 9ab^2 - a^2b^2$
    (B) $4a^2b - 9ab^2$
    (C) $2a + 3b$
    (D) $2a - 3b$

Grid-In

$$\frac{k}{6} + \frac{3(1 - k)}{4} = \frac{k - 5}{2}$$

1. What is the solution for *k* in the equation above?

$$\frac{3}{2} = \frac{-(5m - 3)}{3m} + \frac{7}{12m}$$

2. What is the solution for m in the equation above?

$$f(x) = x^3 + 5x^2 - 4x - 20$$

3. How many of the zeros of function f defined by the equation above are located in the interval $-4 \le x \le 4$?

$$\frac{t}{t-3} - \frac{t-2}{2} = \frac{5t-3}{4t-12}$$

4. If x and y are solutions of the equation above and $y > x$, what is the value of $y - x$?

$$x^3 + 150 = 6x^2 + 25x$$

5. What is the sum of all values of x that satisfy the equation above?

$$p(t) = t^5 - 3t^4 - kt + 7k^2$$

6. In the polynomial function above, k is a nonzero constant. If $p(t)$ is divisible by $t - 3$, what is the value of k?