SATPREP

Assignment : *Quadratics*

Easy

1. How many points does the graph of function, $f(x) = x^2 - 1$, cross the x-axis? Ⓡ
    a) 0
    b) 1
    c) 2
    d) 3

2. If $x^2 - 64 = 0$, which of the following could be a value of x?
    a) −4
    b) −8
    c) 2
    d) 4

3. If $x^2 = 16$ and $2y^3 = -16$, which of the following could be true?

   I. $x = 4$
   II. $y = 2$
   III. $x + y = 2$
   a) I only
   b) II only
   c) 1 and III only
   d) I, II, and III

4. What are the solutions of x for which $(x - 1)(x + 2) = 0$?
   a) –1
   b) –2
   c) 1 and –2
   d) –1 and 2

5. Equation $(x + 2)(x + a) = x^2 + 4x + b$ where a and b are constants. If the equation is true for all values of x, what is the value of b?
   a) 8
   b) 6
   c) 4
   d) 2

6. If $x < 2$ and $a(x - 2)(x - 3) = 0$, what is the value of a?
   a) 3
   b) 2
   c) 1
   d) 0

7. In the xy-coordinate system, $(k, 7)$ is one of the points of intersection of the graphs $y = 2x^2 - 3$ and $y = -x^2 + m$, where m and k are constants. What is the value of m?
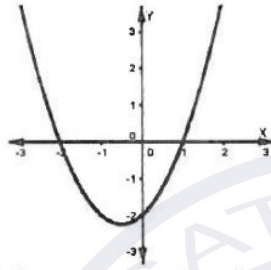   a) 6
   b) 8
   c) 10
   d) 12

8. If $x - 2$ is a factor of $x^2 - ax - 8$, what is the value of a?
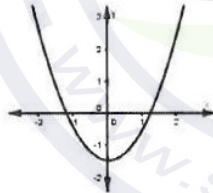   a) 2
   b) 4
   c) –4
   d) –2

Medium

9. If $x(x - 4) = -4$, what is the value of $x^2 + 3x - 5$?
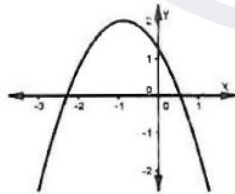   a) 3
   b) 5
   c) 1
   d) 0

10. Which of the following equations best describes the curve in the figure above?
    a) $y = x^2 - 2$
    b) $y = x^2 + 2$
    c) $y = x^2 + x + 2$
    d) $y = x^2 + x - 2$

11. If the function f is defined by $f(x) = ax^2 + bx + c$, where $a < 0$, $b > 0$, and $c > 0$, which of the following could be the graph of $f(x)$?
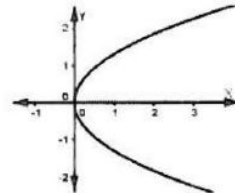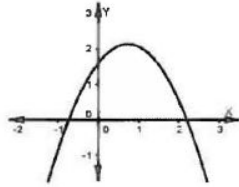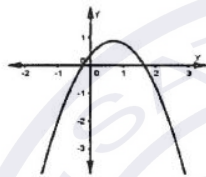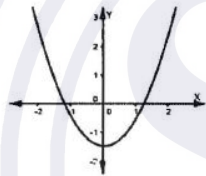   a)

    b)

    c)

d)

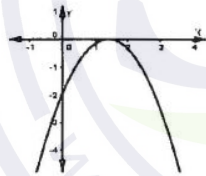12. Which of the following could be a graph of the equation $y = ax^2 + bx + c$, where $b^2 - 4ac = 0$?

a)

b)

c)

d)
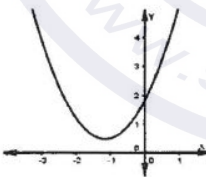
13. At what points the graph of $y = x^2 + 2x - 8$ cuts the x-axis?

a) $(-2, 0)$ and $(0, 0)$
b) $(0, 0)$ and $(2, 0)$
c) $(2, 0)$ and $(-4, 0)$
d) $(4, 0)$ and $(2, 0)$

14. A baseball is hit and flies into a field at a trajectory defined by the equation $d = -1.2t^2 + 100$, where t is the number of seconds after the impact and d is the horizontal distance from the home plate to the outfield fence. How many seconds have passed if the ball is 50 meters away from the outfield fence?

Hard

15. At a particular time, the speed (velocity) of a car is equal to the slope of the tangent line of the curve in the position-time graph. Which of the following position-time graphs represents the motion of a car when its speed (velocity) is constant?

a)

b)

c)

d)
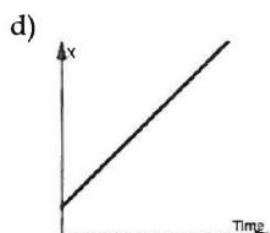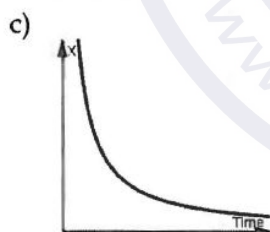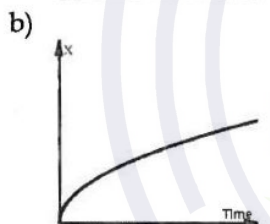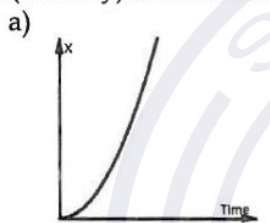
21. The axis of symmetry for $f(x) = x^2 + 3x - 2$ is $x = ?$
    a) 3
    b) −1
    c) 1
    d) −1.5

22. If the value of $f(x) = x^2 - 5x - 2k$ is always positive for any x, which of the following could be the value of k?
    a) −2
    b) −3
    c) −4
    d) 3

23. If the ratio of the two roots of the equation $x^2 - kx + 8 = 0$ is $1 : 2$, find all the possible values of k.
    a) {2, 3}
    b) {3, 6}
    c) {−2, 2}
    d) {−6, 6}

24. What is the range of the quadratic function $f(x) = x^2 - 10x + 23$?
    a) $y \geq -2$
    b) $y \leq -2$
    c) $x \geq 5$
    d) $x \leq 5$

25. In the xy-plane, the point $(-1, 2)$ is the minimum of the quadratic function $f(x) = x^2 + ax + b$. What is the value of $|a - 2b|$?

    a) 7.75
    b) 2.25
    c) 0
    d) −2