St John Baptist De La Salle Catholic School
Mathematics Olympiad
Grade 10

March, 2023

1. Which one of the following is true about the graph of a quadratic function $f(x) = ax^2 + bx + c$?

    A. It has a Y - intercept

    B. It is increasing

    C. It has exactly two zeros

    D. It has exactly one x intercept

2. On a coordinate plane, $\triangle PQR$ has vertices $P(-1,0)$, $Q(3,0)$, and $R(2,3)$. The distance from the point of concurrency of medians to the vertex R is

    A. $\frac{1}{3}\sqrt{10}$ B. $\frac{\sqrt{10}}{2}$ C. $\frac{2}{3}\sqrt{10}$ D. $\frac{3}{4}\sqrt{10}$

3. What is the value of x for which $9^{x-1} + 6 = 3^{2x-1}$ is true?

    A. $\frac{3}{2}$ B. 1   C. $\frac{1}{2}$ D. 0

4. Which of the following is the solution set of the equation $\log_3^x - 2\log_x^9 = 0$?

    A. $\{-9, 9\}$ B. $\{9, \frac{1}{9}\}$ C. $\{-9, \frac{1}{9}\}$ D. $\{3, \frac{1}{9}\}$

5. Which one of the following is not a polynomial function?

    A. $\sqrt{x^4 + 2x^2 + 1}$ B. $2\sqrt{x}(x\sqrt{x} - 3\sqrt{x})$ C. $2x^3 + x^2\sqrt{3} + 4^{-0.7}$ D. $|x^2 - x + 1|$

6. Let $f(x) = \log_2^{x-1}$. The graph of $f(x)$ doesn't pass through:

    A. $(2, 0)$ B. $(1.5, -1)$ C. $(0, \frac{1}{2})$ D. $(1.25, -2)$

7. If the two vertices of an equilateral triangle are $A(2, 4)$ and $B(2, 8)$. What is the 3rd vertex of the triangle?

    A. $(2 + 2\sqrt{3}, 6)$ B. $(2 - 2\sqrt{6}, 6)$ C. $(2 + 2\sqrt{6}, 3)$ D. $(2, 6)$

8. If c is a real number such that $x - c$ is a factor of $x^3 + 2x^2 - c^2x - 8$, then the value of c is

9. What is the simplified form of $\log_2^{(\log_2^{16})}$

10. The solution(s) of the equation $|x - 1| = 1 - x$ is (are)