



FOR LOGO 0902822746



ΦΗΓΟ ACADEMY

O f f i c i a l T e l e g r a m C h a n n e l

I: True and False Questions

Write **TRUE** if the statement is correct, write **FALSE** if the statement is incorrect on the space provided. (1.5pt each)

1. _____ Polynomial of degree 4 has at most four roots.
2. _____ The graph of $f(x) = \frac{x^2 - x - 2}{x^2 + 1}$ has a vertical asymptote at $x = -1$.
3. _____ A rational function $R(x) = \frac{P(x)}{Q(x)}$ has a horizontal asymptote only if degree $P(x) <$ degree $Q(x)$.
4. _____ For any complex number Z , the product $Z \cdot \bar{Z}$ is a complex number.
5. _____ Let z_1 and z_2 are complex numbers, then the argument $\text{Agr}(z_1 \cdot z_2) = \text{Agr}(z_1) + \text{Agr}(z_2)$.
6. _____ Let $f(x)$ and $g(x)$ are functions, $\text{Dom}(f + g) = \text{Dom}(f) \cap \text{Dom}(g)$.

II: Fill The blank Space Questions

Fill in the blank space with simplified answer on the space provided. (1 pt each)

1. Let $Z = (\sqrt{5} - 2i)^5$

- (a) Modulus and argument of Z respectively are _____ and _____
(b) Polar form of Z is _____
(c) Euler's form of Z is _____

2. The standard forms the complex number $\frac{4+3i}{1+i} =$ _____

3. Let $B = \{1, 2, 3, 4, 5, 6, 7, 8\}$. Define relation on B by, $R = \{(x, y) : y = x + 2\}$ then

- (a) $R =$ _____
(b) $R^{-1} =$ _____

- (c) Domain of R is _____ and Domain of R^{-1} is _____

4. A polynomial that has exactly three roots $-2, 3, 4$ with multiplicity 2, 1, 1 respectively is _____

III: Multiple Choice Questions

Choose the best answer from the given alternative and write the answer on the space provided. (1.5pt each)

1. — Which one of the following is the standard form of the complex number $\frac{-28 - \sqrt{-240}}{4}$?
A. $-7 + 15i$ B. $-7 + i\sqrt{240}$ C. $-7 - i\sqrt{15}$ D. $-7 + i\sqrt{15}$
2. — Let $f(x) = 2x^2 - 1$ and $g(x) = x - 2$, then $(f \circ g)(x)$ is
A. $2x^2 - 8x + 7$ B. $2x^3 + 8x^2 + 4x - 3$ C. $2x^2 + 8x + 7$ D. $4x^2 + 8x - 7$
3. — Which one of the following is the domain of the function $f(x) = \sqrt{x+1} - \frac{1}{\sqrt{2-x}}$?
A. $[1, 2]$ B. $(1, 2]$ C. $[1, 2)$ D. $(1, 2)$ E. $[-1, 2)$
4. — If $f(x) = x^3 + 3$ then $f^{-1}(11)$ equals
A. 1 B. 2 C. 3 D. 4 E. 5
5. — What is the remainder when $f(x) = x^{100} - 2x^{49} - 1$ is divided by $(x - 1)$?
A. 1 B. 2 C. 3 D. -2 E. -1
6. — Let $\mathbb{R} \rightarrow \mathbb{R}$, defined by $f(x) = x^3 + 2$, then which one of the following is true for any real number x ?
A. f is onto but not one to one B. f is one to one correspondence
C. f is neither one to one D. f is one to one but not onto
7. — The vertical asymptotes of the function $f(x) = \frac{x^2 + 4x + 4}{x(x+1)}$ is / are:
A. $x = -1$ only B. $x = 0$ only C. $x = 0$ and $x = -1$ D. $y = 1$
8. — Which one of the following is the values of x and y if $(x - iy)(3 + i) = -11 + 3i$?
A. $(x, y) = (2, 3)$ B. $(x, y) = (3, 2)$ C. $(x, y) = (-2, 3)$ D. $(x, y) = (-3, -2)$



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3. Write all solutions of $z^3 = 27i$ in polar and Cartesian form, simplified as much as possible. (5pt)

III: Multiple Choice Questions

Choose the best answer from the given alternatives and write the answer on the space (1.5pt each)

- Which one of the following is the standard form of the complex number $\frac{2-i\sqrt{3}}{1-i}$?
 A. $-7 + 15i$ B. $-7 + i\sqrt{24}$ C. $-7 - i\sqrt{3}$ D. $-7 + i\sqrt{3}$
- Let $f(x) = 2x^2 - 1$ and $g(x) = x - 2$, then $(f \circ g)(x)$ is
 A. $2x^2 - 8x + 7$ B. $2x^2 + 8x^2 + 4x - 3$ C. $2x^2 + 8x + 7$ D. $4x^2 + 8x - 7$
- Which one of the following is the domain of the function $f(x) = \sqrt{x+3} - \frac{1}{x-2}$?
 A. $[1, 2]$ B. $(1, 2]$ C. $[1, 2)$ D. $(1, 2)$ E. $[-1, 2)$
- If $f(x) = x^3 + 3$ then $f^{-1}(11)$ equals
 A. 1 B. 2 C. 3 D. 4 E. 5
- What is the remainder when $f(x) = x^{100} - 2x^{40} - 1$ is divided by $(x - 1)^2$?
 A. 1 B. 2 C. 3 D. -2 E. -1
- Let $\mathbb{R} \rightarrow \mathbb{R}$, defined by $f(x) = x^2 + 2$, then which one of the following is true for any real number x ?
 A. f is onto but not one to one B. f is one to one correspondence
 C. f is neither one to one D. f is one to one but not onto
- The vertical asymptotes of the function $f(x) = \frac{x^2 + 3x + 2}{x(x-1)}$ is / are
 A. $x = -1$ only B. $x = 0$ only C. $x = 0$ and $x = -1$ D. $y = 1$
- Which one of the following is the values of x and y if $(x - y)(3 + 2) = -12 + 36$
 A. $(x, y) = (2, 3)$ B. $(x, y) = (3, 2)$ C. $(x, y) = (-2, 3)$ D. $(x, y) = (-3, -2)$



2. Find $g(x)$ and $g^{-1}(x)$, where $f(x) = 2x + 1$ and $(f \circ g)(x) = 3x - 1$.