



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

Part I: [Short Answer] For each of the following seven questions write the most simplified answers on the space provided. [Each blank space worth 2 Pts].

- (1) Equation of a parabola/s with end points of its latus rectum $(3, -5)$ and $(-5, -5)$ is/are _____.
- (2) Let $U = \{0, 1, 2, 3, -4\}$ be the universal set. Then determine the truth value of
 - (a) $(\exists x)(\forall y)(x < y + 1)$ _____.
 - (b) $(\forall x)(\exists y)(x^2 + y^2 < 12)$ _____.
- (3) Let $A(4, 5)$ and $B(7, -1)$ be two points and the point C divides the line segment AB in the ratio $4 : 3$. Then the coordinate of C is _____.
- (4) For any two non-empty sets A and B , $n(A \triangle B) = n(A) + n(B) - 2n(A \cap B)$: Say True or False
_____.
- (5) If $GCF(45, x) = 9$ and $LCM(45, x) = 135$, then the value of x is _____.
- (6) The fraction form of $1.12\overline{73}$ is _____.
- (7) The distance from the origin to the line $3x + 4y = 5$ is _____.

Part II: [Multiple Choices] For each of the following five questions, choose and circle the best answer from the given alternatives. [Each question worth 2 Pts.]

- (1) Which of the following is/are **False**?
 - (a) Non-terminating non-periodic decimal is an irrational number.
 - (b) Every non-empty subset of $\mathbb{R}$ that has lower bounds has glb.
 - (c) glb and lub of a set are not necessarily in the set.
 - (d) The sum of any two irrational numbers is an irrational number.
- (2) What is the value of b so that, when $g(x) = 2x^2 + bx^3 - x^2 + 3$ is divided by $x + 1$ the remainder is 7?
 - (a) 1
 - (b) -1
 - (c) -3
 - (d) 3
- (3) Which of the following is **true** about the graph of the function $f(x) = \frac{x^2 - 4x + 4}{x^2 - 4}$?
 - (a) $(0, -1)$ is the y -intercept of the graph of f .
 - (b) $(2, 0)$ is the x -intercept of the graph of f .
 - (c) The line $y = 0$ is the horizontal asymptote to the graph of f .
 - (d) The lines $x = 2$ and $x = -2$ are vertical asymptotes of the graph of f .

(4) Which of the following is a **CORRECT** identity?

(b) $\frac{\sin x}{\csc x} - \frac{\cos x}{\sec x} = 1.$

(d) $\sinh^2 x + \cosh^2 x = 1.$

(c) $\frac{\sin^2 x}{\cos x} + \cos x = \sec x.$

(5) Find the center and vertices of the ellipse represented by $4x^2 + 9y^2 - 24x + 72y + 144 = 0.$

(a) Center $(3, -4)$, vertices $(7, 3), (-1, 3)$

(b) Center $(-3, 4)$, vertices $(0, -4), (6, -4)$

(c) Center $(3, -4)$, vertices $(0, -4), (6, -4)$

(d) Center $(-3, 4)$, vertices $(0, 4), (-6, 4)$

Part III: [Workout Problems] Attempt each of the following five questions by showing all the necessary steps on the space provided. [Each question worth the indicated points.]

- (1) Use **only** the method of truth table to determine the validity of
 $p \Rightarrow q, q \Rightarrow r \vdash (p \vee q) \Rightarrow r.$

[4]

- (2) Find all the fourth roots of the complex number $z = \sqrt{3} + i.$

[4]

[4 Pts.]

(3) Let $f(x)$ is a polynomial function such that $f(f(x)) = 3x + 2$. Then find $f(x)$.

(4) The center of a circle is on the line $y = 2x$ and the line $x = 1$ is tangent to the circle at $(1, 6)$. Find the center and radius of the circle. [4 Pts.]

- (5) Consider a hyperbola with foci $(3, 1)$ and $(3, 7)$ and one of its vertices is $(3, 6)$.
- (a) Find the center of the hyperbola.
 - (b) Find the equation of the hyperbola.