

(Lahore Board)
2020, Class 10th
(Mathematics)
(Group I)

1. $\frac{1}{1 + \sin \theta} + \frac{1}{1 - \sin \theta} = \text{_____} :$

- (A) $2 \sec^2 \theta$
- (B) $2 \cos^2 \theta$
- (C) $\sec^2 \theta$
- (D) $\cos^2 \theta$

2. **If** $\frac{u}{v} = \frac{v}{u} = k$, **then:**

- (A) $u = vk^2$
- (B) $u = wk^2$
- (C) $u = w^2k$
- (D) $u = v^2k$

3. **A histogram is a set of adjacent:**

- (A) Square
- (B) Rectangles
- (C) Circles
- (D) Triangles

4. **The measure of the external angle of a regular hexagon is:**

- (A) $\frac{\pi}{2}$
- (B) $\frac{\pi}{3}$
- (C) $\frac{\pi}{4}$
- (D) $\frac{\pi}{6}$

5. **A collection of well-defined objects is called:**

- (A) Subset
- (B) Proper set
- (C) Power set
- (D) Set

6. **The number of methods to solve a quadratic equation is:**

- (A) 1
- (B) 2
- (C) 3
- (D) 4

7. **A line which has only one point in common with a circle is called:**

- (A) Sine of a circle

- (B) Cosine of a circle
- (C) Tangent of a circle
- (D) Secant of a circle

8. Two linear factors of $x^2 - 15x + 56$ are :

- (A) $(x - 7) & (x + 8)$
- (B) $(x + 7) & (x - 8)$
- (C) $(x - 7) & (x - 8)$
- (D) $(x + 7) & (x + 8)$

9. $\frac{2x+1}{(x+1)(x-1)}$ is:

- (A) an improper
- (B) An equation
- (C) A proper fraction
- (D) Identity

10. Cube roots of -1 are:

- (A) $-1, -\omega, -\omega^2$
- (B) $-1, \omega, -\omega^2$
- (C) $-1, -\omega, \omega^2$
- (D) $1, -\omega, -\omega^2$

11. $A \cup (B \cap C)$ is equal to:

- (A) $(A \cup B)(A \cup C)$
- (B) $A \cap (B \cap C)$
- (C) $(A \cap B) \cup (A \cap C)$
- (D) $A \cup (B \cup C)$

12. A pair of chords of a circle subtending two congruent central angles is:

- (A) Congruent
- (B) Incongruent
- (C) Overlapping
- (D) Parallel

13. The spread or scattering of observations in a data set is called:

- (A) Average
- (B) Central tendency
- (C) Dispersion
- (D) Median

14. In a proportion $a:b :: c:d$, b and c are called:

- (A) Means
- (B) Extremes
- (C) Fourth proportional
- (D) Third proportional

15. The symbol for a triangle is denoted by:

- (A) \angle
- (B) Δ
- (C) \perp
- (D) \square

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Q. No. 2: Write short answers of any Six (6) question: 12

- i. Define exponential equation and give an example
- ii. Solve: $\left(2x - \frac{1}{2}\right)^2 = \frac{9}{4}$
- iii. Solve the given equation using quadratic formula: $2 - 2x^2 = 7x$
- iv. Evaluate: $(1 - \omega + \omega^2)^6$
- v. Using synthetic division, show that $x-2$ is a factor of $x^3 + x^2 - 7x + 2$
- vi. Write the quadratic equation having roots: 0, -3
- vii. Define proportion.
- viii. If $w \propto \frac{1}{v^2}$ and $w = 2$ when $v=3$ then find w .
- ix. Find a third proportional to:

Q. No 3: Write short answers of any Six (6) question: 12

- i. Define improper fraction with an example.
- ii. Resolve $\frac{5x+4}{(x-4)(x+2)}$ into partial fraction.
- iii. If $X - \phi, Y = Z$ then find $X \cap Y$
- iv. Find a and b, if $(2a+5, 3) - (7, b-4)$
- v. If set M has 5 elements, then find the numbers of binary relations in M.
- vi. Define a bijective function.
- vii. The marks of seven students in Mathematics are as follows, calculate the arithmetic mean.

Student No	1	2	3	4	5	6	7
Marks	45	60	74	58	65	63	49

- viii. Find the modal size of shoes for the following data:
4,4,5,5,6,6,6,7,7,5,7,5,8,8,8,6,5,6,5,7
- ix. Define median and write its formula.

Q. No. 4: Write short answers of any Six (6) question: 12

- i. Convert $\frac{3\pi}{4}$ radians to degrees
- ii. Find r when $l=52\text{cm}$ $\theta = 45^\circ$
- iii. In a $\triangle ABC, a = 17\text{cm}, b = 15\text{cm}$ and $c = 8\text{cm}$, find $m\angle A$

- iv. Define diameter of a circle.
- v. Define secant of a circle.
- vi. Define circumference of the circle.
- vii. Define central angle of a circle.
- viii. Define circum circle.
- ix. The length of each side of a regular octagon is 3cm. Measure its perimeter.

Part (II)

Q5 (a): Solve equation: $2x^4 = 9x^2 - 4$ 4

(b): solve by using synthetic division if -1 is the root of the equation 4
 $4x^3 - x^2 - 11x - 6 = 0$

Q6 (a) if $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ ($a, b, c, d, e, f \neq 0$) then show that $\frac{ac + ce + ea}{bd + df + fb} = \left[\frac{ace}{bdf} \right]^{2/3}$ 4

(b) Resolve into partial fractions: $\frac{3x + 7}{(x^2 + 1)(x + 3)}$ 4

Q7 (a) if $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 3, 5, 7\}$ then verify $(A \cup B)' = A' \cap B'$ 4

(b) The marks of six students in mathematics are given, determine variance. 4

Student	1	2	3	4	5	6
Marks	60	70	30	90	80	42

Q8 (a) Verify the identity $\cos^4 \theta - \sin^4 \theta = \cos^2 \theta - \sin^2 \theta$ 4

(b) About a circle of radius 3.5 cm, describe a regular hexagon. 4

Q9 Prove that two chords of a circle which are equidistant from the centre are congruent. 8

OR

Prove that any two angles in the same segment of a circle are equal