

**10<sup>th</sup> Grade Multan Board**

**Mathematics**

**2018**

**Group A**

**MCQ SECTION**

- 1. An equation which remains unchanged when “x” is replaced by  $1/x$  is called a/an: (Mark 1)**

  - A. Exponential Equation
  - B. Reciprocal Equation
  - C. Radial Equation
  - D. Quadratic Equation
  
- 2. Roots of equation  $4x^2 - 5x + 2 = 0$  are: (Mark 1)**

  - A. Irrational
  - B. Imaginary
  - C. Rational
  - D. Natural
  
- 3. Product of cube roots of unity is: (Mark 1)**

  - A. 1
  - B. 0
  - C. -1
  - D. 3

4. **The third proportional of  $x^2$  and  $y^2$  is:** (Mark 1)
- A.  $y^2 / x^2$
  - B.  $x^2 y^2$
  - C.  $y^4 / x^2$
  - D.  $y^2 / x^4$
5. **If  $\frac{a}{b} = \frac{c}{d}$ , then componendo property is:** (Mark 1)
- A.  $\frac{a-b}{b} = \frac{c-d}{d}$
  - B.  $\frac{a}{a-b} = \frac{c}{c-d}$
  - C.  $\frac{ad}{bc}$
  - D.  $\frac{a}{a+b} = \frac{c}{c+d}$
6. **A fraction in which the degree of the numerator is less than the degree of the denominator is called.** (Mark 1)
- A. An equation
  - B. An improper fraction
  - C. An identity
  - D. A proper fraction
7. **The number of elements in power set  $\{1, 2, 3\}$  is:** (Mark 1)
- A. 4
  - B. 6
  - C. 8
  - D. 9

- 8. The point  $(-1, 4)$  lies in the quadrant: (Mark 1)**  
A. II  
B. I  
C. IV  
D. III
- 9. A grouped frequency table is also called: (Mark 1)**  
A. Data  
B. Frequency distribution  
C. Frequency polygon  
D. Cumulative Frequency distribution
- 10. The union of two non-collinear rays which have common end point is called: (Mark 1)**  
A. An angle  
B. A degree  
C. A minute  
D. A radian
- 11. The symbol for a triangle is denoted by: (Mark 1)**  
A.  $\angle$   
B.  $\perp$   
C.  $\odot$   
D.  $\Delta$
- 12. A line which has two points in common with a circle is called: (Mark 1)**  
A. Sine of circle  
B. Cosine of circle  
C. Secant of circle  
D. Tangent of circle

- 13. A pair of chords of a circle subtending two congruent central angles is: (Mark 1)**
- A. Congruent
  - B. Incongruent
  - C. Overlapping
  - D. Parallel
- 14. The length of diameter of Circle is \_\_\_\_\_ times the radius of the circle: (Mark 1)**
- A. One
  - B. Two
  - C. Three
  - D. Four
- 15. The tangent and the radius of circle at the point of contact are: (Mark 1)**
- A. Parallel
  - B. Not Perpendicular
  - C. Perpendicular
  - D. Collinear

## SHORT QUESTION SECTION

- i). Solve  $5x^2 = 30x$  by factorization. (Marks 2)
- ii). Define Quadratic Equation (Marks 2)
- iii). Evaluate  $\omega^{37} + \omega^{38} - 5$  (Marks 2)
- iv). If  $\alpha, \beta$  are the roots of the equation  $4x^2 - 5x + 6 = 0$ , then find  
value of  $\frac{1}{\alpha} + \frac{1}{\beta}$  (Marks 2)
- v). Define Synthetic Division. (Marks 2)
- vi). Find the discriminant of the given equation.  
 $2x^2 - 7x + 1 = 0$  (Marks 2)
- vii). Find 'x' if  $3x - 2 : 4 :: 2x + 3 : 7$ . (Marks 2)
- viii). If  $w \propto \frac{1}{v^2}$  and  $w = 2$  when  $v = 3$ , Find  $w$ . (Marks 2)
- ix). Define Proportion. (Marks 2)

### Q # 3

- i). Define Rational Fraction. (Marks 2)
- ii). Resolve the fraction  $\frac{x^3 - x^2 + x + 1}{x^2 + 5}$  into proper fraction. (Marks 2)
- iii). If  $X = \{2, 4, 6, \dots, 20\}$  and  $Y = \{4, 8, 12, \dots, 24\}$ , then find  
 $X - Y$ . (Marks 2)
- iv). Define Binary Relation. (Marks 2)
- v). If  $L = \{a, b, c\}$  and  $M = \{3, 4\}$ , then find  $L \times M$  and  $M \times L$ . (Marks 2)

vi). If  $A = \{1, 2, 3, 4, 5, 6\}$  and  $B = \{2, 4, 6, 8\}$ , then Prove that  
 $A \cap B = B \cap A$ . (Marks 2)

vii). The marks of seven students in Mathematics are as follows.  
(Marks 2)

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

Calculate Arithmetic Mean.

viii). Define Harmonic Mean. (Marks 2)

ix). The Salaries of five teachers(in rupees) as follows: (Marks 2)  
11500, 12400, 15000, 14500, 14800

#### Q # 4

i). Define Angle of elevation. (Marks 2)

ii). Express  $\frac{7\pi}{8}$  Radian to Degree. (Marks 2)

iii). Find "r" when  $l = 52$  cm and  $\theta = 45^\circ$ . (Marks 2)

iv). Define Projection of a Point. (Marks 2)

v). Define Radial Segment. (Marks 2)

vi). Define Tangent of a Circle. (Marks 2)

vii). Define Segment of Circle. (Marks 2)

viii). Define Circumcircle. (Marks 2)

ix). Define Inscribed Circle. (Marks 2)

## LONG QUESTION SECTION

**Q. 5a). Solve  $5x^{1/2} = 7x^{1/4} - 2$ . (Marks 4)**

**Q.5 b). Solve the Simultaneous Equations. (Marks 4)**

$$x^2 + 2y^2 = 22$$

$$5x^2 + y^2 = 29$$

**Q.6 a). Using theorem of componendo-dividendo find the value of**

$$\frac{x+2y}{x-2y} + \frac{x+2z}{x-2z} \text{ if } x = \frac{4yz}{y+z} \quad \text{(Marks 4)}$$

**Q.6 b). Resolve into partial fractions  $\frac{9}{(x-1)(x+2)^2}$ . (Marks 4)**

**Q.7 a). If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  $A = \{1, 3, 5, 7, 9\}$ ,  
 $B = \{2, 3, 5, 7\}$  then prove that  $(A \cap B)' = A' \cup B'$**

(Marks 4)

**Q.7 b). Calculate the variance of the following data: (Marks 4)**

10, 8, 9, 7, 5, 12, 8, 6, 8, 2

**Q.8 a). Prove that  $\frac{\sin\theta + \cos\theta}{\tan^2\theta - 1} = \frac{\cos^2\theta}{\sin\theta - \cos\theta}$  (Marks 4)**

**Q.8 b). Circumscribe a circle about an equilateral triangle ABC  
with each side of length of 4cm. (Marks 4)**

**Q.9 Prove that if two chords of a circle which are equidistant from  
the centre, are congruent. (Marks 8)**

**(Choice)**

**Prove that opposite angles of any quadrilateral inscribed in a  
circle are supplementary.**

# 10<sup>th</sup> Grade Multan Board

## Mathematics

2018

### Group B

#### MCQ SECTION

- 1. The symbol used for a triangle is denoted by: (Mark 1)**
  - A.  $<$
  - B.  $\odot$
  - C.  $\perp$
  - D.  $\Delta$
- 2. A chord passing through the centre of a circle is called: (Mark 1)**
  - A. Secant
  - B. Circumference
  - C. Diameter
  - D. Radius
- 3. A pair of chords of a circle subtending two congruent central angles is: (Mark 1)**
  - A. Congruent
  - B. Incongruent
  - C. Overlapping
  - D. Parallel



4. **Angle inscribed in a semicircle is:** **(Mark 1)**  
A.  $\pi/4$   
B.  $\pi/3$   
C.  $\pi/2$   
D.  $\pi/6$
5. **\_\_\_\_\_ tangent/tangents can be drawn from a point outside the circle:** **(Mark 1)**  
A. One  
B. Four  
C. Three  
D. Two
6. **An equation of the type  $3^x + 3^{2-x} + 6 = 0$  is a/an:** **(Mark 1)**  
A. Exponential Equation  
B. Radical Equation  
C. Reciprocal Equation  
D. Quadratic Equation
7. **Two square roots of unity are:** **(Mark 1)**  
A. 1, -1  
B. 1,  $\omega$   
C. 1,  $-\omega$   
D.  $\omega$ ,  $\omega^2$
8. **If  $\alpha$ ,  $\beta$  are the roots of  $x^2 - x - 1 = 0$  then product of roots  $2\alpha$  and  $2\beta$  is:** **(Mark 1)**  
A. -2  
B. 2  
C. 4  
D. -4

9. In continued Proportion  $a : b = b : c$ ,  $ac = b^2$ ,  $b$  is said to be \_\_\_ proportional between  $a$  and  $c$ : (Mark 1)
- A. Third
  - B. Fourth
  - C. Means
  - D. Second
10. The fourth proportional  $w$  of  $x:y::v:w$  is: (Mark 1)
- A.  $xy/v$
  - B.  $vy/x$
  - C.  $xyv$
  - D.  $x/yv$
11. A fraction in which the degree of the numerator is less than the denominator is called: (Mark 1)
- A. An equation
  - B. An improper fraction
  - C. An identity
  - D. A proper fraction
12. A set with no elements is called: (Mark 1)
- A. Infinite set
  - B. Empty set
  - C. Singleton set
  - D. Super set
13. The range of  $R = \{1, 3\}, \{2, 2\}, \{3, 1\}, \{4, 4\}$  is: (Mark 1)
- A.  $\{1, 2, 4\}$
  - B.  $\{3, 2, 4\}$
  - C.  $\{1, 2, 3, 4\}$
  - D.  $\{1, 3, 4\}$

- 14. The spread or scatterness of observations in a data set is called: (Mark 1)**
- A. Average
  - B. Dispersion
  - C. Central tendency
  - D. Median
- 15. The union of two non-collinear rays, which have common end points is called: (Mark 1)**
- A. An angle
  - B. A degree
  - C. A minute
  - D. A radian

## SHORT QUESTION SECTION

### Q # 2

- i). Write the equation in standard form. (Marks 2)

$$\frac{1}{x+4} + \frac{1}{x-4} = 3$$

- ii). Define Quadratic Equation (Marks 2)

- iii). Discuss the nature of the roots of the equation. (Marks 2)

$$x^2 + 6x - 1 = 0$$

- iv). Evaluate  $(1 - \omega + \omega^2)^6$  (Marks 2)

- v). If  $\alpha, \beta$  are the roots of the equation  $4x^2 - 5x + 6 = 0$ , then find value of  $\frac{1}{\alpha} + \frac{1}{\beta}$  (Marks 2)

- vi). Find the discriminant of the given equation.

$$2x^2 + 3x - 1 = 0 \quad (\text{Marks 2})$$

- vii). Find 'a' if ratios  $a + 3 : 7 + a$  and  $4 : 5$  are equal. (Marks 2)

- viii). Define Inverse Variation. (Marks 2)

- ix). If  $A \propto \frac{1}{r^2}$  and  $A = 2$  when  $r = 3$ , Find 'r' when  $A = 72$ . (Marks 2)

### Q # 3

- i). Define Fraction. (Marks 2)

- ii). Resolve into proper fraction  $\frac{3x+3}{(x-1)(x+2)}$  (Marks 2)

- iii). If  $X = \{a, b, c\}$  and  $Y = \{d, c\}$ , then find  $X \times Y$ . (Marks 2)
- iv). Define Binary Relation. (Marks 2)
- v). If  $A = \{1, 3, 5, 7, \dots, 19\}$  and  $B = \{0, 2, 4, 6, \dots, 20\}$ , then  
Find  $X \cup Y$  (Marks 2)
- vi). Find a and b if  $(a - 4, b - 2) = (2, 1)$  (Marks 2)
- vii). Define Mode. (Marks 2)
- viii). Define Arithmetic Mean. (Marks 2)
- ix). Write the formula to find the mode for grouped data. (Marks 2)

#### Q # 4

- i). Define Quadrantal angle. (Marks 2)
- ii). Verify that  $(\tan\theta + \cot\theta)\tan\theta = \sec^2\theta$  (Marks 2)
- iii). Find “ $l$ ” when  $\theta = 180^\circ$  and  $r = 4.9$  cm. (Marks 2)
- iv). Define right angle. (Marks 2)
- v). Define Chord of a Circle. (Marks 2)
- vi). Find half of the perimeter of circle with  $\pi = 3.1416$ ,  $r = 20$  cm. (Marks 2)
- vii). Define Sector of Circle. (Marks 2)
- viii). What is meant by incentre of triangle. (Marks 2)
- ix). Define Circumcircle. (Marks 2)

## LONG QUESTION SECTION

**Q. 5a). Solve  $x^2 - 2x - 195 = 0$  by completing square method.**

**(Marks 4)**

**Q.5 b). Prove that  $x^3 + y^3 = (x + y)(x + \omega y)(x + \omega^2 y)$ .** (Marks 4)

**Q.6 a). Using componendo-dividendo theorem, solve the equation**

$$\frac{(x+3)^2 - (x-5)^2}{(x+3)^2 + (x-5)^2} = \frac{4}{5} \quad \text{(Marks 4)}$$

**Q.6 b). Resolve into partial fractions  $\frac{9}{(x-1)(x+2)^2}$ .** (Marks 4)

**Q.7 a). If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  $A = \{1, 3, 5, 7, 9\}$ ,  
 $B = \{2, 3, 5, 7\}$  then prove that  $(A \cap B)' = A' \cup B'$**

**(Marks 4)**

**Q.7 b). The marks of six students in Mathematics are as follows.**

**Determine Standard Deviation:**

**(Marks 4)**

<b>Students No</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Marks Obtained</b>	<b>60</b>	<b>70</b>	<b>30</b>	<b>90</b>	<b>80</b>	<b>42</b>

**Q.8 a). Prove that  $\frac{1 + \sin\theta}{1 - \sin\theta} - \frac{1 - \sin\theta}{1 + \sin\theta} = 4 \tan\theta \sec\theta$**  (Marks 4)

**Q.8 b). Draw two circles with radii 3.5 cm and 2 cm. If their centres are 6 cm apart, then draw two transverse common tangents.**

**(Marks 4)**

**Q.9 Prove that if two chords of a circle which are equidistant from the centre, are congruent.** (Marks 8)

**(Choice)**

**Prove that opposite angles of any quadrilateral inscribed in a circle are supplementary.**