

# Gujranwala Board

10<sup>th</sup> – 2018

## Mathematics Group 1

i) 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. radical equation
- D. quadratic equation

Answer:

B. reciprocal equation

ii) If  $b^2 - 4ac < 0$ , then the roots of  $ax^2 + bx + c = 0$ , are: (Mark 1)

- A. irrational
- B. rational
- C. imaginary
- D. Real

Answer:

C. Imaginary

iii)  $\alpha^2 + \beta^2$  is equal to: (Mark 1)

- A.  $\alpha^2 - \beta^2$
- B.  $(1/\alpha^2 + 1/\beta^2)$
- C.  $(\alpha + \beta)^2 - 2\alpha\beta$
- D.  $\alpha + \beta$

Answer:

C.  $(\alpha + \beta)^2 - 2\alpha\beta$

iv) The third proportional of  $x^2$  and  $y^2$  is: (Mark 1)

- A.  $y^2/x^2$
- B.  $x^2y^2$
- C.  $y^4/x^2$
- D.  $y^2/x^4$

Answer:

C.  $y^4/x^2$

v) If  $a:b=x:y$ , then invertendo property is: (Mark 1)

- A.  $a/x = b/y$
- B.  $a/(a-b) = x/(x-y)$
- C.  $(a+b)/b = (x+y)/y$
- D.  $b/a = y/x$

Answer:

D.  $b/a = y/x$

vi) Partial fraction of  $(x-2) / ((x-1)(x+2))$  are of the form: (Mark 1)

- A.  $A/(X-1) + B/(X+2)$
- B.  $Ax/(x-1) + B/(x+2)$
- C.  $A/(x-1) + (Bx+C)/(x+2)$
- D.  $(Ax+B)/(x-1) + C/(x+2)$

Answer:

- A.  $A/(X-1) + B/(X+2)$

vii) 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.  $\{1,3,4\}$

Answer:

- C.  $\{1,2,3,4\}$

viii) Point  $(-1,4)$  lies in the quadrant: (Mark 1)

- A. I
- B. II
- C. III
- D. IV

Answer:

- B. II

ix) The most frequent occurring observation in the data set is called:

(M

ark 1)

- A. mode
- B. median
- C. harmonic mean
- D. arithmetic mean

Answer:

- A. mode

x)  $\sec^2\theta = \underline{\hspace{1cm}}$ : (Mark 1)

- A.  $1 - \sin^2\theta$
- B.  $1 + \tan^2\theta$
- C.  $1 + \cos^2\theta$
- D.  $1 - \tan^2\theta$

Answer:

- B.  $1 + \tan^2\theta$

xi) The symbol for a triangle is denoted by: (Mark 1)

- A.  $<$
- B.  $\Delta$
- C.  $\perp$
- D.  $\odot$

Answer:

B.  $\Delta$

xii) Tangents drawn at the ends of a diameter of a circle are \_\_\_ to each other. (Mark 1)

- A. parallel
- B. non-parallel
- C. collinear
- D. perpendicular

Answer:

A. parallel

xiii) An arc subtends a central angle of  $40^\circ$ , then the corresponding chord will subtend a central angle of: (Mark 1)

- A.  $20^\circ$
- B.  $40^\circ$
- C.  $60^\circ$
- D.  $80^\circ$

Answer:

B.  $40^\circ$

xiv) The portion of a circle between two radii and an arc is called:

(Mark 1)

- A. Sector
- B. segment
- C. chord
- D. perpendicular

Answer:

A. Sector

xv) The measure of the external angle of a regular hexagon is: (Mark 1)

- A.  $\pi/3$
- B.  $\pi/2$
- C.  $\pi/6$
- D.  $3\pi/4$

Answer:

A.  $\pi/3$

Q.2 i) Define reciprocal equation. (Marks 2)

Q.2 ii) Write in standard form. (Marks 2)

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

**Answer:**

Q.2 iii) Define 'Synthetic Division'. (Marks 2)

**Q.2 iv) Write the quadratic equation having the roots  $3 + \sqrt{2}$ ,  $3 - \sqrt{2}$**

**(Marks 2)**

**Answer:**

Q.2 v) Evaluate  $\omega^{37} + \omega^{38} + 1$  (Marks 2)

Q.2 vi) Without solving, find sum and product of the roots of quadratic equation  $(a+b)x^2 - ax + b = 0$  (Marks 2)

Q.2 vii) Define 'Direct variation'. (Marks 2)

Q.2 viii) Find the fourth proportion to 6, 7, 8. (Marks 2)

Q.2 ix) Find 'x'  $3x - 2 : 4 :: 2x + 3 : 7$ . (Marks 2)

Q.3 i) Define fraction. (Marks 2)

**Q.3 ii) Resolve into partial fractions (Marks 2)**

$$\frac{3x+3}{(x-1)(x+2)}$$

**Answer:**

Q.3 iii) Find sets X and Y if  $X \times Y = \{(a,a), (b,a), (c,a), (d,a)\}$ . (Marks 2)

Q.3 iv) If  $Y = \{-2, 1, 2\}$ , then make two binary relations for  $Y \times Y$ . (Marks 2)

Q.3 v) Define range of a relation. (Marks 2)

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

**Q.3 vii) The salaries of five teachers are as follows, find the mean salaries 11500, 12400, 15000, 14500, 14800. (Marks 2)**

Q.3 viii) Define standard deviation. (Marks 2)

Q.3 ix) For the following data find the harmonic mean: (Marks 2)

4	8	5	12	X
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Q.4 i) Define coterminal angle. (Marks 2)

Q.4 ii) Convert  $13\pi/16$  into degree. (Marks 2)

Q.4 iii) Prove that  $\cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$ . (Marks 2)

Q.4 iv) Define zero dimension. (Marks 2)

Q.4 v) Define circumcircle. (Marks 2)

Q.4 vi) Define tangent. (Marks 2)

Q.4 vii) Define chord of a circle.

(Marks 2)

Q.4 viii) Define circum angle.

(Marks 2)

Q.4 ix) Define vertices.

(Marks 2)

**Q.5 a) Solve:**  $\sqrt{x+1} + \sqrt{x-2} = \sqrt{x+6}$

**(Marks 4)**

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Q.5 b) Solve the simultaneous equations:

(Marks 4)

$$4x^2 - 5y^2 = 6$$

$$3x^2 + y^2 = 14$$

**Q.6 a) If  $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$  ( $a, b, c, d, e, f \neq 0$ ), then by**

**using K-method show that:  $\frac{a}{b} = \sqrt{\frac{a^2+c^2+e^2}{b^2+d^2+f^2}}$**

**(Marks 4)**

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**Q.6 b) Resolve  $\frac{7x+4}{(3x+2)(x+1)^2}$  into partial fractions.**

**(Marks 4)**

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Q.7 a) If  $A = \{1, 2, 3, 4, 5, 6\}$ ,  $B = \{2, 4, 6, 8\}$  and  $C = \{1, 4, 8\}$ , then prove that

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

(Marks 4)

Q.7 b) Find the standard deviation 'S' of the set number: 12, 6, 7, 3, 15, 10, 18, 5.

(Marks 4)

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

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Q.8 b) Draw two circles with radii 2.5 cm and 3 cm. If their centers are 6.5 cm apart, then draw two direct common tangents. (Marks 4)

Q.9) Prove that a straight line drawn from the center of a circle to bisect a chord (which is not a diameter) is perpendicular to the chord. (Marks 8)

Q.9) Prove that the measure of a central angle of a minor arc of a circle is double than that of the angle subtended by the corresponding major arc. (Marks 8)

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## Mathematics Group 2

i) The length of a diameter of a circle is \_\_\_\_\_ times the radius of the circle.

(Mark 1)

- A. 1
- B. 2
- C. 3
- D. 4

Answer:

B. 2

ii) The arcs opposite to incongruent central angles of a circle are always:

(Mark

1)

- A. congruent
- B. Incongruent
- C. parallel
- D. perpendicular

Answer:

B. Incongruent

iii) Radii of the circle are:

(Mark 1)

- A. all equal
- B. all unequal
- C. double of the diameter
- D. half of any chord

Answer:

A. all equal

iv) Sum of deviations of the variable 'X' from its means is always

(Mark 1)

- A. zero
- B. 1
- C. same
- D. 2

Answer:

A. zero

v) A set with no element is called:

(Mark 1)

- A. empty set
- B. subset
- C. singleton set

D. supper set

Answer:

A. empty set

vi) In a proportion  $a:b::c:d$  'a' and 'd' are called:

(Mark 1)

A. means

B. extremes

C. third proportional

D. fourth proportional

Answer:

B. extremes

**vii)  $\frac{1}{\alpha} + \frac{1}{\beta}$  is equal to:**

**(Mark 1)**

A.  $\frac{1}{\alpha}$

B.  $\frac{1}{\alpha} - \frac{1}{\beta}$

C.  $\frac{\alpha-\beta}{\alpha\beta}$

D.  $\frac{\alpha+\beta}{\alpha\beta}$

viii) The number of terms in a standard quadratic equation  $ax^2+bx+c=0$  is

(Mark 1)

A. 1

B. 2

C. 3

D. 4

ix) The circumference of a circle is called:

(Mark 1)

A. chord

B. segment

C. boundary

D. diameter

Answer:

C. boundary

x) A line which has two points in a common with a circle is called

(Mark 1)

A. sine of a circle

B. cosine of a circle

C. tangent of a circle

D. secant of a circle

Answer:

D. secant of a circle

xi) The number of elements in a power set  $\{1,2,3\}$  is:

(Mark 1)

- A. 4
- B. 6
- C. 9
- D. 8

Answer:

D. 8

**xii)  $\frac{x^3+1}{(x-1)(x+2)}$  is\_\_\_\_\_.** **(Mark 1)**

- A. A proper fraction
- B. An improper fraction
- C. An identity
- D. A constant term

xiii) The union of two non-collinear rays which have common endpoint is called: (Mark 1)

- A. an angle
- B. a degree
- C. a minute
- D. a radian

Answer:

A. an angle

**xiv) Find 'x' in a proportion 4:x::5:15** **(Mark 1)**

- A.  $\frac{75}{4}$
- B.  $\frac{4}{3}$
- C.  $\frac{3}{4}$
- D. 12

**xv) Cube roots of '-1' are:** **(Mark 1)**

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

Q.2 i) Solve  $x^2 - 11x = 152$  by factorization. (Marks 2)

Q.2 ii) Solve  $5x^2 = 30x$  by factorization. (Marks 2)

**Q.2 iii) Evaluate  $\omega^{37} + \omega^{38} - 5$**  **(Marks 2)**

**Q.2 iv) if  $\alpha, \beta$  are the roots of the equation  $4x^2 - 5x + 6 = 0$ , then find the value of  $\alpha^2\beta^2$  (Marks 2)**

Q.2 v) Write the quadratic equation having roots  $1+i, i+1$ . (Marks 2)

Q.2 vi) Define synthetic division. (Marks 2)

Q.2 vii) Find the value of  $p$  if the ratios  $2p + 5 : 3p + 4$  are equal. (Marks 2)

**Q.2 viii) If  $y \propto \frac{1}{x}$  and  $y = 4$  when  $x = 3$ , find  $y = 24$  (Marks 2)**

Q.2 ix) Find mean proportional between 25 and 45. (Marks 2)

**Q.3 i) Resolve into partial fractions  $\frac{3x+3}{(x-1)(x+2)}$ . (Marks 2)**

Q.3 ii) Define identity. (Marks 2)

Q.3 iii) If  $A = \{0, 2, 4\}$ ,  $B = \{-1, 3\}$ , then find  $A \times A$  and  $B \times B$ . (Marks 2)

Q.3 iv) Define intersection of sets. (Marks 2)

**Q.3 v) If  $A = \{1, 2, 3, 4, 5\}$  and  $B = \{2, 4, 5, 6, 8\}$ , then find  $A \cap B$  and  $A \cup B$ . (Marks 2)**

Q.3 vi) Write De-Morgan's law (Marks 2)

Q.3 vii) Define Moving averages (Marks 2)

Q.3 viii) Find geometric mean of the observations 2, 4, 8, by using basic formula. (Marks 2)

Q.3 ix) The marks of seven students in mathematics are 45, 60, 74, 58, 65, 63, 49. Calculate the arithmetic mean. (Marks 2)

Q.4 i) Define 'Coterminal Angle'. (Marks 2)

**Q.4 ii) Convert  $\frac{13\pi}{6}$  radian to degree measure. (Marks 2)**

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

Q.4 iv) Define 'Right Angle'. (Marks 2)

Q.4 v) What is major arc of a circle? (Marks 2)

Q.4 vi) Define Secant. (Marks 2)

Q.4 vii) Define segment of a circle

(Marks 2)

Q.4 viii) Define 'Chord of a circle'.

(Marks 2)

Q.4 ix) Define 'Polygon'

(Marks 2)

**Q.5 a) Solve the equation:  $5x^{1/2} = 7x^{1/4} - 2$  (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 theorem of componendo-dividendo, find the value of  $\frac{x+2y}{x-2y} + \frac{x+2z}{x-2z}$  if  $x = \frac{4yz}{y+z}$  (Marks 4)**

**Q.6 b) Resolve  $\frac{7x+4}{(3x+2)(x+1)^2}$  into partial fractions.**

**(Marks 4)**

**Q.7 a) If  $A=\{1,2,3,4,5,6\}$ ,  $B=\{2,4,6,8\}$  and  $C= \{1,4,8\}$  then prove that**

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C) \quad \text{(Marks 4)}$$

Q.7 b) The marks of seven students in mathematics are as follows. Determine variance (Marks 4)

Students	1	2	3	4	5	6	7
Marks	45	60	74	58	65	63	49

**Q.8 a) Verify 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) Inscribe a circle in equilateral triangle ABC with each side of length 5cm. (Marks 4)

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

OR

Q.9) Prove that, the measure of a central angle of a minor arc of a circle, is double that of the angle subtended by the corresponding major arc.

