

Dream Scholars League 2014-15

Class X: Mathematics Scholarship Exam: Sample Question Paper

General Instructions:

- There are 60 questions. All questions are compulsory.
- Shade the right answer in the OMR sheet provided A) B) C) D)
- Time allotted is 60 minutes. Total Marks = 60 Marks

Q.1) If $\alpha + \beta = \frac{\pi}{2}$ and $\sin \alpha = \frac{1}{3}$, then $\sin \beta =$ _____.

- A) $\frac{\sqrt{2}}{3}$ B) $\frac{2\sqrt{2}}{3}$ C) $\frac{2\sqrt{2}}{5}$ D) $\frac{3}{4}$

Q.2) If ABC is an acute angled triangle and BD is perpendicular to AC, then $\frac{\sin A}{\sin C} =$ _____.

- A) $\frac{AB}{BC}$ B) $\frac{BC}{AB}$ C) $\frac{BC}{CD}$ D) $\frac{CD}{BC}$

Q.3) If $\sqrt{3} \tan \theta = 1$, then the value of θ is _____.

- A) 45° B) 30° C) 60° D) 90°

Q.4) $\tan^2 45^\circ + 2 \tan^2 60^\circ =$ _____.

- A) 1 B) 7 C) 0 D) $\sqrt{3}$

Q.5) The minimum value of $\tan^2 \alpha + \cot^2 \alpha$ is _____.

- A) 2 B) 3 C) 1 D) 0

Q.6) If $\tan (A+B) = \sqrt{3}$ and $\tan A = 1$, then $\angle B =$ _____.

- A) 30° B) 15° C) 45° D) 36°

Q.7) If $\sin 50^\circ = 0.766$, then $\sec 40^\circ =$ _____.

- A) 1 B) 0.766 C) $\frac{1}{0.766}$ D) 0

Q.8) The value of 36° in radians is _____.

- A) $\frac{\pi}{2}$ B) $\frac{2\pi}{5}$ C) $\frac{\pi}{5}$ D) 3π

Q.9) Which of the following is correct?

- A) $\sec^2 \alpha = 1 - \tan^2 \alpha$ B) $\sin^2 \alpha - \cos^2 \alpha = 1$
 C) $\tan \alpha \times \cot \alpha = 1$ D) $\tan 30^\circ = 1$

Q.10) The area of three rectangular fields are 165 m^2 , 195 m^2 and 285 m^2 . The three fields are divided into some smaller rectangular parts of equal area. If the breadth of each part is 3 m, then the length of each part is _____ m.

- A) 4 B) 15 C) 5 D) 7

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Q.11) The zeroes of the quadratic polynomial $x^2 - 3x - 4$ are _____.
 A) 1 and 3 B) 2 and 4 C) 1 and -1 D) 4 and -1

Q.12) If the sum of the squares of two consecutive natural numbers is 41, then the numbers are _____.
 A) 4 and 5 B) 5 and 6 C) 2 and 3 D) 3 and 4

Q.13) The common difference of AP $-5, 0, 5, 10, 15, ..$ is _____.
 A) -5 B) 0 C) 5 D) 2

Q.14) In a trapezium ABCD, O is the point of intersection of AC and BD, $AB \parallel CD$ and $AB = 2 \times CD$. If the area of $\Delta AOB = 100\text{cm}^2$, then the area of $\Delta COD =$ _____ cm^2 .
 A) 25 B) 20 C) 15 D) 16

Q.15) An ant is at a point having its abscissa as 4 and ordinate as 5. It moves north for 5 units then west for 6 units. The final position of the ant and the distance between its initial position and final positions are _____.
 A) $(-2, 10)$ and $\sqrt{61}$ units B) $(10, 10)$ and 61 units
 C) $(2, -10)$ and $\sqrt{11}$ units D) $(-2, -10)$ and 11 units

Q.16) If $\alpha + \beta = \frac{\pi}{2}$ and $\sin \alpha = \frac{1}{3}$, then $\sin \beta =$ _____.
 A) $\frac{\sqrt{2}}{3}$ B) $\frac{2\sqrt{2}}{3}$ C) $\frac{2\sqrt{2}}{5}$ D) $\frac{3}{4}$

Q.17) To construct a tangent at a point T on a circle with the centre at O and radius 5 cm, the steps involved are given below:

- (i) Take a point T on the circle and join O and T.
 - (ii) Produce TR to R1.
 - (iii) Construct $\angle OTR = 90^\circ$.
 - (iv) Take a point O on a plane paper and draw a circle of radius 5 cm with centre O.
- The proper order of the steps of construction is _____.
 A) iii, ii, i, iv B) iv, i, iii, ii C) iv, iii, i, ii D) ii, iv, iii, i

Q.18) The mean of five observations is 42. If one of the observation is deleted, then the mean of the remaining observations is 40. The deleted observation is _____.
 A) 40 B) 50 C) 52 D) 44

Q.19) The number 32760 can be expressed in the form of product of prime exponents as _____.

- A) $2^3 \times 3^2 \times 5 \times 7^2 \times 13$ B) $2^3 \times 3^2 \times 5^2 \times 7 \times 13$
 C) $2^3 \times 3^3 \times 5 \times 7 \times 13$ D) $2^3 \times 3^2 \times 5 \times 7 \times 13$

Q.20) α , β and γ are the zeroes of the cubic polynomial $p(x) = ax^3 + bx^2 + cx + d$. If the values of $\alpha + \beta + \gamma$, $\alpha\beta + \beta\gamma + \gamma\alpha$ and $\alpha\beta\gamma$ are $\frac{-1}{2}$, $\frac{-5}{2}$ and -1 respectively, then the polynomial $p(x)$ among the following is _____.

- A) $2x^3 + x^2 - 5x - 42$ B) $2x^3 - x^2 - 5x + 2$
 C) $2x^3 + x^2 - 5x + 2$ D) $x^3 + x^2 - 5x + 2$

Q.21) An exterior angle of a triangle is 110° and one of its interior opposite angles is 30° . Then the other interior opposite angle is _____.

- A) 40° B) 70° C) 80° D) 50°

Q.22) The inner and outer diameters of ring I of a dart board are 32 cm and 34 cm respectively and that of the ring II are 19 cm and 21 cm respectively. Then the total area of the two rings is _____.

- A) 160 cm^2 B) 153 cm^2 C) 166.57 cm^2 D) 167.28 cm^2

Q.23) The area of a sector of a circle is 22 cm^2 , which is equal to $\frac{1}{7}$ th of the area of the circle. Then the angle of the sector is _____.

- A) 52.41° B) 53.42° C) 51.43° D) 50.44°

Q.24) A hemispherical bowl of radius 18 cm is full of water and the water is poured into cylindrical bottles of each diameter 3 cm and height 4 cm. Then the number of bottles required to empty the bowl is _____.

- A) 108 B) 432 C) 423 D) 234

Q.25) The height of a frustum of a cone is 2.6 m. If the diameters of its two circular ends are 4 cm and 6 cm, then its slant height is _____.

- A) 260 cm B) 266 cm C) 256 cm D) 257 cm

Q.26) The mean of five observations is 42. If one of the observation is deleted, then the mean of the remaining observations is 40. The deleted observation is _____.

- A) 40 B) 50 C) 52 D) 44

Q.27) The mode of the following data is ____.

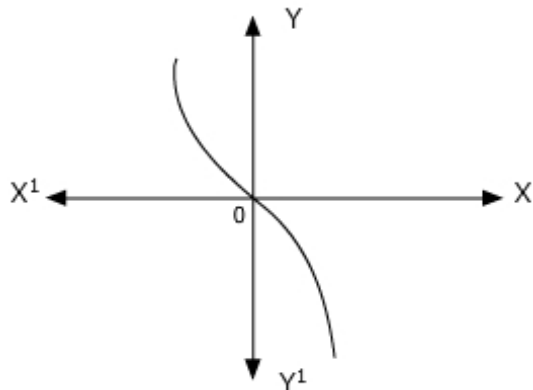
Class interval	Frequency
4 - 8	2
8 - 12	12
12 - 16	15
16 - 20	25
20 - 24	18

- A) 17.35 B) 16.35 C) 18.35 D) 19.25

Q.28) The $\frac{p}{q}$ form of $1\bar{3}$ is ____.

- A) $\frac{5}{4}$ B) $\frac{6}{5}$ C) $\frac{4}{3}$ D) $\frac{7}{5}$

Q.29) In the figure below, the curve represents a polynomial.



The number of zeroes of the polynomial is ____

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

Q.30) David went to a stationery shop and purchased five pencils and two erasers for Rs 9. His friend Albert bought four pencils and six erasers of the same kind for Rs 18. If the cost of one pencil is Rs x and the cost of one eraser is Rs y, then the linear equations which represent the given information is ____.

- A) $5x - 2y = 9$ and $4x - 6y = 18$ B) $5x + 2y = 9$ and $4x - 6y = 18$
 C) $5x + 2y = 9$ and $4x + 6y = 18$ D) $5x + y = 9$ and $4x + 6y = 18$

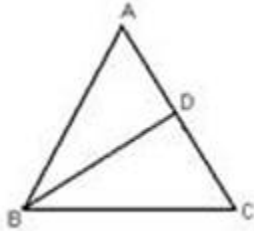
Q.31) The roots of the equation $(x+1)x = -2x + 5\frac{1}{3}$ are ____.

- A) $\frac{\sqrt{273+9}}{6}$ and 1 B) $\frac{\sqrt{273+9}}{6}$ and -1
 C) $\frac{\sqrt{273+9}}{6}$ and $\frac{-9+\sqrt{273}}{6}$ D) $-\left(\frac{\sqrt{273+9}}{6}\right)$ and $-\left(\frac{9-\sqrt{273}}{6}\right)$

Q.32) If the n th term of the AP 9, 7, 5, ... is equal to the n th term of the AP 15, 12, 9, ..., then the value of n is ____.

- A) 6 B) 4 C) 5 D) 7

Q.33) In the figure below, ABC is a triangle in which $AB = AC$ and D is a point on AC such that $BC^2 = AC \times CD$. Then $\frac{BD}{BC} =$ ____.



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

Q.34) If the midpoint of the line joining A $(x, y+1)$ and B $(x+1, y+2)$ is C $(\frac{3}{2}, \frac{5}{2})$, then the values of x and y are ____.

- A) 1 and 1 B) 2 and 1 C) 1 and 2 D) 2 and 2

Q.35) θ_1 and θ_2 are acute angles, $\tan \theta_1 = \frac{1}{2}$ and $\tan \theta_2 = \frac{1}{3}$. If

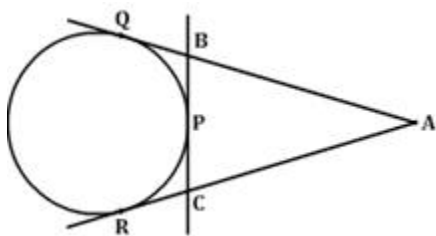
$\tan(\theta_1 + \theta_2) = \frac{\tan \theta_1 + \tan \theta_2}{1 - \tan \theta_1 \tan \theta_2}$, then the value of $\theta_1 + \theta_2$ is ____.

- A) 30° B) 90° C) 45° D) 15°

Q.36) At the foot of a mountain the elevation of its summit is 45° . After ascending 1000 m towards the mountain up a slope of 30° inclination, the elevation is found to be 60° . The height of the mountain is ____.

- A) 1.366 km B) 1.395 km C) 1.654 km D) 1.869 km

Q.37) A circle touches the side BC of ΔABC at P and touches the sides AB and AC produced at Q and R respectively. If $AB = 5.6$ cm, $BC = 4$ cm and $AC = 5$ cm, then the length of the tangent AQ is ____.



- A) 7.1 cm B) 7.2 cm C) 7.3 cm D) 7.4 cm

Q.38) $4\sqrt{6} \times 3\sqrt{24} = \underline{\hspace{2cm}}$.

- A) 124 B) 134 C) 144 D) 154

Q.39) The quotient on dividing the polynomial $x^3 - 12x^2 - 42$ by $x - 3$ is $\underline{\hspace{2cm}}$.

- A) $x^2 - 9x - 27$ B) $x^2 + 9x - 27$ C) $x^2 - 6x - 27$ D) $x^2 - 9x + 27$

Q.40) John purchased four pants and three shirts, which cost Rs 2600. James bought three pants and five shirts, which cost Rs 2500. The system of linear equations describing the situation are $\underline{\hspace{2cm}}$.

- A) $4x + 3y = 2500$ and $3x + 5y = 2600$ B) $4x - 3y = 2500$ and $3x + 5y = 2500$
 C) $4x + 3y = 2600$ and $3x - 5y = 2500$ D) $4x + 3y = 2600$ and $3x + 5y = 2500$

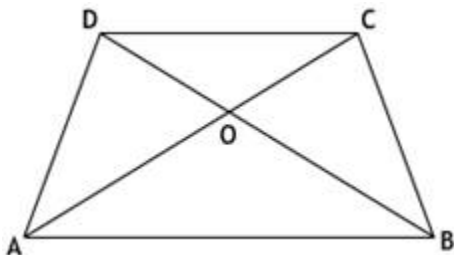
Q.41) A train travels at a uniform speed and covers 360 km. If the speed had been 5 km/h more, it would have been taken 1 hour less for the same journey. The speed of the train is $\underline{\hspace{2cm}}$.

- A) 45 km/h B) 40 km/h C) 44 km/h D) 48 km/h

Q.42) Number of terms of the AP $-6, -\frac{11}{2}, -5, \dots$ needed to give the sum - 25 is $\underline{\hspace{2cm}}$.

- A) 5 or 20 B) 2 or 50 C) 4 or 25 D) 10 or 100

Q.43) In quadrilateral ABCD, $AB \parallel CD$. AC and BD are diagonals intersecting at O. If $OA = (3x - 19)$ cm, $OB = (x - 4)$ cm, $OC = (x - 3)$ cm and $OD = 4$ cm, then the values of x are $\underline{\hspace{2cm}}$.



- A) 4 and 5 B) 7 and 8 C) 6 and 9 D) 8 and 11

Q.44) If $2 \cos 2\theta = \sqrt{3}$, then $\theta = \underline{\hspace{2cm}}$.

- A) 30° B) 90° C) 45° D) 15°

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Q.45) A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60° . When he moves 40 metres away from the bank, he finds the angle of elevation to be 30° . The height of the tree and the width of the river are respectively _____.

- A) 35.64 m and 10 m
 B) 37.64 m and 30 m
 C) 39.64 m and 20 m
 D) 34.64 m and 20 m

Q.46) The HCF of $2^3 \times 3^2 \times 5 \times 7^4$, $2^2 \times 3^5 \times 5^2 \times 7^3$ and $2^3 \times 5^3 \times 7^2$ is _____.

- A) 900
 B) 920
 C) 980
 D) 948

Q.47) On dividing a polynomial $P(x)$ by $x^2 + 2x + 2$, the quotient and the remainder were $x^2 + 1$ and 18 respectively. The polynomial $P(x) =$ _____.

- A) $2x^4 + 2x^3 - 4x^2 + 2x + 20$
 B) $x^4 + 2x^3 + 3x^2 + 4x + 10$
 C) $x^4 + 2x^3 + 3x^2 + 2x + 20$
 D) $x^4 - x^3 + 3x^2 + 2x + 20$

Q.48) When the lines $y = x - 4$ and $x + y = 6$ are plotted on a graph, the lines intersect at _____.

- A) (6, 2)
 B) (12, 6)
 C) (5, 1)
 D) (10, 6)

Q.49) If in an AP, $S_n = n^2 + 2n$, then the values of a_1 and d are respectively _____.

- A) 3 and 2
 B) 2 and 3
 C) 3 and 5
 D) 5 and 7

Q.50) A ladder reaches a window which is 12 m above the ground on one side of the street. Keeping its foot at the same point the ladder is turned to the other side to reach a window 9 m high. If the ladder is 15 m high, then the width of the street is _____.

- A) 20 m
 B) 21 m
 C) 16 m
 D) 23 m

Q.51) $Q(7, 7)$ is the midpoint of the line joining the points $P(3, 4)$ and $R(x, y)$. The coordinates of the point R are _____.

- A) (5, 6)
 B) (11, 10)
 C) (8, 3)
 D) (2, 3)

Q.52) If $x = 4 \operatorname{cosec} A$ and $y = 4 \cot A$, then $x^2 - y^2 =$ _____.

- A) 2
 B) 4
 C) 8
 D) 16

Q.53) The angles of elevation and depression of the top and bottom of a light house from the top of a building of 60 m high are 30° and 60° respectively. The height of the light house is _____.

- A) 76 m
 B) 78 m
 C) 80 m
 D) 82 m

