NBSE Class 10 Maths Previous Year Question Papers 2016

Total number of printed pages : 6 *NB-T/M*

2016
MATHEMATICS

Total marks : 80 Time : 3 hours

General Instructions:

i) *Approximately 15 minutes is allotted to read the question paper and revise the answers.*

ii) *The question paper consists of 22 questions.*

iii) *All questions are compulsory.*

iv) *Internal choice has been provided in some questions.*

v) *Marks allocated to every question are indicated against it.*

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

SECTION - A

1. **Choose the correct answer from the given alternatives.**

(a) A quadratic polynomial with zeros 2 and –3 can be written as **1**

(i) $x^2 + 2x - 3$ (ii) $x^2 - 3x - 6$

(iii) $x^2 + x - 6$ (iv) $x^2 - x + 6$

(b) In the linear equation $ax + by = c$, if $a \neq 0$, $b = 0$ and $c = 0$, then the graph of this equation is **1**

(i) the y-axis (ii) the x-axis

(iii) a line parallel to x-axis (iv) a line parallel to y-axis

(c) The discriminant of the quadratic equation $2x + \frac{4}{x} = 9$ is **1**

(i)113 (ii) 49 (iii) 0 (iv) –113

(d) The n^{th} term of the A.P. 6, 10, 14, 18, ... is **1**

(i) $2 - 4n$ (ii) $2 + 4n$ (iii) $4n - 2$ (iv) $4n + 2$

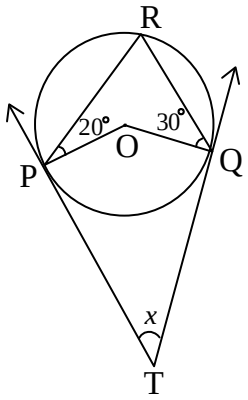
(e) In the right ΔABC right angled at B, cosec A is equal to **1**

(i) $\frac{AB}{AC}$ (ii) $\frac{BC}{AC}$ (iii) $\frac{AC}{BC}$ (iv) $\frac{AC}{AB}$

(f) The difference between the abscissa and the ordinate of two points in a plane are $2a$ and $2b$ respectively. The distance between these two points is **1**

(i) $\sqrt{a^2 + b^2}$ (ii) $2\sqrt{a^2 + b^2}$ (iii) $4a^2 + 4b^2$ (iv) $a^2 + b^2$

(g) TP and TQ are tangents to the adjoining circle with centre O. ∠RPO = 20° and ∠RQO = 30°. Then the value of *x* is **1**



(i) 100° (ii) 80° (iii) 60° (iv) 50°

(h) The perimeter of a quadrant circle is 50 cm. The radius of the circle is **1**
(i) 88 cm (ii) 28 cm (iii) 22 cm (iv) 14 cm

(i) The slant height of a frustrum of a cone of radii 10 cm, 4 cm and height 8 cm is **1**
(i) 10 cm (ii) 12 cm (iii) 14 cm (iv) 18 cm

(j) The probability that an ordinary year selected at random will contain 53 Mondays is **1**
(i) $\frac{2}{7}$ (ii) $\frac{1}{7}$ (iii) $\frac{1}{2}$ (iv) 0

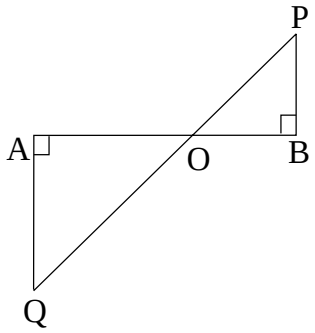
Section – B

2. If α and β be the distinct roots of the quadratic equation $3x^2-(m+n)x-4p-1=0$, find the value of *p* such that $3\alpha-\frac{4}{\beta}=0$ **2**

3. Given that $\tan(A+B)=\frac{\tan A+\tan B}{1-\tan A\tan B}$, find the value of tan 75° **2**

4. Find the value of *k*, if the points A(2, 3), B(4, *k*) and C(6, –3) are collinear. **2**

5. In the figure given below, QA and PB are perpendicular to AB. If AO = 10 cm, BO = 6 cm and PB = 9 cm, then find the value of AQ. **2**



6. The circumference of a circle is 220 cm. Find the area of the sector of that circle whose central angle is 36° **2**

Section – C

7. **a.** If α, β are the zeros of the quadratic polynomial $x^2 - 9$, form the quadratic polynomial whose zeros are $\frac{3\alpha}{\beta}$ and $\frac{3\beta}{\alpha}$

Or **3**

b. Determine whether the quadratic equation $\frac{3}{4}x^2 - 8x + 3 = 0$ has real roots and if so, find the roots by using quadratic formula.

8. Solve the following system of linear equation by cross-multiplication method: **3**

$$\frac{5}{x-1} + \frac{1}{y-2} = 2$$
$$\frac{6}{x-1} - \frac{3}{y-2} = 1$$

9. The last term of an A.P. is 120. It's first term and common difference are 20 and 5 respectively. Find the sum of the A.P. **3**

10. If $\tan\theta = \frac{2mn}{m^2 - n^2}$, find the values of sin θ and sec θ with respect to the sides of a right-angled triangle. **3**

11. **a.** Prove that $\left(1+\cot^2\theta\right)+\left(1+\frac{1}{\cot^2\theta}\right)=\frac{1}{\sin^2\theta-\sin^4\theta}$

Or **3**

b. Prove that $\cos\left(40°-\theta\right)-\sin\left(50°+\theta\right)+\frac{\cos^2 40°+\cos^2 50°}{\sin^2 40°+\sin^2 50°}=1$

12. **a.** A boy is standing on the deck of an anchored ship which is 15 m above the sea level. He observes that the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30°. Calculate the distance of the base of the hill from the ship and also the height of the hill. [Use $\sqrt{3}$ = 1.732]

Or **3**

b. A pole 5 m high is fixed on the top of a tower. From a point A on the ground, the angle of elevation of the top of the pole is 60° and from the top of the tower, the angle of depression of the point A is 45° . Find the height of the tower. [Use $\sqrt{3}$ = 1.732]

13. Draw a line AB of length 9 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. (Traces of construction only is required.) **3**

14. **a.** Two circles touch internally. The sum of their areas is 116π cm^2 and the distance between their centres is 6 cm. Find the radii of the circles.

Or **3**

b. A horse is tethered at one corner of a squared-shaped grass field of side 21 m by means of a 7 m long rope. Find:
(i) the area it can graze,
(ii) the ungrazed area if the rope were 14 m long.

15. Find the median of the weights of 30 students of a class. **3**

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
No. of students	2	3	8	6	6	3	2

16. **a.** A box contains 8 dozen oranges out of which 8 are rotten. An orange is selected at random. Find the probability of getting:
(i) a good orange,
(ii) a rotten orange

Or **3**

b. Two dice are rolled simultaneously. Find the probability of getting:
(i) a sum greater than 7,
(ii) same number on both dice.

Section – D

17. **a.** Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis.

Or **5**

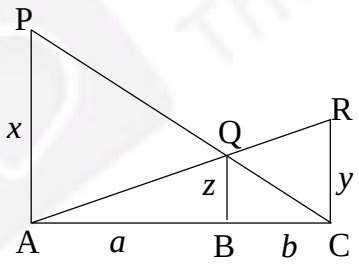
b. The area of a rectangle gets reduced by 9 square units if its length is reduced by 5 units and the breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area is increased by 67 square units. Find the length and breadth of the rectangle.

18. **a.** The points A(0, –1), B(–2, 3), C(6, 7) and D(8, 3) are the vertices of a quadrilateral. Identify the name of the quadrilateral ABCD with reasons.

Or **5**

b. The line segment joining the points P(3, 3) and Q(6, –6) is trisected at the points A and B such that A is nearer to P. If A also lies on the line given by $2x + y + k = 0$, find the value of k.

19. **a.** In the adjoining figure, PA, QB and RC each is perpendicular to AC such that PA = x, RC = y, QB = z, AB = a and BC = b. Prove that: $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$



Or **5**

b. State and prove Thales theorem.

20. **a.** Angle between two tangents PQ and PR from a point P to a circle with centre O is right angle. If PQ + PR = 8 cm, find the diameter of the circle.

Or **5**

b. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

21. **a.** A solid is composed of a cylinder with hemispherical ends. The total height of the solid is 19 cm and the diameter of the cylinder is 7 cm. Find the volume and the surface area of the solid.

Or **5**

b. A semi-circular metal sheet of diameter 28 cm is bent into an open conical cup. Find the capacity of the cup. [Use $\sqrt{147} = 12.12$]

22. **a.** Find the mean of the following data using Step-deviation method:

Marks obtained	No. of students
Less than 30	6
Less than 40	24
Less than 50	49
Less than 60	71
Less than 70	88
Less than 80	100

[Take assumed mean = 45]

Or **5**

b. The total sales contributed by different counters in a departmental store during a month was:

Counter	Sale (`)
Electrical	3,50,000
Hardware	2,50,000
Men's wear	2,00,000
Ladies wear	3,00,000
Toys	1,00,000

Represent this information in a pie-chart by rounding-off the values (not on graph paper). Also shade and label the different sectors.

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