

10th CBSE MATHEMATICS

2010-11

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<https://github.com/RaghavendraKulkarni6398/QuestionPaper2010>

1 SECTION A

- 1.1. Write whether $\frac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$ on simplification gives a rational or an irrational number
- 1.2. If α, β are the zeroes of the polynomial $2y^2 + 7y + 5$, write the value of $\alpha + \beta + \alpha\beta$.
- 1.3. If the sum of the first q terms of an A.P is $2q + 3q^2$ what is its common difference?
- 1.4. In Fig 1.4, CP and CQ are tangents from an external point C to a circle with centre O. AB are another tangent which touches the circle at R. If CP = 11 cm and BR = 4 cm, find the length of BC.
- 1.6. If $5x = \sec \theta$ and $(\frac{5}{x} = \tan \theta)$ find the value of $5(x^2 - \frac{1}{x^2})$
- 1.7. What is the distance between the points A (c,0) and B(0,-c)?
- 1.8. In a $\triangle ABC$, right-angled at C, AC = 6cm and AB = 12cm. Find $\angle A$.
- 1.9. The slant height of the frustum of a cone is 5cm. If the difference between the radii of its two circular ends is 4 cm, write the height of the frustum.
- 1.10. A die is thrown once. What is the probability of getting a number greater than 4?

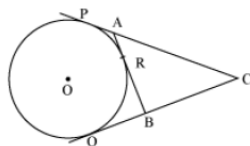


Fig. 1.4.

- 1.5. In Fig 1.5, $DE \parallel BC$ in $\triangle ABC$ such that BC = 8cm, AB = 6cm and DA = 1.5cm. Find DE.

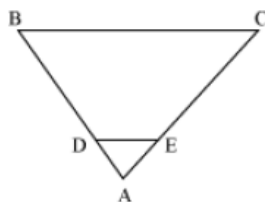


Fig. 1.5.

2 SECTION B

- 2.1. For what value of k , is 3 a zero of the polynomial $2x^2 + x + k$?
- 2.2. Find the value of m for which the pair of linear equations $2x + 3y - 7 = 0$ and $(m-1)x + (m+1)y = (3m-1)$ has infinitely many solutions.
- 2.3. Find the common difference of an A.P. whose first term is 4, the last term is 49 and the sum of all its terms is 265.
- 2.4. In Fig 2.4, there are two concentric circles with centre O and of radii 5 cm and 3 cm. From an external point P, Tangents PA and PB are drawn to these circles. If AP = 12 cm, find the length of BP.

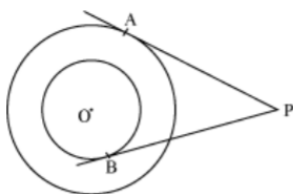


Fig. 2.4.

2.5. Without using trigonometric tables, evaluate the following:

$$\frac{\cos 70^\circ}{3 \sin 20^\circ} + \frac{4(\sec^2 59^\circ - \cot^2 31^\circ)}{3} - \frac{2}{3} \sin 90^\circ$$

3 SECTION C

3.1. Prove that $\sqrt{3}$ is an irrational number

3.2. a) Solve the following pair of linear equations for x and y : $\frac{b}{a}x + \frac{a}{b}y = a^2 + b^2$ and $x + y = 2ab$

b) The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If 3 is added to each of the numerator and denominator, their ratio becomes 2:3. Find the fraction.

3.3. In an A.P., the sum of its first ten terms is -80 and the sum of its next ten terms is -280 . Find the A.P.

3.4. In Fig 3.4, ABC is an isosceles triangle in which $AB = AC$. E is a point on the side CB produced, such that $FE \perp AC$. If $AD \perp CB$, prove that: $AB \times EF = AD \times EC$

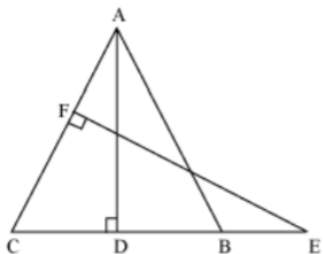


Fig. 3.4.

3.5. a) Prove the following:

$$(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$$

b) Prove the following:

$$\sin A(1 + \tan A) + \cos A(1 + \cot A) = \sec A + \operatorname{cosec} A$$

3.6. Construct a triangle ABC in which $AB = 8$ cm, $BC = 10$ cm and $AC = 6$ cm. Then construct another triangle whose sides are $\frac{4}{5}$ of the corresponding sides of $\triangle ABC$.

3.7. Point P divides the line segment joining the points A $(-1, 3)$ and B $(9, 8)$ such that

$$\frac{AP}{BP} = \frac{k}{1}$$

If P lies on the line $x - y + 2 = 0$, find the value of k .

3.8. If the points (p, q) ; (m, n) and $(p - m, q - n)$ are collinear, show that $pn = qm$.

3.9. a) The rain-water collected on the roof of a building, of dimensions $22m \times 20m$, is drained into a cylindrical vessel having base diameter 2 m and height 3.5 m. If the vessel is full up to the brim, find the height of rain-water on the roof [Use $\pi = \frac{22}{7}$]

b) In Fig 3.9, AB and CD are two perpendicular diameters of a circle with centre O. If $OA = 7$ cm, find the area of the shaded region. [Use $\pi = \frac{22}{7}$]

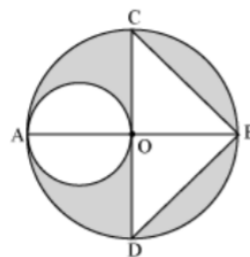


Fig. 3.9.

3.10. A bag contains cards which are numbered from 2 to 90. A card is drawn at random from

the bag. Find the probability that it bears

- a) a two digit number,
- b) a number which is a perfect square.

4 SECTION D

4.1. A girl is twice as old as her sister. Four years hence, the product of their ages (in years) will be 160. Find their present ages.

4.2. In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then prove that the angle opposite the first side is a right angle.

Using the above, do the following:

In an isosceles triangle PQR, $PQ = QR$ and $PR^2 = 2PQ^2$. Prove that $\angle Q$ is a right angle.

4.3. a) A man on the deck of a ship, 12 m above water level, observes that the angle of elevation of the top of a cliff is 60° and the angle of depression of the base of the cliff is 30° . Find the distance of the cliff from the ship and the height of the cliff. [Use $\sqrt{3} = 1.732$]

b) The angle of elevation of a cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60° . Find the height of the cloud from the surface of the lake.

4.4. a) The surface area of a solid metallic sphere is 616 cm^2 . It is melted and recast into a cone of height 28 cm. Find the diameter of the base of the cone so formed. [Use $\pi = \frac{22}{7}$]

b) The difference between the outer and inner curved surface areas of a hollow right circular cylinder, 14 cm long, is 88 cm^2 . If the volume of metal used in making the cylinder is 176 cm^3 , find the outer and inner diameters of the cylinder. [Use $\pi = \frac{22}{7}$]

4.5. Draw 'less than ogive' and 'more than ogive' for the following distribution and hence find its median.

| Class | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|-----------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 8 | 12 | 24 | 6 | 10 | 15 | 25 |