

CBSE CLASS – X
MATH ANSWER KEYS
(CBSE DELHI)
2010

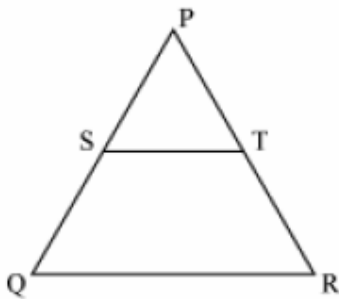
Series LRH/1

Code No. (30/1/2)

SECTION – A(Set-2)

This answer key as per the order of questions given in set – 2.

1. In fig. 1, S and T are points on the sides PQ and PR, respectively of $\triangle PQR$, such that $PT = 2$ cm, $TR = 4$ cm and ST is parallel to QR . Find the ratio of the areas of $\triangle PST$ and $\triangle PQR$.



Ans. 1:9

2. If $P(2, p)$ is the mid-point of the line segment joining the points $A(6, -5)$ and $B(-2, 11)$, find the value of p .

Ans. $p = 3$

3. If $A(1, 2)$, $B(4, 3)$ and $C(6, 6)$ are the three vertices of a parallelogram ABCD, find the coordinates of the fourth vertex D.

Ans. (3,5)

4. The slant height of a frustum of a cone is 4 cm and the perimeters (circumferences) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

$$\left[\text{Use } \pi = \frac{22}{7} \right]$$

Ans. Curved surface area of frustum: 48 cm^2

5. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting a red face card.

Ans. $\frac{3}{6}$

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6. If $2x = \sec A$ and $\frac{2}{x} = \tan A$, find the value of $2\left(x^2 - \frac{1}{x^2}\right)$.

Ans. $\frac{1}{2}$

7. In fig. 2, $\triangle AHK$ is similar to $\triangle ABC$. If $AK = 10$ cm, $BC = 3.5$ cm and $HK = 7$ cm, find AC .

Ans. $AC = 5$ cm

8. If the sum of first p terms of an A.P., is $ap^2 + bp$, find its common difference.

Ans. Common difference, $d = 2a$

9. If α, β are the zeroes of a polynomial, such that $\alpha + \beta = 6$ and $\alpha\beta = 4$, then write the polynomial.

Ans. $x^2 - 6x + 4$

10. Has the rational number $\frac{441}{2^2 \cdot 5^7 \cdot 7^7}$ a terminating or a non-terminating decimal representation?

Ans. Terminating

SET - 3

6. If $\operatorname{cosec} \theta = 2x$ and $\cot \theta = \frac{2}{x}$, find the value of $2\left(x^2 - \frac{1}{x^2}\right)$.

Ans. $\frac{1}{2}$

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SECTION – B (Set-2)

11. If $\sqrt{3}$ and $-\sqrt{3}$ are two zeroes of the polynomial $x^3 - 5x^2 - 3x + 15$, find its third zero.

Ans. 5

12. If all the sides of a parallelogram touch a circle, show that the parallelogram is a rhombus.

Ans. Proof

13. Without using trigonometric tables, find the value of the following expression:

$$\frac{\sec(90^\circ - \theta) \cdot \operatorname{cosec} \theta - \tan(90^\circ - \theta) \cot \theta + \cos^2 25^\circ + \cos^2 65^\circ}{3 \tan 27^\circ \cdot \tan 63^\circ}$$

OR

Find the value of $\operatorname{cosec} 30^\circ$, geometrically.

Ans. $\frac{2}{3}$

OR

2

14. In an A.P., first term is 2, the last term is 29 and sum of the terms is 155. Find the common difference of the A.P.

Ans. Common difference, $d = 3$

15. Find the value of k for which the following pair of linear equation have infinitely many solutions:

$$2x + 3y = 7; (k - 1)x + (k + 2)y = 3k$$

Ans. $k = 7$

Set 3

11. If $\sqrt{5}$ and $-\sqrt{5}$ are two zeroes of the polynomial $x^3 + 3x^2 - 5x - 15$, find its third zero.

Ans. -3

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MATH ANSWER KEY

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SECTION – C (Set-2)

This answer key is as per the order of questions given in set – 2.

16. Prove that $4 - 5\sqrt{2}$ is an irrational number.

Ans. Proof

17. Cards bearing numbers 1, 3, 5, ..., 35 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing

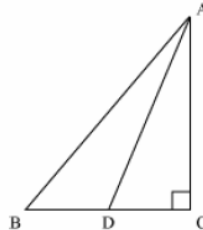
(i) a prime number less than 15.

(ii) a number divisible by 3 and 5.

Ans. (i) $\frac{5}{18}$

(ii) $\frac{1}{18}$

18. In figure 3, ABC is a right triangle, right angled at C and D is the mid-point of BC. Prove that $AB^2 = 4AD^2 - 3AC^2$.



Ans. Proof

19. Point P divides the line segment joining the points A (2, 1) and B (5, -8) such that $\frac{AP}{AB} = \frac{1}{3}$. If P lies on the line $2x - y + k = 0$, find the value of k.

Ans. $k = -8$

20. Prove the following

$$\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \tan A + \cot A$$

OR

Prove that following

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

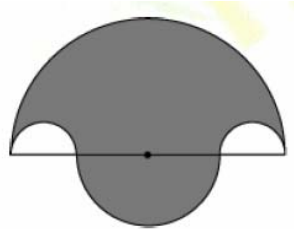
Ans. Proof

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21. Construct a triangle ABC in which AB = 5 cm, BC = 6cm and AC = 7cm. Construct another triangle similar to ΔABC such that its side are $\frac{3}{5}$ of the corresponding sides of ΔABC .

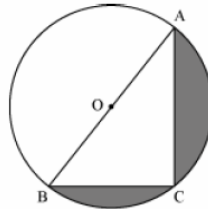
Ans. Construction

22. In figure 4, the boundary of shaded region consists of four semicircular arcs, two smallest being equal. If diameter of the largest is 14 cm and that of the smallest is 3.5 cm, calculate the area of the shaded region. [Use $\pi = \frac{22}{7}$]



OR

Find the area of shaded region in figure 5, if AC = 24 cm, BC = 10 cm and O is the centre of the circle. [Use $\pi = 3.14$]



Ans. Area of shaded region = 86.625 cm^2

OR

Area of shaded region = 145.33 cm^2

23. Prove that the points P(a, b + c), Q (b, c + d) and R (c, a + b) are collinear.

Ans. Proof

24. In an A.P., the sum of first ten terms is -150 and the sum of its next ten terms is -550 . Find the A.P.

Ans. 3, -1, -5, -9,

25. The sum of numerator and denominator of a fraction is 3 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the fraction becomes $\frac{1}{2}$. Find the fraction.

OR

Solve the following pair of equations:

$$\frac{4}{x} + 3y = 8; \quad \frac{6}{x} - 4y = -5$$

Ans. $\frac{4}{7}$

OR

$x = 2, y = 2$

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MATH ANSWER KEY

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SECTION – D(Set-2)

The answer key is as per questions in set – 2.

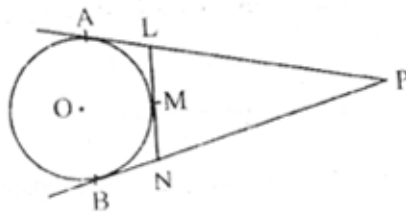
26. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60 and the angle of depression of the foot of the tower is 30. Find the height of the tower.

Ans. Height of tower = 14 m

27. Prove that the lengths of tangents drawn from an external point to a circle are equal.

Using the above prove the following

In figure, PA and PB are tangents from an external point P to a circle with centre O. LN touches the circle at M. Prove that $PL + LM = PN + MN$



Ans. Proof

28. A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7}$ cm³. The radii of its lower and upper circular ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs. 1.40 per square centimetre. [Use $\pi = \frac{22}{7}$]

OR

A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. [Use $\pi = \frac{22}{7}$]

- Ans. Cost of metal sheet = Rs. 4505.6 (Assuming top covered)
Cost of metal sheet = Rs. 2745.6 (Assuming top open)

OR

Height of cone = 28 cm
Surface area of toy = 5082 cm²

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29. Three consecutive positive integers are such that the sum of the square of the first and the product of the other two is 46, find the integers.

OR

The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find the two numbers.

Ans. Integers are 4, 5, 6.

OR

9 & 13

30. Find the mean, mode and median of the following frequency distribution:

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	8	8	14	22	30	8	10

Ans. Mean = 37.3

Mode = 42.7

Median = 41

SET – 3

30. Find the mean, mode and median of the following frequency distribution:

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	8	7	15	20	12	8	10

Ans. Mean = 35.625

Mode = 33.84

Median = 35