

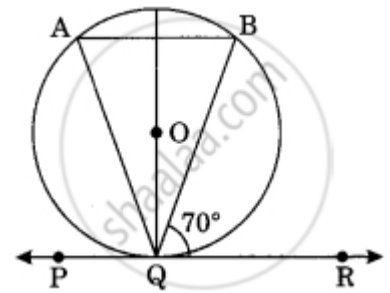
1. The LCM of the smallest two digit number and the smallest composite number is
 - a. 12
 - b. 20
 - c. 4
 - d. 44
2. If the product of the zeros of the quadratic polynomial $3x^2 + 5kx + k$ is $\frac{-2}{3}$, then the value of k is
 - a. -3
 - b. -2
 - c. 2
 - d. 3
3. The value of k for which the system of linear equations $x + 2y = 3$, $5x + ky + 7 = 0$ is inconsistent is
 - a. $\frac{-14}{3}$
 - b. $\frac{2}{5}$
 - c. 5
 - d. 10
4. If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then
 - a. $b^2 = 16ac$
 - b. $b^2 = 3ac$
 - c. $3b^2 = 16ac$
 - d. $16b^2 = 3ac$
5. If the second term of an A.P is 13 and 5th term is 25 then 7th term is
 - a. 30
 - b. 33
 - c. 37
 - d. 38

6. If AM and PN are altitudes, of $\triangle ABC$ and $\triangle PQR$ respectively. If $\triangle ABC \sim \triangle PQR$ and $AB^2 : PQ^2 = 4:9$, then $AM : PN =$

- a. 16 : 81 b. 4 : 9 c. 3 : 2 d. 2 : 3

7. In figure, if PQR is the tangent to a circle at Q whose centre is O, AB is a chord parallel to PR and $\angle AQB$ is equal to

- a. 20° b. 40°
c. 35° d. 45°



8. If radii of two concentric circles are 4cm and 5cm then the length of each chord of one circle which is tangent to the other circle is

- a. 3cm b. 6cm c. 9cm d. 1cm

9. The ratio in which the line segment joining the points A(3, -4) and B(-2,7) is divided by x- axis is

- a. 3 : 2 b. 2 : 3 c. 4 : 7 d. 7 : 4

10. The point which lies on the perpendicular bisector of the line segment joining the points A(-2, -5) and B (2, 5) is

- a. (0, 0) b. (0, 2) c. (2, 0) d. (-2, 0)

11. If $\sin\theta + \cos\theta = \sqrt{2} \cos\theta$, $\theta \neq 90^\circ$, then $\tan\theta =$ _____.

- a. $\sqrt{2} - 1$ b. $\sqrt{2} + 1$ c. $\sqrt{2}$ d. $-\sqrt{2}$

12. If $x \tan 60^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$ then $x =$

- a. $\cos 30^\circ$ b. $\tan 30^\circ$ c. $\sin 30^\circ$ d. $\cot 30^\circ$

13. If the height of a flagstaff is twice the height of the tower on which it is fixed and the angle of elevation of the top of the tower as seen from a point on the ground is 30° then the angle of elevation of the top of the flag staff as seen from the same point is

- a. 45° b. 30° c. 60° d. 90°

14. If the area of a circle is $64\pi \text{ cm}^2$, then its circumference is

- a. $7\pi \text{ cm}$ b. $16\pi \text{ cm}$ c. $14\pi \text{ cm}$ d. $21\pi \text{ cm}$

15. The arc of a circle of radius 30cm having length 19cm then the angle subtended by this arc at the centre O of the circle is

- a. 36.27° b. 36° c. 30.99° d. 34°

16. The mean of first n odd natural numbers is $\frac{n^2}{81}$ then $n =$

- a. 9 b. 81 c. 27 d. 18

17. From the letters of the word “MOBILE”, if the letter is selected then the probability that it is a vowel is

a. $\frac{1}{3}$

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

c. $\frac{3}{7}$

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

18. A number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3. The probability that $|x| < 2$ is

a. $\frac{5}{7}$

b. $\frac{2}{7}$

c. $\frac{3}{7}$

d. $\frac{1}{7}$

Direction: In the question number 19 and 20, Assertion (A) is followed by a Reason (R). Choose the correct option.

- a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- b. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
- c. Assertion (A) is true but reason (R) is false.
- d. Assertion (A) is false but reason (R) is true.

19. **Assertion (A):** If $x + 1$, $3x$ and $4x + 2$ are in A.P then $x = 3$.

Reason (R): If the seventh term of an A.P is $\frac{1}{9}$ and its ninth term is $\frac{1}{7}$ then its 63rd term is 1.

20. **Assertion (A):** Three cubes each of volume 8 cubic centimeters are joined end to end to form a cuboid. The surface area of the resulting cuboid is 28cm^2 .

Reason (R): If n cubes each of volume a^3 cubic units are joined end to end to form a cuboid then the surface area of the resulting cuboid is $2(2n + 1) a^2$ square units.

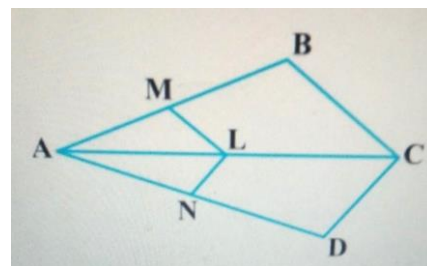
SECTION B

Section B consists of 5 questions of 2 marks each.

21. If the HCF of 35 and 45 is 5, LCM of 35

and 45 is $63x$, then find the value of x .

22. In figure, if $LM \parallel CB$ and $LN \parallel CD$, prove that $\frac{AM}{AB} = \frac{AN}{AD}$.



23. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

24. If $\sin (A-B) = \frac{1}{2}$, $\cos (A+B) = \frac{1}{2}$, $0^\circ < A+B \leq 90^\circ$, $A > B$, find A and B .

OR

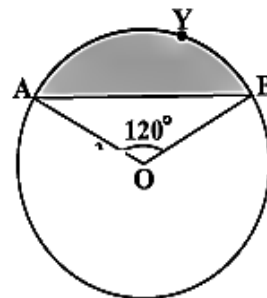
In a $\triangle ABC$, right angled at B, $\angle A = \angle C$, find the value of

- i. $\sin A \cos C + \cos A \sin C$ ii. $\sin A \sin B + \cos A \cos B$

25. In a circle of radius 21cm, an arc subtends an angle of 60° at the centre. Find i) the length of an arc. ii) Area of the sector formed by the arc.

OR

Find the area of the segment AYB, if radius of the circle is 21cm and $\angle AOB = 120^\circ$. (Use $\pi = \frac{22}{7}$)



SECTION C

Section C consists of 6 questions of 3 marks each.

26. Prove that $\sqrt{5}$ is an irrational number.
 27. Find the zeros of the polynomial $f(x) = 4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ and verify the relationship between the zeros and its coefficients.
 28. Determine the value of a and b for which the following system of linear equations has infinitely many solutions:
 $2x - (a-4)y = 2b + 1$; $4x - (a-1)y = 5b - 1$

OR

In a $\triangle ABC$, $\angle C = 3\angle B = 2(\angle A + \angle B)$. Find the three angles.

29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

OR

Prove that a parallelogram circumscribing a circle is a rhombus.

30. Prove that $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1 + \sin\theta}{\cos\theta}$.

31. Find the median of the following frequency distribution:

Weekly Wages (in Rs)	60-69	70-79	80-89	90-99	100-109	110-119
No. of days	5	15	20	30	20	8

SECTION D

Section D consists of 4 questions of 5 marks each

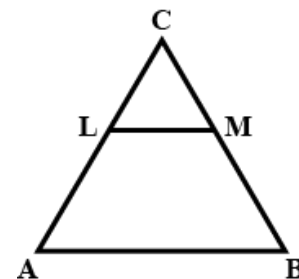
32. The speed of a boat in still water is 15km/hr. It can go 30km upstream and return downstream to the original point in 4 hours 30 minutes. Find the speed of the stream.

OR

If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are equal, Prove that either $a = 0$ (or) $a^3 + b^3 + c^3 = 3abc$.

33. State and Prove Basic Proportionality Theorem.

In figure, $LM \parallel AB$. If $AL = x - 3$, $AC = 2x$, $BM = x - 2$ and $BC = 2x + 3$, find the value of x .



34. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2cm and the diameters of the base is 4cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volume of the cylinder and the toy. (Take $\pi = 3.14$)

OR

Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state Government to provide place and canvas for 1500 tents to be fixed by the Government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8m and height 3.5m, with conical upper part of the same base radius but of height 2.1m. If the canvas used to make the tents costs Rs. 120 per sq.m, find the amount shared by each school to set up the tents.

35. The mean of the following frequency table is 50. But the frequencies f_1 and f_2 in class 20-40 and 60-80 are missing. Find the missing information.

C.I	0-20	20-40	40-60	60-80	80-100	TOTAL
FREQUENCY	17	f_1	32	f_2	19	120

SECTION E

Case study based questions are compulsory.

36. In November 2020, some new animals were added to a zoo. As a result the number of visitors to the zoo, increased daily by 10. A total of 6150 people visited zoo during that month.



Based on the above information, answer the following questions:

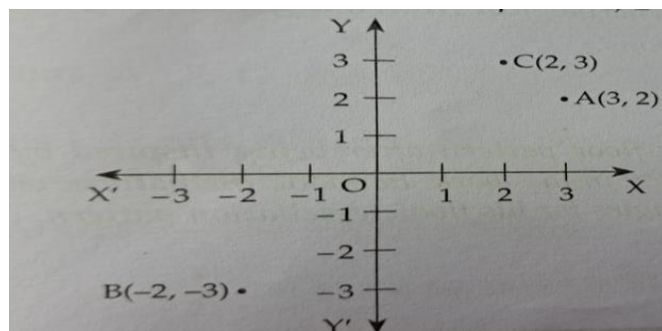
- How many visitors visited the zoo on 1st November?
- On which day of the month did 250 visitors visit the zoo?
- How many persons visited the zoo in the last 5 days of the month of November?

Or

How much collection (in rupees) from sale of tickets was done in the zoo on 15th November., if each entry ticket costs Rs. 50?

37. The following diagram shows the position of three electric poles A, B and C in a society park.

In spite of three poles in the park, the kids playing in the park complained about darkness in the park, So the society president decided to place 2 more poles in the park.



Based on the above information, answer the following questions:

- Find the type of triangle formed by joining the points A, B and C.
- The fourth pole D is to be placed such that it divides the line segment joining A and B in the ratio 2:3. Then find the coordinates of position of pole D.
- The fifth pole is placed at a point E such that ABEC forms a ||gm. Find the coordinates of the point E.

OR

Find the coordinates of the point of intersection of diagonals of ||gm ABEC.

38. Gadisar Lake is located in the Jaisalmer district of Rajasthan. It was built by the King of Jaisalmer and rebuilt by Gadsingh in 14th century. The lake has many Chhatris One of them is shown below:



Observe the picture. From a point A, h meters above from water level, the angle of elevation of top of Chhatri (point B) is 45° and angle of depression of its reflection in water (point C) is 60° . If the height of Chhatri above water level is (approximately) 10m, then

- Draw a well-labeled figure based on the above information:
- Find the length (h) of the point A above water level. (Use $\sqrt{3} = 1.73$)