

JSUNIL TUTORIAL Class 10 Maths 2020 Sample Paper 04

Section-I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Denote the decimal number 0.0875 in rational form.

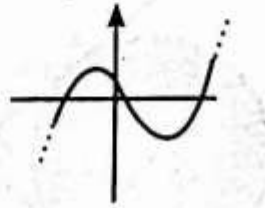
OR

Show that $5 - \sqrt{3}$ is an irrational number.

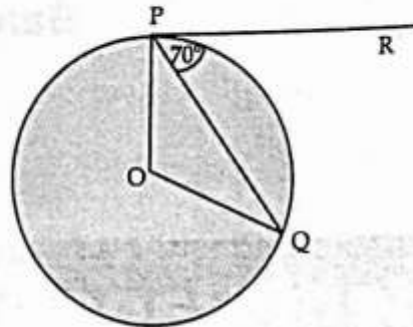
2. The following is not the graph of a quadratic polynomial. Justify.

OR

The pair of equations $y = 0$ and $y = -7$ has no solution why ?



3. A line intersects the y -axis and x -axis at the points P and Q , respectively. If $(2, -5)$ is the mid-point of PQ , then find the coordinates of P and Q .
4. In the given figure, ' O ' is the centre of circle, PQ is a chord and the tangent PR at P makes an angle of 70° with PQ , then find $\angle POQ$.



5. The angle of depression of a car parked on the road from the top of 150 m high tower is 30° . find the distance of the car from the tower (in metres).

OR

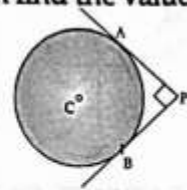
If a ladder 10 m long reaches a window 8m above the ground, then find the distance of the foot of the ladder from the base of the wall.

6. Two coins of diameter 2 cm and 4 cm respectively are kept one over the other as shown in the figure, then find the area of the shaded ring shaped region in square cm.
7. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. Find the probability that the selected ticket has a number which is a multiple of 5.
8. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time they will toll together ?
9. Aruna has only ₹ 1 and ₹ 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is ₹ 75, then find the number of ₹ 1 and ₹ 2 coins.

10. If one root of the equation $(k-1)x^2 - 10x + 3 = 0$ is the reciprocal of the other, then find the value of k .

OR

If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then find the value of k .



11. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, then find its 20th term.

12. In fig., PA and PB are two tangents drawn from an external point P to a circle with centre C and radius 4 cm. If $PA \perp PB$, then find the length of each tangent.

13. A thin wire is in the shape of a circle of radius 77 cm. It is bent into a square. Find the side of the square. (Taking, $\pi = \frac{22}{7}$)

14. Two cubes have their volumes in the ratio 1 : 27. Find the ratio of their surface areas.

OR

Find the volume (in cm^3) of the largest right circular cone that can be cut off from a cube of edge 4.2 cm.

15. If the mid-point of the line segment joining $A\left[\frac{x}{2}, \frac{y+1}{2}\right]$ and $B(x+1, y-3)$ is $C(5, -2)$, find x, y .

16. Consider the following distribution :

Marks Obtained	0 or more	10 or more	20 or more	30 or more	40 or more	50 or more
Number of students	63	58	55	51	48	42

(i) Calculate the frequency of the class 30 – 40. (ii) Calculate the class mark of the class 10 – 20.

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

Section-II

17. Case Study based-1 :

Given figure depicts an archery target marked with its five scoring regions from the centre outwards as Gold, Red, Blue, Black and white. The diameter of the region representing Gold score is 21 cm and each of the other bands is 10.5 cm wide.



(a) Find the area of gold region.

(i) 347 cm^2 (ii) 1040 cm^2 (iii) 3119 cm^2 (iv) 2526 cm^2

(b) Find the area of red region.

(i) 347 cm^2 (ii) 1040 cm^2 (iii) 1733 cm^2 (iv) 2526 cm^2

(c) Find the area of blue region.

(i) 347 cm^2 (ii) 1040 cm^2 (iii) 1733 cm^2 (iv) 2526 cm^2

(d) Find the area of black region.

(i) 3119 cm^2 (ii) 1040 cm^2 (iii) 1733 cm^2 (iv) 2526 cm^2

(e) Find the area of white region.

(i) 3119 cm^2 (ii) 1040 cm^2 (iii) 1733 cm^2 (iv) 2526 cm^2

18. Case Study based-2 :

100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows :

Number of letters	1-4	4-7	7-10	10-13	13-16	16-19
Number of surnames	6	30	40	16	4	4

- (a) What is the upper limit of median class?
 (i) 10 (ii) 13 (iii) 16 (iv) 19
- (b) Determine the median number of letters in the surnames.
 (i) 8.05 (ii) 8 (iii) 7.88 (iv) 8.32
- (c) What is the upper limit of modal class?
 (i) 13 (ii) 19 (iii) 10 (iv) 16
- (d) Sum of lower limits of median and modal class is
 (i) 10 (ii) 12 (iii) 20 (iv) 14
- (e) Cumulative frequency of median class
 (i) 36 (ii) 76 (iii) 92 (iv) 96

Q19. Case Study based-3 :

In a club men are playing the card game. A man named Ramesh draw a card from a well-shuffled deck of cards.

- (a) Find the probability of getting a king of red colour.
 (i) $\frac{1}{26}$ (ii) $\frac{3}{13}$ (iii) $\frac{3}{26}$ (iv) $\frac{1}{52}$
- (b) Find the probability of getting a face card.
 (i) $\frac{1}{26}$ (ii) $\frac{3}{13}$ (iii) $\frac{3}{26}$ (iv) $\frac{1}{52}$
- (c) Find the probability of getting a jack of hearts.
 (i) $\frac{1}{26}$ (ii) $\frac{3}{13}$ (iii) $\frac{1}{52}$ (iv) $\frac{1}{4}$
- (d) Find the probability of getting a spade card.
 (i) $\frac{1}{26}$ (ii) $\frac{3}{13}$ (iii) $\frac{1}{52}$ (iv) $\frac{1}{4}$
- (e) Find the probability of getting a queen of diamonds.
 (i) $\frac{1}{26}$ (ii) $\frac{3}{13}$ (iii) $\frac{1}{52}$ (iv) $\frac{1}{4}$

Q20. Case Study based-4 :

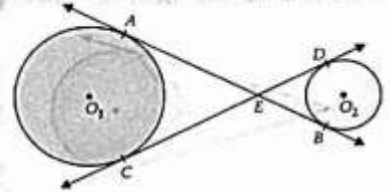
The students of a school decided to beautify the school on the Annual Day by fixing colourful flags on the straight passage of the school. They have 27 flags to be fixed at intervals of every 2 m. The flags are stored at the position of the middle most flag. Ruchi was given the responsibility of placing the flags. Ruchi kept her books where the flags were stored. She could carry only one flag at a time.

- (a) What is the position of middle most flag?
 (i) 13th (ii) 13.5th (iii) 14th (iv) 12.5th
- (b) How many flags are left and right to the middle flag?
 (i) 14, 12 (ii) 13, 13 (iii) 13, 14 (iv) 14, 13
- (c) How much distance did she cover in completing this job and returning back to collect her books ?
 (i) 339 m (ii) 634 m (iii) 364 m (iv) 346 m
- (d) What is the maximum distance she travelled carrying a flag ?
 (i) 13 m (ii) 52 m (iii) 27 m (iv) 26 m
- (e) What is the mathematical concept related to this question?
 (i) AP (ii) Lines (iii) Linear equations (iv) none of these

PART-B

Section-III

All questions are compulsory. In case of internal choices, attempt any one.



[AI] 21. Prove that $\sqrt{3}$ is an irrational number.

22. In Figure, common tangents AB and CD to the two circles with centres O_1 and O_2 intersect at E . Prove that $AB = CD$.

23. An observer, 1.7 m tall, is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of tower is 30° . Find the height of the tower.

24. Evaluate : $\tan^2 30^\circ \sin 30^\circ + \cos 60^\circ \sin^2 90^\circ \tan^2 60^\circ - 2 \tan 45^\circ \cos^2 0^\circ \sin 90^\circ$

OR

[AI] If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, prove that $m^2 + n^2 = a^2 + b^2$.

[AI] 25. A child prepares a poster on "save water" on a square sheet whose each side measures 50 cm. At each corner of the sheet, she draws a quadrant of radius 15 cm in which she shows the ways to save water. At the centre, she draws a circle of diameter 21 cm and writes a slogan save water in it. Find the area of the remaining sheet.

OR

A right circular cylinder and a cone have equal bases and equal heights. If their curved surface areas are in the ratio 8 : 5, show that the ratio between radius of their bases to their height is 3 : 4.

[AI] 26. A die is thrown twice. Find the probability that :

- (i) 5 will come up at least once.
- (ii) 5 will not come up either time.

27. If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 5x + k$ satisfying the relation, $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$, then find the value of k .

28. Raghav scored 70 marks in a test, getting 4 marks for each right answer and losing 1 mark for each wrong answer. Had 5 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Raghav would have scored 80 marks. How many questions were there in the test?

29. If the roots of the quadratic equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ are equal, prove that $2a = b + c$.

OR

The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction.

30. How many terms of the Arithmetic Progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer.

OR

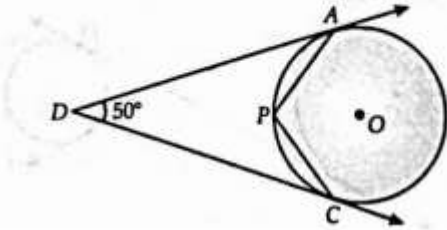
[AI] If the m^{th} term of an A.P. is $\frac{1}{n}$ and n^{th} term is $\frac{1}{m}$, then show that its $(mn)^{\text{th}}$ term is 1.

31. Two trees of height a and b are p metre apart.

(i) Prove that the height of the point of intersection of the lines joining the top of each tree to the foot of the opposite trees is given by $\frac{ab}{a+b} m$.

(ii) Which mathematical concept is used in this problem?

- Q 32.** In the given figure, O is the centre of the circle. Determine $\angle APC$, if DA and DC are tangents and $\angle ADC = 50^\circ$.



- Q 33.** If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, prove that $x^2 + y^2 = 1$.

- 34.** Draw a line segment AB of length 8 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.

- 35.** A man on the top of a vertical observation tower observes a car moving at uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45° , how long will the car take to reach the observation tower from this point?

OR

From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower with angles of depression as 60° and 45° . Find the distance between two cars.

- 36.** A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in fig. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article.

