Sample Paper 10

Class - 10th Exam - 2026 - 27

Mathematics - Basic

Time : 3 Hours **Max. Marks : 80**

General Instructions :

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \frac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION - A

Section A consists of 20 questions of 1 mark each.

1. The HCF and the LCM of 12, 21, 15 respectively are

(a) 3, 140 (b) 12, 420

(c) 3, 420 (d) 420, 3

2. From an external point Q, the length of tangent to a circle is 12 cm and the distance of Q from the centre of circle is 13 cm. The radius of circle (in cm) is

(a) 10 (b) 5

(c) 12 (d) 7

3. The length of a string between a kite and a point on the ground is 85 m. If the string makes an angle θ with level ground such that $\tan\theta = \frac{15}{8}$, then the height of kite is

(a) 75 m (b) 78.05 m

(c) 226 m (d) None of these

4. Twelve solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 16 cm. The diameter of each sphere is

(a) 4 cm (b) 3 cm

(c) 2 cm (d) 6 cm

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5. Consider the following frequency distribution

Class	0-5	6-11	12-17	18-23	24-29
Frequency	13	10	15	8	11

The upper limit of the median class is

(a) 17 (b) 17.5

(c) 18 (d) 18.5

6. The zeroes of the quadratic polynomial $x^2 + kx + k$ where $k \neq 0$,

(a) Cannot both be positive (b) Cannot both be negative

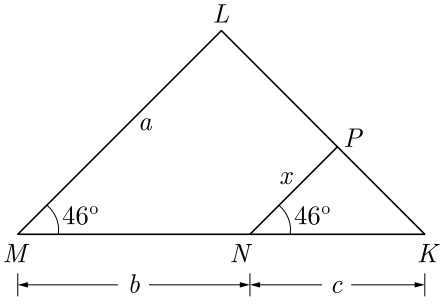
(c) Are always unequal (d) Are always equal

7. If the point P (6, 2) divides the line segment joining $A(6, 5)$ and $B(4, y)$ in the ratio $3:1$ then the value of y is

(a) 4 (b) 3

(c) 2 (d) 1

8. In the given figure, x is



(a) $\frac{ab}{a+b}$ (b) $\frac{ac}{b+c}$

(c) $\frac{bc}{b+c}$ (d) $\frac{ac}{a+c}$

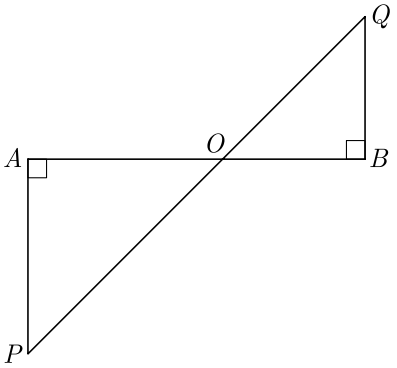
9. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then

(a) $R_1 + R_2 = R$ (b) $R_1 + R_2 > R$

(c) $R_1 + R_2 > R$ (d) $R_1 + R_2 < R$

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10. In the given figure, if $\angle A = 90^0, \angle B = 90^0$, $OB = 4.5$cm $OA = 6$ cm and $AP = 4$ cm then find QB.



(a) 3 cm (b) 6 cm
(c) 4.5 cm (d) 3.5 cm

11. A tree casts a shadow 15 m long on the level of ground, when the angle of elevation of the sun is 45°. Find the height of a tree.
(a) 15 m (b) 10 m
(c) 7.5 m (d) 12 m

12. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is
(a) $\frac{1}{5}$ (b) $\frac{3}{5}$
(c) $\frac{4}{5}$ (d) $\frac{1}{3}$

13. The probability that a number selected at random from the numbers 1, 2, 3, ..., 15 is a multiple of 4 is
(a) $\frac{4}{15}$ (b) $\frac{2}{15}$
(c) $\frac{1}{15}$ (d) $\frac{1}{5}$

14. Each root of $x^2 - bx + c = 0$ is decreased by 2. The resulting equation is $x^2 - 2x + 1 = 0$, then
(a) $b = 6, c = 9$ (b) $b = 3, c = 5$
(c) $b = 2, c = -1$ (d) $b = -4, c = 3$

15. If the mean of a, b, c is M and $ab + bc + ca = 0$, the mean of a^2, b^2 and c^2 is KM^2, then K is equal to
(a) 3 (b) 9
(c) 6 (d) 4

16. The 2 digit number which becomes $\frac{5}{6}$th of itself when its digits are reversed. The difference in the digits of the number being 1, then the two digits number is
(a) 45 (b) 54
(c) 36 (d) None of these

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17. If the nth term of an AP is given by $a_n = 5n - 3$, then the sum of first 10 terms if
(a) 225 (b) 245
(c) 255 (d) 270

18. If the perimeter of one face of a cube is 20 cm, then its surface area is
(a) $120\,cm^2$ (b) $150\,cm^2$
(c) $125\,cm^2$ (d) $400\,cm^2$

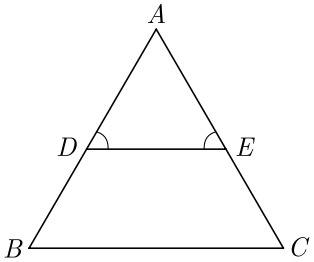
19. **Assertion :** The value of $\sec^2 10^\circ - \cot^2 80^\circ$ is 1.
Reason : The value of $\sin 30^\circ = \frac{1}{2}$.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not 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.

20. **Assertion :** $x^3 + x$ has only one real zero.
Reason : A polynomial of n th degree must have n real zeroes.
(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 but 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.

SECTION - B

Section B consists of 5 questions of 2 marks each.

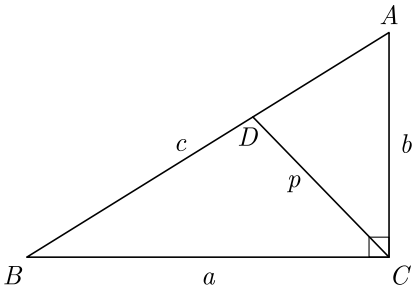
21. In Figure $\angle D = \angle E$ and $\frac{AD}{DB} = \frac{AE}{EC}$, prove that
ΔBAC is an isosceles triangle.



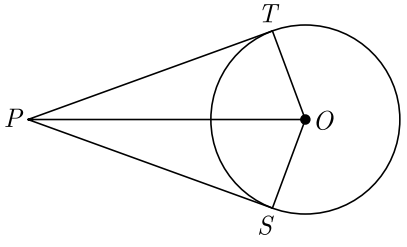
OR

ABC is a right triangle right angled at C. Let $BC = a$, $CA = b, AB = c$ $PQR, ST \,||\, QR$and p be the length of perpendicular from C to AB. Prove that $cp = ab$.

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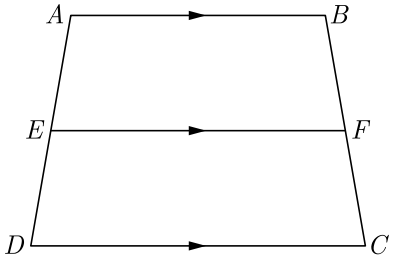


22. In the given figure, from a point P, two tangents PT and PS are drawn to a circle with centre O such that $\angle SPT = 120^\circ$, Prove that $OP = 2PS$.



23. If $\sqrt{3}\sin\theta - \cos\theta = 0$ and $0^\circ < \theta < 90^\circ$, find the value of θ.

24. In the given figure, if $ABCD$ is a trapezium in which $AB \,||\, CD \,||\, EF$, then prove that $\frac{AE}{ED} = \frac{BF}{FC}$



25. A box contains cards numbered 11 to 123. A card is drawn at random from the box. Find the probability that the number of the drawn card is

(i) A perfect square number

(ii) A multiple of 7.

OR

A letter of English alphabet is chosen at random, find the probability that the letter so chosen is :

(i) a vowel,

(ii) a consonant.

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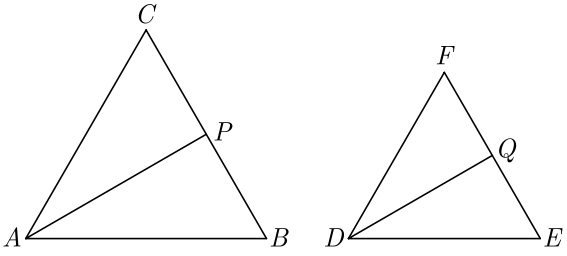
SECTION - C

Section C consists of 6 questions of 3 marks each.

26. Find whether the following pair of linear equations has a unique solutions. If yes, find the solution :

$7x-4y = 49, 5x-6y = 57$

27. In given figure $\Delta ABC \sim \Delta DEF$. AP bisects $\angle CAB$ and DQ bisects $\angle FDE$.



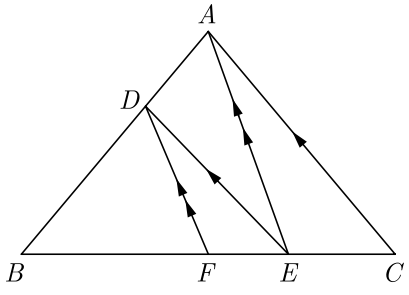
Prove that :

(1) $\frac{AP}{DQ} = \frac{AB}{DE}$

(2) $\Delta CAP \sim \Delta FDQ$.

OR

In the given figure, $DE \| AC$ and $DF \| AE$. Prove that $\frac{BE}{FE} = \frac{BE}{EC}$.



28. A conical vessel, with base radius 5 cm height 24 cm, is full of water. This water emptied into a cylindrical vessel, of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. Use $\pi = \frac{22}{7}$

OR

504 cones, each of diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area. Use $\pi = \frac{22}{7}$

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29. Quadratic polynomial $2x^2 - 3x + 1$ has zeroes as α and β. Now form a quadratic polynomial whose zeroes are 3α and 3β.

30. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time will they next toll together?

31. If $\cos(40^\circ + x) = \sin 30^\circ$, find the value of x.

SECTION - D

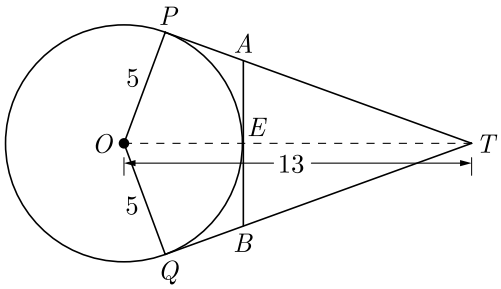
Section D consists of 4 questions of 5 marks each.

32. Find for x : $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}$; $x \neq 0,\ 1,\ 2$

OR

Find the values of k for which the equation $(3k+1)x^2 + 2(k+1)x + 1$ has equal roots. Also find the roots.

33. In figure O is the centre of a circle of radius 5 cm. T is a point such that $OT = 13$ cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB, where TP and TQ are two tangents to the circle.



34. Find the mode of the following frequency distribution

Class Interval	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	25	34	50	42	38	14

OR

On the sports day of a school, 300 students participated. Their ages are given in the following distribution :

Age (in years)	5-7	7-9	9-11	11-13	13-15	15-17	17-19
Number of students	67	33	41	95	36	13	15

Find the mean and mode of the data.

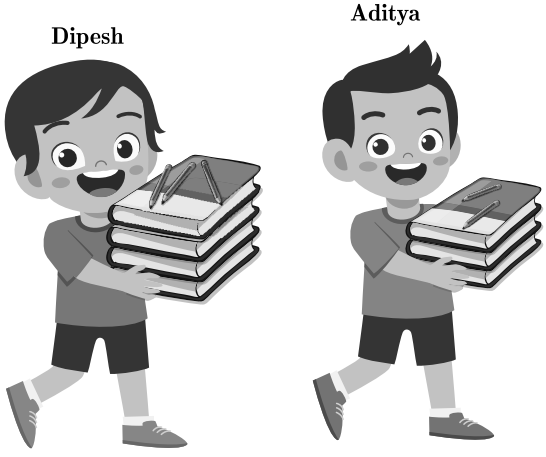
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35. Find the ratio in which the line $x-3y=0$ divides the line segment joining the points $(-2,-5)$ and $(6,3)$. Find the coordinates of the point of intersection.

SECTION - E

Section E consists of 3 case study based questions of 4 marks each.

36. Dipesh bought 3 notebooks and 2 pens for Rs. 80. His friend Ramesh said that price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs. 5 and each pen could be for Rs. 2.50. Another friend Amar felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16.



Aditya also bought the same types of notebooks and pens as Dipesh. He paid 110 for 4 notebooks and 3 pens.

(i) Whether the estimation of Ramesh and Amar is applicable for Aditya?

(ii) Let the cost of one notebook be x and that of pen be y. Which of the following set describe the given problem ?

(iii) What is the exact cost of the notebook?

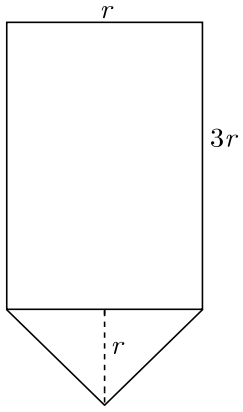
(iv) What is the exact cost of the pen? What is the total cost if they purchase the same type of 15 notebooks and 12 pens.

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37. Conical Tank : The advantages of cone bottom tanks are found in nearly every industry, especially where getting every last drop from the tank is important. This type of tank has excellent geometry for draining, especially with high solids content slurries as these cone tanks provide a better full-drain solution. The conical tank eliminates many of the problems that flat base tanks have as the base of the tank is sloped towards the centre giving the greatest possible full-drain system in vertical tank design.



Rajesh has been given the task of designing a conical bottom tank for his client. Height of conical part is equal to its radius. Length of cylindrical part is the 3 times of its radius. Tank is closed from top. The cross section of conical tank is given below.



(i) If radius of cylindrical part is taken as 3 meter, what is the volume of above conical tank ?

(ii) What is the area of metal sheet used to make this conical tank ? Assume that tank is covered from top.

(iii) What is the ratio of volume of cylindrical part to the volume of conical part?

(iv) The cost of metal sheet is Rs 2000 per square meter and fabrication cost is 1000 per square meter. What is the total cost of tank ?

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38. Volume of a Bird Cage. A company makes rectangular shaped bird cages with height b inches and square bottoms. The volume of these cages is given by the function $V = b^3 - 6b^2 + 9b$.

(i) Find an expression for the length of each side of the square bottom.

(ii) Use the function to find the volume of a cage with a height of 18 inches.

(iii) Use the remainder theorem to find the volume of a cage with a height of 15 inches.

(iv) Verify the result of (iii) using function ?



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