MATHEMATICS BASIC 2022

TERM-1

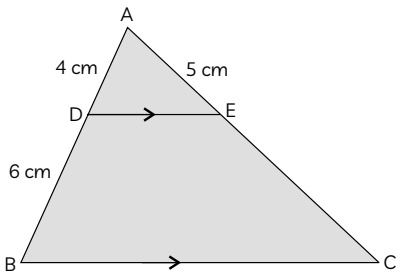
SECTION - A

16 Marks

(Q. No. 1 to 20 are of 1 mark each. Attempt any 16 from Q. 1 to 20.)

1. HCF of 92 and 152 is:
(a) 4 (b) 19
(c) 23 (d) 57 1

2. In ΔABC, DE || BC, AD = 4 cm, DB = 6 cm and AE = 5 cm. The length of EC is:



(a) 7 cm (b) 6.5 cm
(c) 7.5 cm (d) 8 cm 1

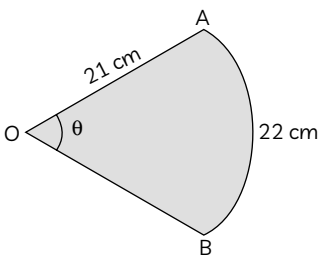
3. The value of k, for which the pair of linear equations $x + y - 4 = 0$, $2x + ky - 3 = 0$ have no solution, is:
(a) 0 (b) 2
(c) 6 (d) 8 1

4. The value of $(\tan^2 45° - \cos^2 60°)$ is:
(a) $\frac{1}{2}$ (b) $\frac{1}{4}$
(c) $\frac{3}{2}$ (d) $\frac{3}{4}$ 1

5. A point $(x, 1)$ is equidistant from (0, 0) and (2, 0). The value of x is:
(a) 1 (b) 0
(c) 2 (d) $\frac{1}{2}$ 1

6. Two coins are tossed together. The probability of getting exactly one head is:
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) $\frac{3}{4}$ (d) 1 1

7. A circular arc of length 22 cm subtends an angle θ at the centre of the circle of radius 21 cm. The value of θ is:



(a) 90° (b) 50°
(c) 60° (d) 30° 1

8. A quadratic polynomial having sum and product of its zeroes as 5 and 0 respectively, is:
(a) $x^2 + 5x$ (b) $2x(x - 5)$
(c) $5x^2 - 1$ (d) $x^2 - 5x + 5$ 1

9. If P(E) = 0.65, then the value of P(not E) is:
(a) 1.65 (b) 0.25
(c) 0.65 (d) 0.35 1

10. It is given that ΔDEF ~ ΔPQR. EF:QR = 3 : 2, then value of ar(ΔDEF) : ar(ΔPQR) is: **
(a) 4 : 9 (b) 4 : 3
(c) 9 : 2 (d) 9 : 4 1

11. Zeroes of a quadratic polynomial $x^2 - 5x + 6$ are:
(a) –5,1 (b) 5, 1
(c) 2, 3 (d) –2, –3 1

12. $\frac{57}{300}$ is a:**
(a) non-terminating and non-repeating decimal expansion.
(b) terminating decimal expansion after 2 places of decimals.
(c) terminating decimal expansion after 3 places of decimals.
(d) non-terminating but repeated decimal expansion. 1

13. Perimeter of a rectangle whose length (l) is 4 cm more than twice its breadth (b) is 14 cm. The pair of linear equations representing the above information is:
(a) $l + 4 = 2b$, $2(l + b) = 14$ (b) $l - b = 4$, $2(l + b) = 14$
(c) $l = 2b + 4$, $l + b = 14$ (d) $l = 2b + 4$, $2(l + b) = 14$ 1

14. $5.\overline{213}$ can also be written as:**
(a) 5.213213213... (b) 5.2131313...
(c) 5.213 (d) $\frac{5213}{1000}$ 1

15. The ratio in which the point (4, 0) divides the line segment joining the points (4, 6) and (4, –8) is:

(a) 1 : 2 (b) 3 : 4

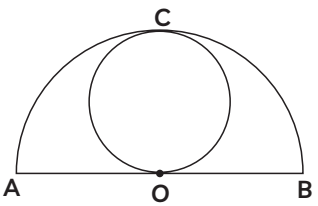
(c) 4 : 3 (d) 1 : 1 1

16. Which of the following is not defined?

(a) sec 0° (b) cosec 90°

(c) tan 90° (d) cot 90° 1

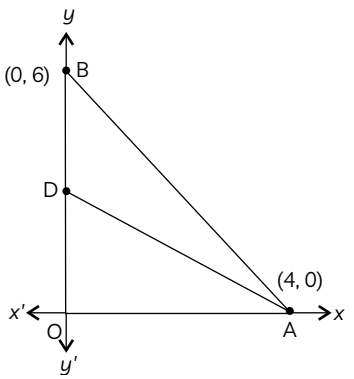
17. In the given figure, a circle is touching a semi-circle at C and its diameter AB at O. If AB = 28 cm, what is the radius of the inner circle?



(a) 14 cm (b) 28 cm

(c) 7 cm (d) $\frac{7}{2}$ cm 1

18. The vertices of a triangle OAB are O(0, 0), A(4, 0) and B(0, 6). The median AD is drawn on OB. The length AD is:



(a) $\sqrt{52}$ units (b) 5 units

(c) 25 units (d) 10 units 1

19. In a right-angled triangle PQR, $\angle Q = 90°$. If $\angle P = 45°$, then value of $\tan P - \cos^2 R$ is:

(a) 0 (b) 1

(c) $\frac{1}{2}$ (d) $\frac{3}{2}$ 1

20. If $\tan \theta = \frac{2}{3}$, then the value of $\sec \theta$ is:

(a) $\frac{\sqrt{13}}{3}$ (b) $\frac{\sqrt{5}}{3}$

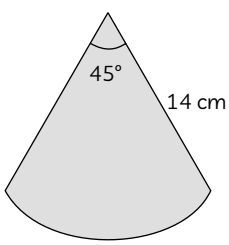
(c) $\sqrt{\frac{13}{3}}$ (d) $\frac{3}{\sqrt{13}}$ 1

SECTION - B

16 Marks

(Q. No. 21 to 40 are of 1 mark each. Attempt any 16 from Q. 21 to 40.)

21. The perimeter of the sector of a circle of radius 14 cm and central angle 45° is:



(a) 11 cm (b) 22 cm

(c) 28 cm (d) 39 cm 1

22. A bag contains 16 red balls, 8 green balls and 6 blue balls. One ball is drawn at random. The probability that it is blue ball is:

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$

(c) $\frac{1}{30}$ (d) $\frac{5}{6}$ 1

23. If $\sin \theta - \cos \theta = 0$, then the value of θ is:

(a) 30° (b) 45°

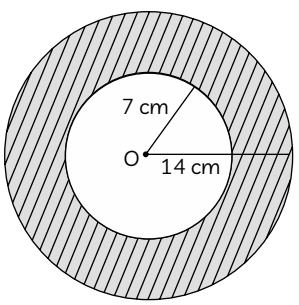
(c) 90° (d) 0° 1

24. The probability of happening of an event is 0.02. The probability of not happening of the event is:

(a) 0.02 (b) 0.80

(c) 0.98 (d) $\frac{49}{100}$ 1

25. Two concentric circles are centred at O. The area of shaded region, if outer and inner radii are 14 cm and 7 cm respectively, is:



(a) 462 cm^2 (b) 154 cm^2

(c) 231 cm^2 (d) 308 cm^2 1

26. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta}$ can be simplified to get:

(a) $2\cos^2\theta$ (b) $\frac{1}{2}\sec^2\theta$

(c) $\frac{2}{\sin^2\theta}$ (d) $2\sec^2\theta$ 1

27. The origin divides the line segment AB joining the points A(1, –3) and B(–3, 9) in the ratio:

(a) 3 : 1 (b) 1 : 3
(c) 2 : 3 (d) 1 : 1 1

28. The perpendicular bisector of a line segment A(–8, 0) and B(8, 0) passes through a point (0, *k*). The value of *k* is:

(a) 0 only
(b) 0 or 8 only
(c) any real number
(d) any non-zero real number 1

29. Which of the following is a correct statement?

(a) Two congruent figures are always similar.
(b) Two similar figures are always congruent.
(c) All rectangles are similar.
(d) The polygons having same number of sides are similar. 1

30. The solution of the pair of linear equations $x = -5$ and $y = 6$ is:

(a) (–5, 6) (b) (–5, 0)
(c) (0, 6) (d) (0, 0) 1

31. A circle of radius 3 units is centred at (0, 0). Which of the following points lie outside the circle?

(a) (–1, –1) (b) (0, 3)
(c) (1, 2) (d) (3, 1) 1

32. The value of *k* for which the pair of linear equations $3x + 5y = 8$ and $kx + 15y = 24$ has infinitely many solutions, is:

(a) 3 (b) 9
(c) 5 (d) 15 1

33. HCF of two consecutive even numbers is:

(a) 0 (b) 1
(c) 2 (d) 4 1

34. The zeroes of quadratic polynomial $x^2 + 99x + 127$ are:

(a) both negative
(b) both positive
(c) one positive and one negative
(d) reciprocal of each other 1

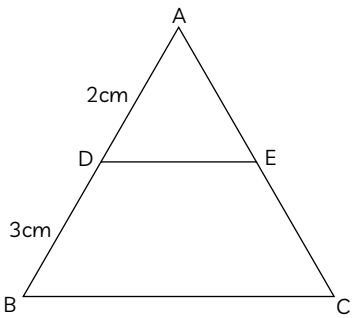
35. The mid-point of line segment joining the points (–3, 9) and (–6, –4) is:

(a) $\left(\frac{-3}{2}, \frac{-13}{2}\right)$ (b) $\left(\frac{9}{2}, \frac{-5}{2}\right)$
(c) $\left(\frac{-9}{2}, \frac{5}{2}\right)$ (d) $\left(\frac{9}{2}, \frac{5}{2}\right)$ 1

36. The decimal expansion of $\frac{13}{2 \times 5^2 \times 7}$ is:**

(a) terminating after 1 decimal place.
(b) non-terminating and non-repeating.
(c) terminating after 2 decimal places.
(d) non-terminating but repeating. 1

37. In $\triangle ABC$, DE || BC, AD = 2 cm, DB = 3 cm, DE : BC is equal to:



(a) 2 : 3 (b) 2 : 5
(c) 1 : 2 (d) 3 : 5 1

38. The (HCF × LCM) for the numbers 50 and 20 is:

(a) 1000 (b) 50
(c) 100 (d) 500 1

39. For which natural number *n*, 6^n ends with digit zero?

(a) 6 (b) 5
(c) 0 (d) None of these 1

40. $(1 + \tan^2 A)(1 + \sin A)(1 - \sin A)$ is equal to:

(a) $\frac{\cos^2 A}{\sec^2 A}$ (b) 1
(c) 0 (d) 2 1

SECTION - B

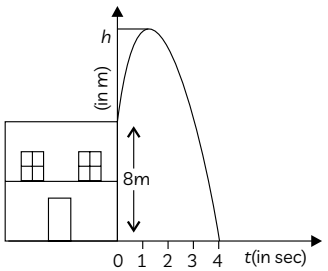
8 Marks

(Attempt any 4 Questions from Q.No. 41 to 45 and another 4 from Q.No. 46 to 50.)

CASE STUDY 1

Sukriti throws a ball upwards, from a rooftop which is 8 m high from ground level. The ball reaches to some maximum height and then returns and hit the ground.

If height of the ball at time t (in sec) is represented by h(m), then equation of its path is given as $h = -t^2 + 2t + 8$.



Based on above information, answer the following question:

41. **The maximum height achieved by ball is:**
(a) 7 m **(b) 8 m**
(c) 9 m **(d) 10 m** 1

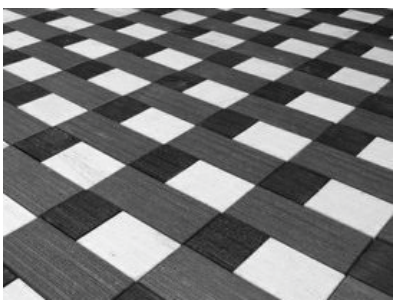
42. **The polynomial represented by above graph is:**
(a) linear polynomial
(b) quadratic polynomial
(c) constant polynomial
(d) cubic polynomial 1

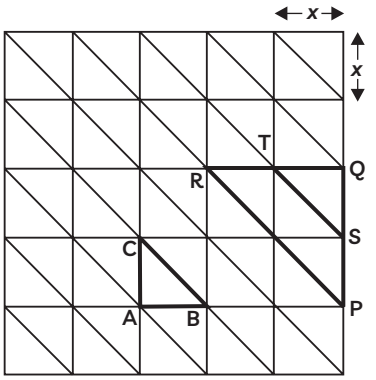
43. **Time taken by ball to reach maximum height is:**
(a) 2 sec **(b) 4 sec**
(c) 1 sec **(d) 2 min** 1

44. **Number of zeroes of the polynomial whose graph is given, is:**
(a) 1 **(b) 2**
(c) 0 **(d) 3** 1

45. **Zeroes of the polynomial are:**
(a) 4 **(b) –2, 4**
(c) 2, 4 **(d) 0, 4** 1

CASE STUDY 2





Diagrammatic View

Quilts are available in various colours and design. Geometric design includes shapes like squares, triangles, rectangles, hexagons etc.

One such design is shown above. Two triangles are highlighted, ΔABC *and* ΔPQR.

Based on above information, answer the following questions:

46. **Which of the following criteria is not suitable for ΔABC to be similar to ΔQRP?**
(a) SAS **(b) AAA**
(c) SSS **(d) RHS** 1

47. **If each square is of length *x* unit, then length BC is equal to:**
(a) $x\sqrt{2}$ **unit** **(b) 2*x* unit**
(c) $2\sqrt{x}$ **unit** **(d)** $x\sqrt{x}$ **unit** 1

48. **Ratio BC : PR is equal to:**
(a) 2 : 1 **(b) 1 : 4**
(c) 1 : 2 **(d) 4 : 1** 1

49. **ar(PQR) : ar(ABC) is equal to:**[**]
(a) 2 : 1 **(b) 1 : 4**
(c) 4 : 1 **(d) 1 : 8** 1

50. **Which of the following is not true?**
(a) ΔTQS ~ ΔPQR
(b) ΔCBA ~ ΔSTQ
(c) ΔBAC ~ ΔPQR
(d) ΔPQR ~ ΔABC 1

TERM-2

SECTION - A

12 Marks

(Question Numbers 1 to 6 carry 2 marks each.)

1. **In an AP, if $a = 50$, $d = -4$ and $S_n = 0$, then find the value of *n*.**

OR

Find the sum of the first twelve 2-digit multiples of 7, using an AP. 2

2. **A solid metallic sphere of radius 3 cm is melted and recast into the shape of a solid cylinder of radius 2 cm. Find the height of the cylinder.** 2

3. **Find the nature of the roots of the quadratic equation $x^2 - 5x + 9 = 0$.**

OR

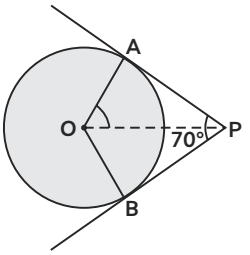
Write a quadratic equation with roots – 3 and 5. 2

4. Find the mode of the following frequency distribution:

Class	Frequency
0 – 20	8
20 – 40	7
40 – 60	12
60 – 80	5
80 – 100	3

5. Solve the quadratic equation $2x^2 - 5x - 1 = 0$ for x. 2

6. In figure, if tangents PA and PB drawn from a point P to a circle with centre O, are inclined to each other at an angle of 70°, then find the measure of ∠POA.



2

SECTION - B

12 Marks

(Question Numbers from 7 to 10 carry 3 marks each.)

7. The frequency distribution given below shows the weight of 40 students of a class. Find the median weight of the students.

Weight (in kg)	Number of Students
40 – 45	9
45 – 50	5
50 – 55	8
55 – 60	9
60 – 65	6
65 – 70	3

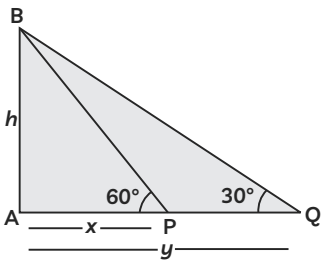
3

8. Draw a circle of radius 4 cm. Construct a pair of tangents to the circle from a point 6 cm away from its centre.**

OR

Draw a line segment PQ = 7.5 cm. Divide it in the ratio 3 : 1.** 3

9. In figure, the angles of elevation of the top of a tower AB of height 'h' m, from two points P and Q at a distance of x m and y m from the base of the tower respectively and in the same straight line with it, are 60° and 30°, respectively, Prove that $h^2 = xy$.



3

10. The following table shows the age of patients admitted in a hospital during a particular week:

Age (in years)	Number of Patients
5 – 15	5
15 – 25	12
25 – 35	20
35 – 45	24
45 – 55	15
55 – 65	4

Find the mean age of the patients. 3

SECTION - C

16 Marks

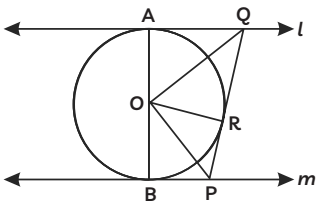
(Question Numbers from 11 to 14 carry 4 marks each.)

11. A spherical glass vessel has a neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely.

OR

From a solid cylinder, whose height is 2.4 cm. and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. 4

12. **In figure, the tangent *l* is parallel to the tangent *m* drawn at points A and B respectively to a circle centred at O. PQ is a tangent to the circle at R. Prove that ∠POQ = 90°.**



4

CASE STUDY 1

13. *Do you know old clothes which are thrown as waste not only fill the landfill site but also produce very harmful greenhouse gas. So, it is very important that we reuse old clothes in whatever way we can.*

The picture given below on the right, shows a footmat (rug) made out of old t-shirts yarn. Observing the picture, you will notice that a number of stitches in circular rows are making a pattern : 6, 12, 18, 24, ...

Based on the above information, answer the following questions:

(A) Check whether the given pattern forms an AP. If yes, find the common difference and the next term of the AP. 2

(B) Write the n^{th} term of the AP. Hence, find the number of stitches in the 10th circular row. 2

CASE STUDY 2

14. *The following TV Tower was built in 1988 and is located in Pitampura, Delhi. It has an observation deck. Observe the picture given below:*

The TV Tower stands vertically on the ground. From a point 'A' on the ground, the angle of elevation of top of the tower (point 'B') is 60°. There is a point 'C' on the tower which is 78 m (approx.) above the ground.

The angle of elevation of the point C from point A is found to be 30°.

(A) Draw a well-labelled figure, based on the information given above. 2

(B) Find the height of the tower and the distance of the tower from point A. 2