

**Sample/Pre-Board Paper 6**  
**Class X Term 1 Exam Nov -Dec 2021**  
**Mathematics (Standard) 041**

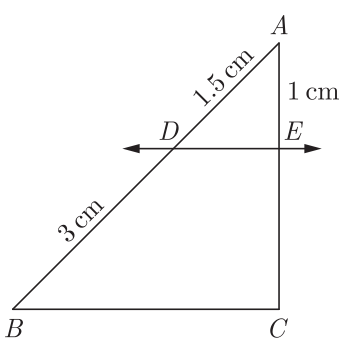
**Time Allowed: 90 minutes Maximum Marks: 40**

**General Instructions:**

1. The question paper contains three parts A, B and C.
  2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
  3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
  4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.
  5. There is no negative marking.
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## SECTION A

Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

1. The sum of exponents of prime factors in the prime-factorisation of 196 is  
(a) 3 (b) 4  
(c) 5 (d) 2
2. 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
3. In the given figure,  $DE \parallel BC$ . The value of  $EC$  is  
  
(a) 1.5 cm (b) 3 cm  
(c) 2 cm (d) 1 cm
4. In an equilateral triangle of side  $3\sqrt{3}$  cm the length of the altitude will be  
(a) 6.5 cm (b) 5.5 cm  
(c) 4.5 cm (d) 7.5 cm
5. The point  $P$  on  $x$ -axis equidistant from the points  $A(-1, 0)$  and  $B(5, 0)$  is  
(a) (2, 0) (b) (0, 2)  
(c) (3, 0) (d)  $(-3, 5)$
6.  $\triangle ABC$  is an equilateral triangle with each side of length  $2p$ . If  $AD \perp BC$  then the value of  $AD$  is  
(a)  $\sqrt{3}$  (b)  $\sqrt{3}p$   
(c)  $2p$  (d)  $4p$
7. Given that  $\sin \alpha = \frac{\sqrt{3}}{2}$  and  $\cos \beta = 0$ , then the value of  $\beta - \alpha$  is  
(a)  $0^\circ$  (b)  $90^\circ$   
(c)  $60^\circ$  (d)  $30^\circ$
8. The decimal representation of  $\frac{11}{2^3 \times 5}$  will  
(a) terminate after 1 decimal place  
(b) terminate after 2 decimal place  
(c) terminate after 3 decimal places  
(d) not terminate
9. The pair of equations  $x = a$  and  $y = b$  graphically represents lines which are  
(a) parallel  
(b) intersecting at  $(b, a)$   
(c) coincident  
(d) intersecting at  $(a, b)$
10. The co-ordinates of the point which is reflection of point  $(-3, 5)$  in  $x$ -axis are  
(a) (3, 5) (b) (3, -5)  
(c)  $(-3, -5)$  (d)  $(-3, 5)$
11. If one zero of a quadratic polynomial  $(kx^2 + 3x + k)$  is 2, then the value of  $k$  is  
(a)  $\frac{5}{6}$  (b)  $-\frac{5}{6}$   
(c)  $\frac{6}{5}$  (d)  $-\frac{6}{5}$

12. Which of the following are the HCF and LCM of 404 and 96 ?

- (a) 4 and 9696 (b) 6 and 38784  
(c) 8 and 1486 (d) 6 and 9648

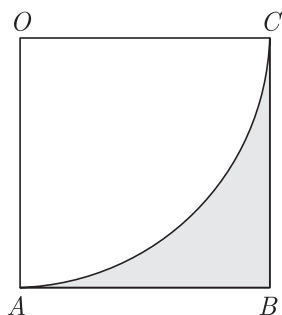
13. If  $\triangle ABC$  is right angled at  $C$ , then the value of  $\cos(A + B)$  is

- (a) 0 (b) 1  
(c)  $\frac{1}{2}$  (d)  $\frac{\sqrt{3}}{2}$

14. If  $\sin \theta = \frac{a}{b}$ , then  $\cos \theta$  is equal to

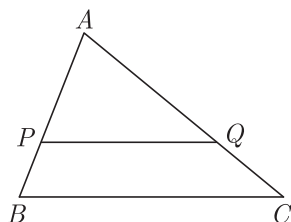
- (a)  $\frac{b}{\sqrt{b^2 - a^2}}$  (b)  $\frac{\sqrt{b^2 - a^2}}{a}$   
(c)  $\frac{\sqrt{b^2 - a^2}}{b}$  (d)  $\frac{a}{\sqrt{b^2 - a^2}}$

15. In the adjoining figure,  $OABC$  is a square of side 7 cm.  $OAC$  is a quadrant of a circle with  $O$  as centre. The area of the shaded region is



- (a)  $10.5 \text{ cm}^2$  (b)  $38.5 \text{ cm}^2$   
(c)  $49 \text{ cm}^2$  (d)  $11.5 \text{ cm}^2$

16. In the given figure,  $P$  and  $Q$  are points on the sides  $AB$  and  $AC$  respectively of a triangle  $ABC$ .  $PQ$  is parallel to  $BC$  and divides the triangle  $ABC$  into 2 parts, equal in area. The ratio of  $PA : AB =$

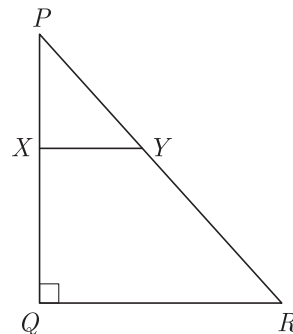


- (a) 1 : 1 (b)  $(\sqrt{2} - 1) : \sqrt{2}$   
(c)  $1 : \sqrt{2}$  (d)  $(\sqrt{2} - 1) : 1$

### Case Based Questions:

In the given figure,  $PQR$  is a triangle right angled at  $Q$  and  $XY \parallel QR$ . If  $PQ = 6 \text{ cm}$ ,  $PY = 4 \text{ cm}$  and  $PX : XQ = 1 : 2$ .

17. The length of  $PR$  will be



- (a) 12 cm (b)  $2\sqrt{3} \text{ cm}$   
(c)  $6\sqrt{3} \text{ cm}$  (d) 18 cm

18. If  $4 \tan \theta = 3$ , then  $\left( \frac{4 \sin \theta - \cos \theta}{4 \sin \theta + \cos \theta} \right)$  is equal to

- (a)  $\frac{2}{3}$  (b)  $\frac{1}{3}$   
(c)  $\frac{1}{2}$  (d)  $\frac{3}{4}$

19.  $x$  and  $y$  are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of  $x + y$  is

- (a) 10 (b) 11  
(c) 12 (d) 13

20. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

- (a) 7 (b) 14  
(c) 21 (d) 28

## SECTION B

Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

21. If two positive integers  $a$  and  $b$  are written as  $a = x^3 y^2$  and  $b = xy^3$ , where  $x, y$  are prime numbers, then HCF  $(a, b)$  is

- (a)  $xy$  (b)  $xy^2$   
(c)  $x^3 y^3$  (d)  $x^2 y^2$

22. The point  $P$  on  $x$ -axis equidistant from the points  $A(-1, 0)$  and  $B(5, 0)$  is

- (a) (2, 0) (b) (0, 2)  
(c) (3, 0) (d)  $(-3, 5)$

23. If  $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$ , ( $\theta \neq 90^\circ$ ) then the value of  $\tan \theta$  is

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

24. 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

25. If  $\alpha$  and  $\beta$  are the zeroes the polynomial  $2x^2 - 4x + 5$ , the value of  $\alpha^2 + \beta^2$  is

- (a)  $-7$  (b) 1  
(c)  $-1$  (d)  $-6$

26. If a number  $x$  is chosen at random from the numbers  $-2, -1, 0, 1, 2$ . Then, the probability that  $x^2 < 2$  is

- (a)  $\frac{2}{5}$  (b)  $\frac{4}{5}$   
(c)  $\frac{1}{5}$  (d)  $\frac{3}{5}$

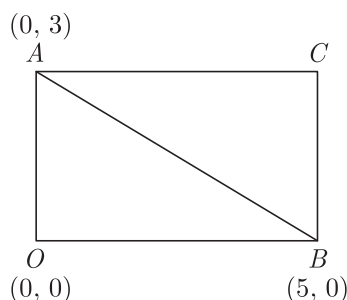
27. A dice is rolled twice. What is the probability that 5 will not come up either time?

- (a)  $\frac{5}{18}$  (b)  $\frac{25}{36}$   
(c)  $\frac{13}{36}$  (d)  $\frac{11}{36}$

28. If  $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$  and  $x \sin \theta = y \cos \theta$ , then  $x^2 + y^2$  is equal to

- (a) 0 (b)  $1/2$   
(c) 1 (d)  $3/2$

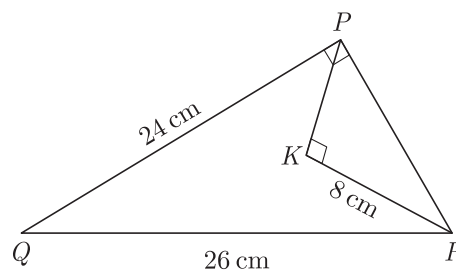
29. If  $AOBC$  is a rectangle whose three vertices are  $A(0, 3)$ ,  $O(0, 0)$  and  $B(5, 0)$ , then the length of its diagonal is



- (a) 5 (b) 3  
(c)  $\sqrt{34}$  (d) 4

30. In the given triangle  $PQR$ ,  $\angle QPR = 90^\circ$ ,  $PQ = 24$  cm and  $QR = 26$  cm and in  $\triangle PKR$ ,  $\angle PKR = 90^\circ$  and

$KR = 8$  cm, the length of  $PK$  will be



- (a) 3 cm (b) 4 cm  
(c) 5 cm (d) 6 cm

31. Point  $(-1, y)$  and  $B(5, 7)$  lie on a circle with centre  $O(2, -3y)$ . What is the radius of the circle?

- (a) 5 (b) 2  
(c) 3 (d) 4

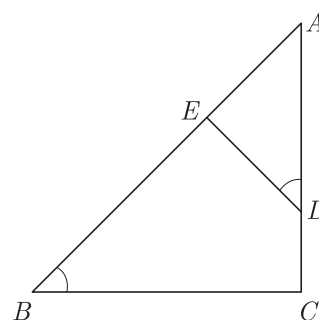
32.  $\frac{\cos \theta - \sin \theta + 1}{\cos \theta + \sin \theta - 1} = ?$

- (a)  $\cos \theta - \sin \theta$  (b)  $\sin \theta - \cos \theta$   
(c)  $\sin \theta + \cos \theta$  (d)  $\operatorname{cosec} \theta + \cot \theta$

33. An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

- (a) 12 (b) 16  
(c) 714 (d) 1428

34. In  $\triangle ABC$ , if  $\angle ADE = \angle B$ , then prove that  $\triangle ADE \sim \triangle ABC$ . Also, if  $AD = 7.6$  cm,  $AE = 7.2$  cm,  $BE = 4.2$  cm and  $BC = 8.4$  cm, then length  $DE$  will be

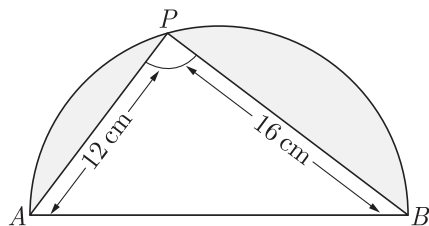


- (a) 5.6 cm (b) 2.8 cm  
(c) 4.8 cm (d) 3.8 cm

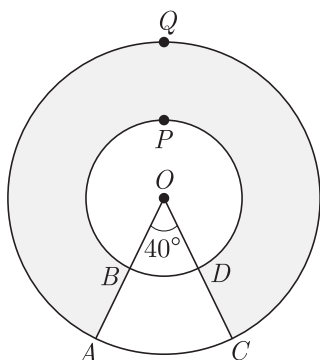
35. If the distances of  $P(x, y)$  from  $A(5, 1)$  and  $B(-1, 5)$  are equal, then

- (a)  $3x = 4y$  (b)  $2x = 3y$   
(c)  $3x = 2y$  (d)  $4x = 3y$

36. In the given figure,  $AB$  is the diameter where  $AP = 12$  cm and  $PB = 16$  cm. If the value of  $\pi$  is taken 3, what is the perimeter of the shaded region?



- (a) 58 cm (b) 116 cm  
(c) 29 cm (d) 156 cm
37. In the given figure, what is the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where  $\angle AOC = 40^\circ$ ? Use  $\pi = \frac{22}{7}$ .

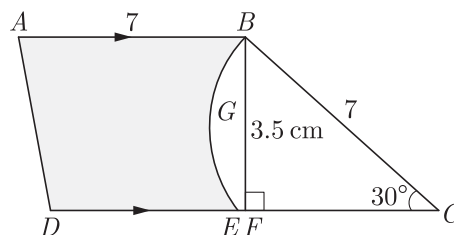


- (a)  $165 \text{ cm}^2$  (b)  $189 \text{ cm}^2$   
(c)  $210 \text{ cm}^2$  (d)  $411 \text{ cm}^2$

38. If  $\alpha$  and  $\beta$  are zeroes and the quadratic polynomial  $f(x) = x^2 - x - 4$ , then the value of  $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$  is

- (a)  $\frac{15}{4}$  (b)  $-\frac{15}{4}$   
(c) 4 (d) 15

39. Adjoining fig,  $ABCD$  is a trapezium with  $AB \parallel DC$  and  $\angle BCD = 30^\circ$ . Fig.  $BGEC$  is a sector of a circle with centre  $C$  and  $AB = BC = 7$  cm,  $DE = 4$  cm and  $BF = 3.5$  cm, then What is the area of the shaded region? Use  $\pi = \frac{22}{7}$ .



- (a)  $24.67 \text{ cm}^2$  (b)  $12.34 \text{ cm}^2$   
(c)  $28.14 \text{ cm}^2$  (d)  $18.67 \text{ cm}^2$
40. What are the values of  $x$  and  $y$  for the following system of equations.

$$\frac{21}{x} + \frac{47}{y} = 110, \frac{47}{x} + \frac{21}{y} = 162, x, y \neq 0$$

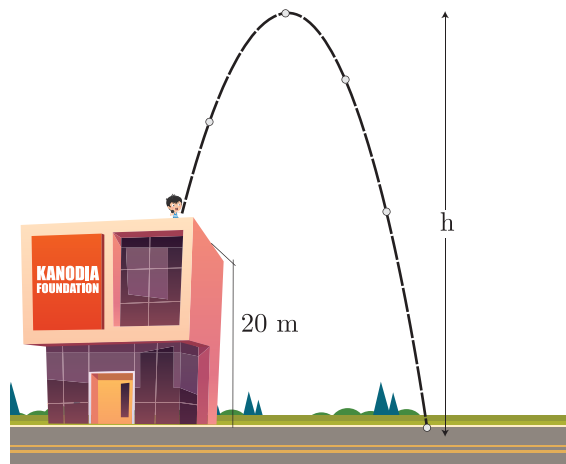
- (a)  $\frac{1}{3}$  and  $\frac{1}{2}$  (b)  $\frac{1}{3}$  and 1  
(c)  $\frac{1}{2}$  and  $\frac{1}{3}$  (d)  $\frac{1}{2}$  and 1

## SECTION C

Case study based questions: Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

### Case Based Questions: (41-45)

Lavanya throws a ball upwards, from a rooftop, which is 20 m above from ground. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time  $t$  is  $h$ , which is given by  $h = -4t^2 + 16t + 20$ .



41. What is the height reached by the ball after 1 second?
- (a) 64 m (b) 128 m  
(c) 32 m (d) 20 m

42. What is the maximum height reached by the ball?

- (a) 54 m (b) 44 m  
(c) 36 m (d) 18 m

43. How long will the ball take to hit the ground?

- (a) 4 seconds (b) 3 seconds  
(c) 5 seconds (d) 6 seconds

44. What are the two possible times to reach the ball at the same height of 32 m?

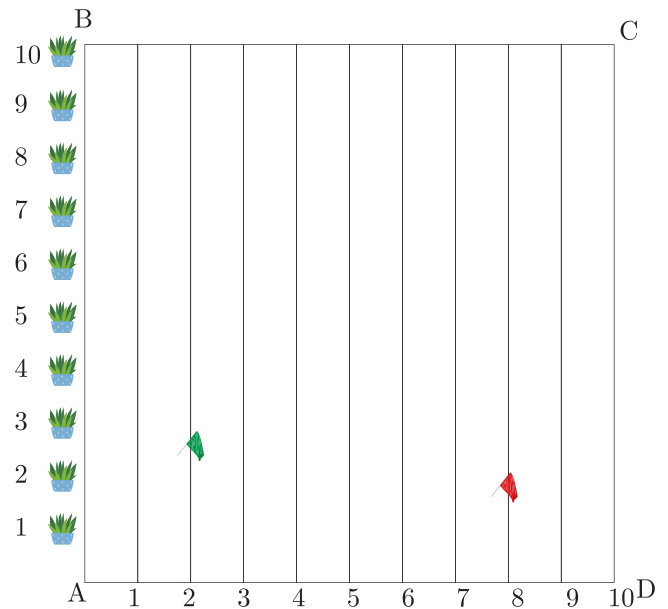
- (a) 1 and 3 seconds (b) 1 and 4 seconds  
(c) 1 and 2 seconds (d) 1 and 5 seconds

45. Where is the ball after 5 seconds ?

- (a) at the ground (b) rebounds  
(c) at highest point (d) fall back

#### Case Based Questions: (46-50)

To conduct sports day activities, in a rectangular shaped school ground  $ABCD$ , lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along  $AB$ , as shown in figure. Nishtha runs  $\frac{1}{4}$ th the distance  $AB$  on the 2nd line and posts a green flag. Suman runs  $\frac{1}{5}$ th the distance  $AB$  on the 8th line and posts a red flag.



46. What is the position of green flag ?

- (a) (2, 25) (b) (25, 4)  
(c) (25, 2) (d) (4, 25)

47. What is the position of red flag ?

- (a) (20, 4) (b) (8, 20)  
(c) (20, 8) (d) (4, 20)

48. What is the distance between both the flags?

- (a)  $\sqrt{51}$  (b)  $3\sqrt{3}$   
(c)  $\sqrt{61}$  (d)  $2\sqrt{3}$

49. What is the distance of red flag from point A ?

- (a)  $4\sqrt{29}$  (b)  $2\sqrt{29}$   
(c)  $8\sqrt{15}$  (d)  $16\sqrt{3}$

50. If Rakhi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?

- (a) (20, 4) (b) (22.5, 5)  
(c) (4, 20) (d) (5, 22.5)

## SAMPLE PAPER - 1 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(b)	Ch-1	1
2	(d)	Ch-3	1
3	(c)	Ch-4	1
4	(c)	Ch-4	39
5	(a)	Ch-8	1
6	(b)	Ch-4	3
7	(d)	Ch-6	1
8	(c)	Ch-1	4
9	(d)	Ch-3	14
10	(c)	Ch-5	3
11	(d)	Ch-2	1
12	(a)	Ch-1	S-1
13	(a)	Ch-6	9
14	(c)	Ch-6	6
15	(a)	Ch-7	2
16	(c)	Ch-4	11
17	(a)	Ch-4	48
18	(c)	Ch-6	11
19	(b)	Ch-3	8
20	(b)	Ch-8	12
21	(b)	Ch-1	14
22	(a)	Ch-5	1
23	(a)	Ch-6	3
24	(b)	Ch-3	4
25	(a)	Ch-2	34

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(d)	Ch-8	24
27	(a)	Ch-8	176
28	(c)	Ch-6	18
29	(c)	Ch-5	27
30	(d)	Ch-4	43
31	(a)	Ch-5	11
32	(d)	Ch-6	129
33	(a)	Ch-1	S-29
34	(a)	Ch-4	78
35	(c)	Ch-5	83
36	(a)	Ch-7	38
37	(d)	Ch-7	58
38	(a)	Ch-2	9
39	(d)	Ch-7	69
40	(b)	Ch-3	43
41	(c)	Ch-2	94
42	(c)	Ch-2	95
43	(c)	Ch-2	96
44	(a)	Ch-2	97
45	(b)	Ch-2	98
46	(a)	Ch-5	126
47	(b)	Ch-5	127
48	(c)	Ch-5	128
49	(a)	Ch-5	129
50	(d)	Ch-5	130

\* S- = Self Test Question