Sample/Pre-Board Paper 8

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.

SECTION A

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

1. The LCM of smallest two digit composite number and smallest composite number is

(a) 12 (b) 4

(c) 20 (d) 44

2. For which value(s) of p, will the lines represented by the following pair of linear equations be parallel

$$3x - y - 5 = 0$$
$$6x - 2y - p = 0$$

(a) all real values except 10

(b) 10

(c) 5/2

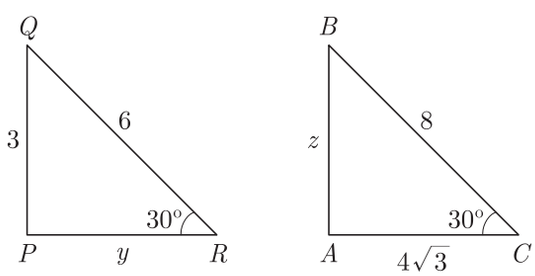
(d) 1/2

3. It is given that, $\Delta ABC \sim \Delta EDF$ such that $AB = 5$ cm, $AC = 7$ cm, $DF = 15$ cm and $DE = 12$ cm then the sum of the remaining sides of the triangles is

(a) 23.05 cm (b) 16.8 cm

(c) 6.25 cm (d) 24 cm

4. In the given figure, $\Delta ABC \sim \Delta PQR$. The value of $y + z$ will be



(a) $2\sqrt{2} + 3$ (b) $3\sqrt{3} + 4$

(c) $3\sqrt{2} + 1$ (d) $2\sqrt{3} + 2$

5. Which of the following cannot be the probability of an event?

(a) $\frac{1}{3}$ (b) 0.1

(c) 3% (d) $\frac{17}{16}$

6. Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio.

(a) 2 : 3 (b) 4 : 9

(c) 81 : 16 (d) 16 : 81

7. If $\cos A = \frac{4}{5}$, then the value of $\tan A$ is

(a) $\frac{3}{5}$ (b) $\frac{3}{4}$

(c) $\frac{4}{3}$ (d) $\frac{5}{3}$

8. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after

(a) one decimal place (b) two decimal places

(c) three decimal places (d) four decimal places

9. If $x = a$ and $y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then the values of a and b are, respectively

(a) 3 and 5 (b) 5 and 3

(c) 3 and 1 (d) -1 and -3

10. The distance of the point $(-12, 5)$ from the origin is

(a) 12 (b) 5

(c) 13 (d) 169

11. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

(a) 10 (b) -10

(c) -7 (d) -2

12. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and $\text{LCM}(a, b, c) = 2^3 \times 3^2 \times 5$, then n is

(a) 1 (b) 2

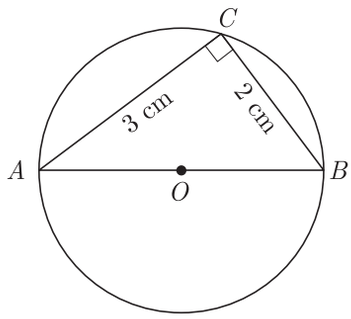
(c) 3 (d) 4

13. $\sin^2 60^\circ - 2\tan 45^\circ - \cos^2 30^\circ = ?$

(a) 2 (b) –2

(c) 1 (d) –1

14. In the given figure, AOB is a diameter of a circle with centre O, The value of $\tan A \tan B$. will be



(a) 1 (b) 2

(c) $\sqrt{3}$ (d) 3

15. If a circular grass lawn of 35 m in radius has a path 7 m wide running around it on the outside, then the area of the path is

(a) $1450\ \text{m}^2$ (b) $1576\ \text{m}^2$

(c) $1694\ \text{m}^2$ (d) $3368\ \text{m}^2$

16. ΔABC and ΔBDE are two equilateral triangle such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is ..... .

(a) 1 : 1 (b) 3 : 1

(c) 2 : 1 (d) 4 : 1

17. Two similar triangles ABC and PQR have their areas $25\ \text{cm}^2$ and $49\ \text{cm}^2$ respectively. If $QR = 9.8$ cm, what is the length of side BC?

(a) 2 cm (b) 5 cm

(c) 7 cm (d) 4 cm

18. If $x = 3\sin\theta + 4\cos\theta$ and $y = 3\cos\theta - 4\sin\theta$ then $x^2 + y^2$ is

(a) 25 (b) 45

(c) 7 (d) 49

19. Given the linear equation $3x + 4y = 9$. Select another linear equation in these two variables such that the geometrical representation of the pair so formed is intersecting lines.

(a) $3x - 5y = 10$ (b) $6x + 8y = 18$

(c) $8x + 12y = 18$ (d) above all

20. The probability of getting a number greater then 3 in throwing a die is

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$

(c) $\frac{3}{4}$ (d) $\frac{2}{3}$

SECTION B

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

21. If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is

(a) an even number

(b) an odd number

(c) an odd prime number

(d) a prime number

22. If $A\left(\frac{m}{3}, 5\right)$ is the mid-point of the line segment joining the points $Q(-6, 7)$ and $R(-2, 3)$, then the value of m is

(a) -12 (b) -4

(c) 12 (d) -6

23. If $\sin\theta - \cos\theta = \frac{1}{2}$, the value of $\sin\theta + \cos\theta$ will be

(a) $\frac{\sqrt{2}}{3}$ (b) $\frac{\sqrt{7}}{2}$

(c) $\frac{\sqrt{5}}{3}$ (d) $\frac{\sqrt{5}}{2}$

24. A fraction becomes 4 when 1 is added to both the numerator and denominator and it becomes 7 when 1 is subtracted from both the numerator and denominator. The numerator of the given fraction is

(a) 2 (b) 3

(c) 5 (d) 15

25. If zeroes of the polynomial $x^2 + 4x + 2a$ are a and $\frac{2}{a}$, then the value of a is

(a) 1 (b) 2

(c) 3 (d) 4

26. A number is chosen at random from the numbers -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5. Then the probability that square of this number is less than or equal to 1 is ..... .

(a) $\frac{9}{11}$ (b) $\frac{3}{11}$

(c) $\frac{8}{11}$ (d) $\frac{7}{11}$

27. A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. What is the probability that product of x and y is less than 16?

(a) $\frac{1}{2}$ (b) $\frac{5}{16}$

(c) $\frac{9}{16}$ (d) $\frac{7}{16}$

28. If $\frac{\cos\theta}{1-\sin\theta}+\frac{\cos\theta}{1+\sin\theta}=4;\theta\leq 90^{\circ}$ the value of θ will be

(a) 30° (b) 45°

(c) 60° (d) 90°

29. If the point $P(2,1)$ lies on the line segment joining points $A(4,2)$ and $B(8,4)$, then

(a) $AP=\frac{1}{3}AB$ (b) $AP=PB$

(c) $PB=\frac{1}{3}AB$ (d) $AP=\frac{1}{2}AB$

30. Triangle ΔABC is right angled at C. If p is the length of the perpendicular from C to AB and a,b,c are the lengths of the sides opposite $\angle A,\angle B$ and $\angle C$ respectively, then $\frac{1}{p^2}$ is equal to

(a) $\frac{a-b}{a^2+b^2}$ (b) $\frac{a+b}{a^2+b^2}$

(c) $\frac{1}{a^2}+\frac{1}{b^2}$ (d) $\frac{2ab}{a^2+b^2}$

31. What is the ratio in which the straight line $x-y-2=0$ divides the line segment joining $(3,-1)$ and $(8,9)$?

(a) 5 : 6 (b) 4 : 5

(c) 3 : 4 (d) 2 : 3

32. If $\frac{\sin\phi}{1+\cos\phi}+\frac{1+\cos\phi}{\sin\phi}=4$ then ϕ is equal to

(a) 9° (b) 90°

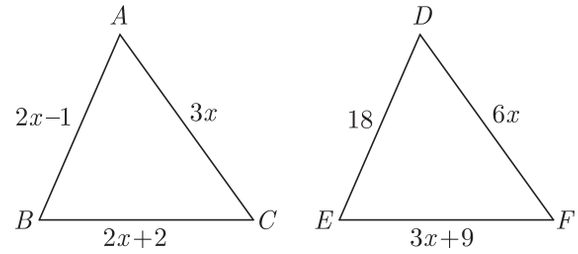
(c) 45° (d) 30°

33. Select the smallest number which is divisible by both 306 and 657.

(a) 16498 (b) 22398

(c) 22338 (d) 16414

34. In Figure, if $\Delta ABC\sim\Delta DEF$ and their sides of lengths (in cm) are marked along them, then find the lengths of sides of each triangle.



The length of side AB is

(a) 9 (b) 12

(c) 15 (d) 24

35. In what ratio does the point $(\frac{24}{11}, y)$ divides the line segment joining the points $P(2,-2)$ and $Q(3,7)$? Also find the value of y.

(a) 2 : 9 (b) 2 : 7

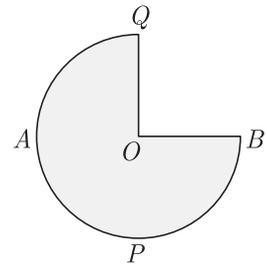
(c) 7 : 5 (d) 6 : 5

36. If the difference between the circumference and the radius of a circle is 37 cm, then using $\pi=\frac{22}{7}$, what is the circumference of the circle?

(a) 44π cm (b) 44 cm

(c) 22 cm (d) 22π cm

37. In given figure APB and AQP are semi-circle, and $AO=OB$. If the perimeter of the figure is 47 cm, what is the area of the shaded region? Use $\pi=\frac{22}{7}$.



(a) 231 cm^2 (b) 155.5 cm^2

(c) 55.5 cm^2 (d) 111 cm^2

38. If the zeroes of the quadratic polynomial $x^2+(a+1)x+b$ are 2 and -3, then

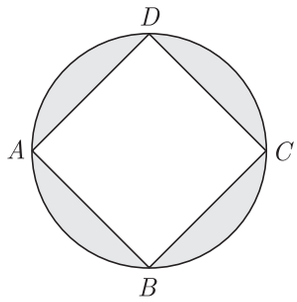
(a) $a=-7,b=-1$

(b) $a=5,b=-1$

(c) $a=2,b=-6$

(d) $a=0,b=-6$

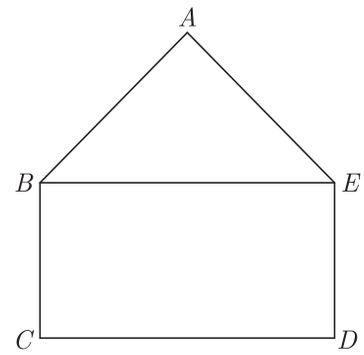
39. In given figure, $ABCD$ is a square with side $2\sqrt{2}$ cm and inscribed in a circle. What is the area of the shaded region? (Use $\pi = 3.14$).



(a) $9.2\,\text{cm}^2$ (b) $4.6\,\text{cm}^2$

(c) $12.4\,\text{cm}^2$ (d) $8.4\,\text{cm}^2$

40. In the figure, $ABCDE$ is a pentagon with $BE \parallel CD$ and $BC \parallel DE$. BC is perpendicular to CD. $AB = 5$ cm, $AE = 5$ cm, $BE = 7$ cm, $BC = x - y$ and $CD = x + y$. If the perimeter of $ABCDE$ is 27 cm. The value of x and y, will be



(a) 3 and 2 (b) 2 and 3

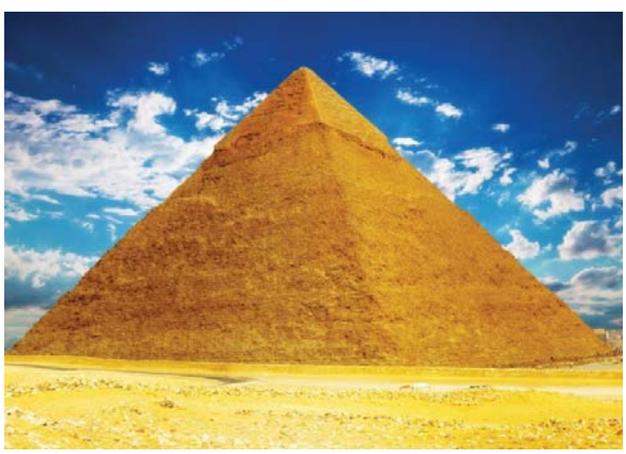
(c) 1 and 6 (d) 6 and 1

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)

Pyramid, in architecture, a monumental structure constructed of or faced with stone or brick and having a rectangular base and four sloping triangular sides meeting at an apex. Pyramids have been built at various times in Egypt, Sudan, Ethiopia, western Asia, Greece, Cyprus, Italy, India, Thailand, Mexico, South America, and on some islands of the Pacific Ocean. Those of Egypt and of Central and South America are the best known.



The volume and surface area of a pyramid with a square base of area a^2 and height h is given by

$$V = \frac{ha^2}{3} \text{ and } S = a^2 + 2a\sqrt{(\tfrac{a}{2})^2 + h^2}$$

A pyramid has a square base and a volume of $3y^3 + 18y^2 + 27y$ cubic units.

41. If its height is y, then what polynomial represents the length of a side of the square base ?

(a) $9(y+3)$ (b) $9(y+3)^2$

(c) $3(y+3)$ (d) $3(y+3)^2$

42. If area of base is 576 metre, what is the side of base?

(a) 24 metre (b) 16 metre

(c) 13 metre (d) 12 metre

43. What is the height of pyramid at above area of base ?

(a) 4 metre (b) 6 metre

(c) 5 metre (d) 12 metre

44. What is the ratio of length of side to the height ?

(a) $\frac{1}{5}$ (b) $\frac{2}{5}$

(c) $\frac{5}{24}$ (d) $\frac{24}{5}$

45. What is surface area of pyramid ?

(a) 800 m^2 (b) 2400 m^2

(c) 1200 m^2 (d) 1600 m^2

Case Based Questions: (46-50)

Satellite Images : Satellite images are images of Earth collected by imaging satellites operated by governments and businesses around the world. Satellite imaging companies sell images by licensing them to governments and businesses such as Apple Maps and Google Maps. It should not be confused for astronomy images collected by space telescope.

Barun lives in Jaipur in Vaishali. Satellite image of his colony is shown in given figure. In this view, his house is pointed out by a flag, which is situated at the point of intersection of x and y- axes. If he goes 2 cm east and 3 cm north from the house, then he reaches to a grocery store, If he goes 4 cm west and 6 cm south from the house, then he reaches to his office. If he goes 6 cm east and 8 cm south from the house, then he reaches to a food court. If he goes 6 cm west and 8 cm north from the house, he reaches to a his kid's school. Based on the above information, answer the following questions.

46. What is the distance between grocery store and food court?

(a) $\sqrt{137}$ cm (b) $\sqrt{129}$ cm

(c) $8\sqrt{15}$ cm (d) $16\sqrt{3}$ cm

47. What is the distance of the school from the house?

(a) 10 cm (b) 15 cm

(c) 20 cm (d) 25 cm

48. If the grocery store and office lie on a line, what is the ratio of distance of house from grocery store to that from office ?

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

(c) 4 : 1 (d) 5 : 1

49. What is the ratio of distances of house from school to food court.

(a) 1 :1 (b) 2 : 1

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

50. What shape is formed by the coordinates of positions of school, grocery store, food court and office?

(a) square (b) rectangle

(c) rhombus (d) quadrilateral

SAMPLE PAPER - 3 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(c)	Ch-1	5
2	(a)	Ch-3	3
3	(a)	Ch-4	7
4	(b)	Ch-4	40
5	(d)	Ch-8	4
6	(c)	Ch-4	15
7	(b)	Ch-6	4
8	(d)	Ch-1	10
9	(c)	Ch-3	19
10	(c)	Ch-5	7
11	(b)	Ch-2	4
12	(b)	Ch-1	S-7
13	(b)	Ch-6	33
14	(a)	Ch-6	55
15	(c)	Ch-7	4
16	(d)	Ch-4	20
17	(c)	Ch-4	64
18	(a)	Ch-6	32
19	(a)	Ch-3	34
20	(d)	Ch-8	16
21	(a)	Ch-1	17
22	(a)	Ch-5	10
23	(b)	Ch-6	62
24	(d)	Ch-3	7
25	(a)	Ch-2	35

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(b)	Ch-8	33
27	(a)	Ch-8	158
28	(c)	Ch-6	60
29	(d)	Ch-5	31
30	(c)	Ch-4	59
31	(d)	Ch-5	105
32	(d)	Ch-6	124
33	(c)	Ch-1	S-26
34	(a)	Ch-4	D-73
35	(a)	Ch-5	79
36	(b)	Ch-7	48
37	(b)	Ch-7	61
38	(d)	Ch-2	16
39	(b)	Ch-7	71
40	(d)	Ch-3	45
41	(c)	Ch-2	99
42	(a)	Ch-2	100
43	(c)	Ch-2	101
44	(d)	Ch-2	102
45	(c)	Ch-2	103
46	(a)	Ch-5	138
47	(a)	Ch-5	139
48	(a)	Ch-5	140
49	(a)	Ch-5	141
50	(d)	Ch-5	142

*** S- = Self Test Question, * D- = Direction Based Question**