

# ....International School

Academic Year 2021 – 2022

## PRE - BOARD -1 – EXAMINATION

### MATHEMATICS

Class: X

Sub. Code: 041

Time Allotted: 90 Minutes

Date: 31.10.2021

Set A

Max. 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. Attempt any 16 questions.
3. **Section B** consists of 20 questions of 1 mark each. Attempt any 16 questions.
4. Section C consists of 10 questions based on **two Case Studies**. Attempt any 8 questions.
5. There is no negative marking.

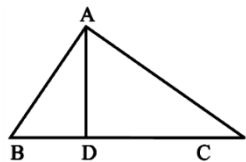
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#### SECTION A

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

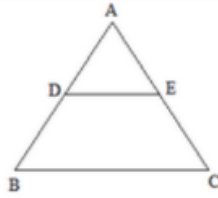
[16x1=16]

- 1) The sum of the exponents of the prime factors in the prime factorization of 196, is  
a) 1                                      b) 2                                      c) 4                                      d) 6
- 2) Shivi gave a note of ₹2,000 for a pair of jeans worth ₹500. She was returned 11 notes in denominations of ₹200 and ₹100. Which pair of equations can be used to find the number of ₹200 notes,  $x$ , and the number of ₹100 notes  $y$ ?  
a)  $x + y = 11; 200x + 100y = 500$                                       b)  $y = x + 11; 200x + 100y = 2000$   
c)  $x + y = 11; 200x + 100y = 1500$                                       d)  $x + y = 11; 100x + 200y = 1500$
- 3) In the figure given below,  $\angle BAC = 90^\circ$  and  $AD \perp BC$  then:

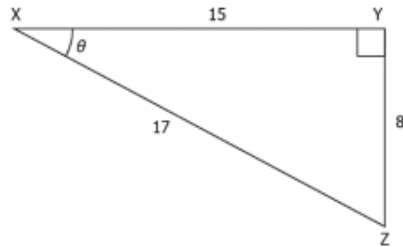


- a).  $BD \cdot CD = BC^2$
- b).  $AB \cdot AC = BC^2$
- c).  $BD \cdot CD = AD^2$
- d).  $AB \cdot AC = AD^2$

- 4) Rahul claims that congruent figures are similar as well. Aman claims that similar figures are congruent as well. Who is/are correct?  
a) Only Rahul  
b) only Aman  
c) Both Rahul and Aman  
d) Neither Rahul nor Aman
- 5) A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.  
a)  $\frac{7}{13}$       b)  $\frac{9}{13}$       c)  $\frac{6}{13}$       d)  $\frac{10}{13}$
- 6) In the given figure,  $AD = 2\text{ cm}$ ,  $BD = 3\text{ cm}$ ,  $AE = 3.5\text{ cm}$  and  $AC = 7\text{ cm}$ . Is  $DE$  parallel to  $BC$ ?



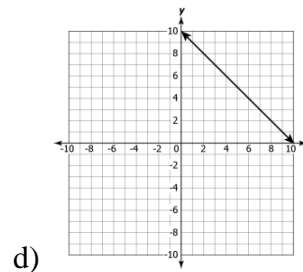
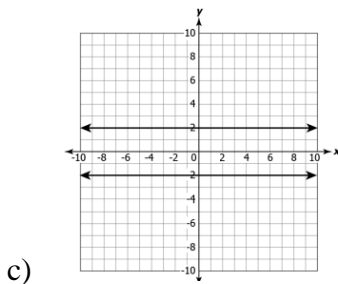
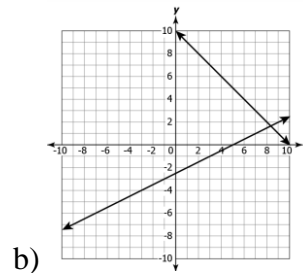
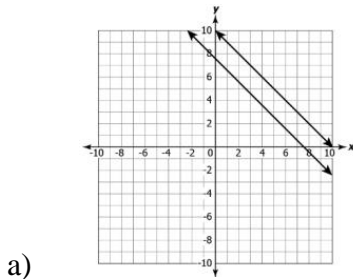
- a) Yes      b) No      c) Neither Yes nor No      d) None of these
- 7) Consider the triangle shown below



What are the values of  $\tan\theta$ ,  $\text{cosec}\theta$  and  $\sec\theta$ ?

- a)  $\tan\theta = \frac{8}{15}$ ,  $\text{cosec}\theta = \frac{17}{15}$ ,  $\sec\theta = \frac{17}{8}$       b)  $\tan\theta = \frac{8}{15}$ ,  $\text{cosec}\theta = \frac{17}{8}$ ,  $\sec\theta = \frac{17}{15}$   
c)  $\tan\theta = \frac{17}{15}$ ,  $\text{cosec}\theta = \frac{8}{15}$ ,  $\sec\theta = \frac{17}{8}$       d)  $\tan\theta = \frac{8}{15}$ ,  $\text{cosec}\theta = \frac{17}{15}$ ,  $\sec\theta = \frac{8}{17}$
- 8) The largest number that divides 70 and 125 leaving remainders 5 and 8 respectively is \_\_\_\_\_  
a) 13      b) 125      c) 875      d) 1750
- 9) If the LCM of two numbers is 9 times their HCF. The sum of LCM and HCF is 500, then the HCF of the two numbers is \_\_\_\_\_ .  
a) 50      b) 45      c) 450      d) 500

10) Which of these linear equations have a unique solution?



11) The relation between  $x$  and  $y$  such that the point  $P(x, y)$  is equidistant from the points  $A(1, 4)$ ,  $B(-1, 2)$  is

- a)  $x=y$                       b)  $x=2y$                       c)  $x+y=3$                       d)  $x+y+3=0$

12) The LCM of two numbers is 1200, which of the following cannot be their HCF?

- a) 600                      b) 500                      c) 400                      d) 200

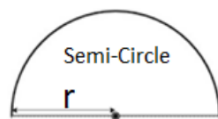
13) If  $\sqrt{3} \tan \theta = 2 \sin \theta$ , then the value of  $\sin^2 \theta - \cos^2 \theta = ?$

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

14) Evaluate  $\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

- a)  $\frac{67}{12}$                       b)  $\frac{12}{67}$                       c)  $\frac{65}{4}$                       d)  $\frac{67}{2}$

15) If the diameter of a semi-circular protractor is 28 cm, then find its perimeter.

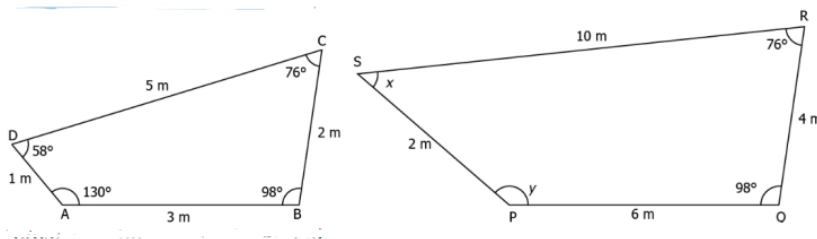


- a) 42cm                      b) 52cm                      c) 62cm                      d) 72cm

16) The diameter of a wheel is 40 cm. How many revolutions will it make on covering 176 cm?

- a) 140                      b) 150                      c) 160                      d) 170

17) Two similar figures are shown.



What are the values of  $x$  and  $y$ ?

- a)  $x = 58^\circ, y = 130^\circ$                       b)  $x = 98^\circ, y = 76^\circ$   
c)  $x = 82^\circ, y = 84^\circ$                       d)  $x = 130^\circ, y = 84^\circ$

18) What is the value of  $\sec A (1 - \sin A) (\sec A + \tan A)$ ?

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

19) If the lines given by  $3x + 2ky = 2$  and  $2x + 5y + 1 = 0$  are parallel, then the value of  $k$  is

- a)  $\frac{-5}{4}$                                       b)  $\frac{2}{5}$                                       c)  $\frac{15}{4}$                                       d)  $\frac{3}{2}$

20) The probability of getting the sum of two numbers, less than 3 or more than 11 when a pair of distinct dice is thrown together is \_\_\_\_\_

- a) 0                                      b)  $\frac{1}{18}$                                       c)  $\frac{1}{3}$                                       d)  $\frac{1}{2}$

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### SECTION B

**Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted** **[16x1=16]**

21) Which of the following rational numbers have terminating decimal?

- i)  $\frac{16}{125}$     ii)  $\frac{5}{18}$     iii)  $\frac{2}{21}$     iv)  $\frac{7}{250}$

- a) i and ii                      b) ii and iii                      c) i and iii                      d) i and iv

22) In the equations shown below,  $a$  and  $b$  are unknown constants.

$$3ax + 4y = -2$$

$$2x + by = 14$$

If  $(-3, 4)$  is the solution of the given equations, what are the values of  $a$  and  $b$ ?

- a)  $a = 2, b = 5$                       b)  $a = -2, b = 5$   
c)  $a = 5, b = 2$                       d)  $a = 5, b = -2$



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

- a)  $\frac{2}{9}$                       b)  $\frac{4}{11}$                       c)  $\frac{1}{3}$                       d)  $\frac{1}{4}$

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

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

33) Three bulbs red, green and yellow flash at intervals of 80 seconds, 90 seconds and 110 seconds. All three flash together at 8:00 am. At what time the three bulbs flash altogether again?

- a) 9:00 am                      b) 9:12 am  
c) 10:00 am                      d) 10:12 am

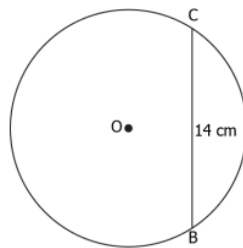
34) The length of the side of a square whose diagonal is 16cm, is

- a)  $3\sqrt{2}$ cm                      b)  $2\sqrt{8}$ cm                      c)  $8\sqrt{2}$  cm                      d)  $2\sqrt{2}$  cm

35) AOBC is a rectangle whose three vertices are vertices A (0, 3), O (0, 0) and B (5, 0). The length of its diagonal is \_\_\_\_\_ units.

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

36) A circle with center O of diameter 28 cm and a chord BC of length 14 cm is shown below:



What is the length of the major arc of the circle, to the nearest tenth?

- a) 7.3 cm                      b) 14.7 cm                      c) 73.3 cm                      d) 146.7 cm

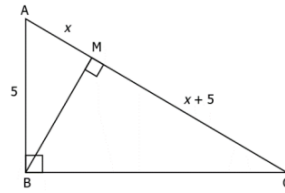
37) A cow is tied with a rope of length 14 m at the corner of a rectangular field of dimensions 20m  $\times$  16m. The area of the field in which the cow can graze is \_\_\_\_\_

- a)  $154\text{m}^2$                       b)  $150\text{m}^2$                       c)  $162\text{m}^2$                       d)  $100\text{m}^2$

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)  $a = 0, b = -6$

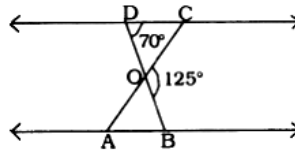
39) Observe the right triangle ABC, right angled at B as shown below.



What is the length of MC?

- a) 7.5cm                      b) 2.5cm                      c) 6.5cm                      d) 10.5cm

40) In the Fig.,  $\triangle ODC \sim \triangle OBA$ ,  $\angle BOC = 125^\circ$  and  $\angle CDO = 70^\circ$ . Find  $\angle OAB$ .



- a)  $55^\circ$                       b)  $70^\circ$                       c)  $125^\circ$                       d)  $110^\circ$

### SECTION C

#### Case study based questions:

**Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.**

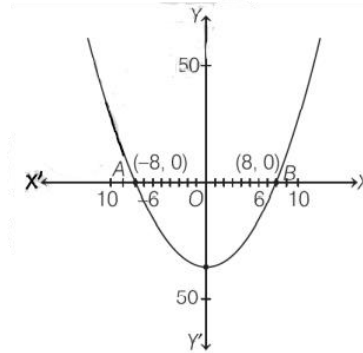
**Q41-Q45 are based on Case Study -1**

**[4x1=4]**

**HONEYCOMB:** While playing in the mango garden Sudhir saw honeycomb and asked his father about that. His father replied that a honeycomb is a mass of hexagonal prismatic wax cells built by honey bees in their nests to contain their larvae and stores of honey and pollen. Beekeepers may remove the entire honeycomb to harvest honey.

Honey bees consume about 8.4 lb (3.8 kg) of honey to secrete 1 lb (450 g) of wax and so beekeepers may return the wax to the hive after harvesting the honey to improve honey outputs. The structure of the comb may be left basically intact when honey is extracted from it by uncapping and spinning in a centrifugal machine, more specifically a honey extractor.

**His father told that honeycomb formed is parabolic. The mathematical representation of the honeycomb structure is shown in the graph.**



41) A polynomial of degree  $n$  has

- a) only 1 zero  
 b) exactly  $n$  zeroes  
 c) atmost  $n$  zeroes  
 d) more than  $n$  zeroes

42) The expression of the polynomial represented by the graph is

- a)  $x^2-49$       b)  $x^2-64$       c)  $x^2-36$       d)  $x^2-81$

43) What are the zeroes of the polynomial  $5x^2 - 4 - 8x$ ?

- a)  $2, \frac{-2}{5}$       b)  $-2, \frac{-1}{5}$       c)  $2, 5$       d)  $-2, 5$

44) The product of the zeroes of the polynomial  $7x^2-3x+4$  is

- a)  $\frac{-3}{7}$       b)  $\frac{4}{7}$       c)  $\frac{-4}{7}$       d)  $\frac{3}{7}$

45) If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $P(x) = x^2 - px + 36$  and  $\alpha^2 + \beta^2 = 9$  then the value of  $p$  is \_\_\_\_\_

- a)  $\pm 6$       b)  $\pm 3$       c)  $\pm 9$       d)  $\pm 8$

**Q46-Q50 are based on Case Study -2**

**[4x1=4]**

In an examination hall, students are seated at a distance of 2 m from each other, to maintain the social distance due to CORONA virus pandemic. Let three students sit at points A, Band C whose coordinates are  $(4, -3)$ ,  $(7,3)$  and  $(8, 5)$  respectively.





46) Based on the above information, answer the following questions.

The distance between A and C is

- a)  $\sqrt{5}$  units                      b)  $4\sqrt{5}$  units                      c)  $3\sqrt{5}$  units                      d) none of these

47) If an invigilator at the point P, lying on the straight line joining Band C such that it divides the distance between them in the ratio of 1 : 2. Then coordinates of P are

- a)  $(\frac{22}{3}, \frac{11}{3})$                       b)  $(\frac{23}{3}, \frac{13}{3})$                       c) (6,1)                      d) (9,1)

48) The mid-point of the line segment joining A and C is

- a) (1,6)                      b) (6,1)                      c)  $(\frac{11}{2}, 0)$                       d) None of these

49) The ratio in which B divides the line segment joining A and C is

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

50) The points A, Band C lie on

- a) a straight line                      b) an equilateral triangle  
c) a scalene triangle                      d) an isosceles triangle

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