

Roll Number

SET B



INDIAN SCHOOL MUSCAT  
FIRST PRE-BOARD EXAMINATION  
MATHEMATICS

CLASS: X

Sub. Code: 041

Time Allotted: 3 Hrs.

28.02.2021

Max. Marks: 80

**General Instructions:**

1. All questions are compulsory; however internal choices are provided in a few questions whose guidelines are given below.
2. Calculators are not allowed.
3. This question paper contains two parts A and B.
4. Both Part A and Part B have internal choices.

**Part – A:**

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

**Part – B:**

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choices are provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks in which any one out of two are only to be answered in each question.

Q. No.	Part - A	Marks
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**Section-I**

**Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.**

- |    |  |   |
|----|--|---|
| 1. | Find a quadratic equation whose sum and product of the roots are -7 and $-\frac{1}{3}$                   | 1 |
| 2. | For what value of k, the pair of linear equations $3x + y = 3$ and $6x + ky = 8$ have a unique solution. | 1 |

**OR**

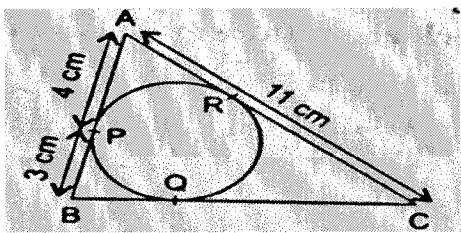
If 3 chairs and 1 table cost Rs.1500 and 6 chairs and 1 table costs Rs.2400, form linear equations to represent this situation.

3.

Two cones have their heights in the ratio of 1 : 3 and radii in the ratio 3 : 1. What is the ratio of their volumes?

1
4.

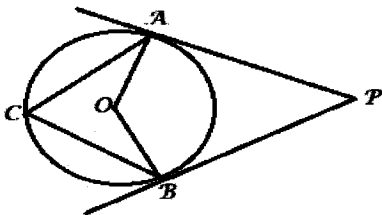
1



In figure,  $\triangle ABC$  is circumscribing a circle. Find the length of BC.

OR

In the fig PA and PB are tangents to the circle from an external point P. If  $\angle APB = 80^\circ$  then what is the measure of  $\angle ACB$ ?



5.

Find the common difference and write next term of the AP: 1.8, 2.3, 2.8.....

1
- OR

The first term is  $\frac{1}{3}$  and the common difference is  $\frac{1}{3}$  then write the third and the fifth term of this AP.
6.

What is the HCF of the smallest prime number and the smallest composite number?

1
- OR

The decimal expansion of the rational number  $\frac{14587}{1250}$  will terminate after how many places
7.

If the equation  $2x^2 - 5x + (k + 3) = 0$  has equal roots then find the value of k

1
8.

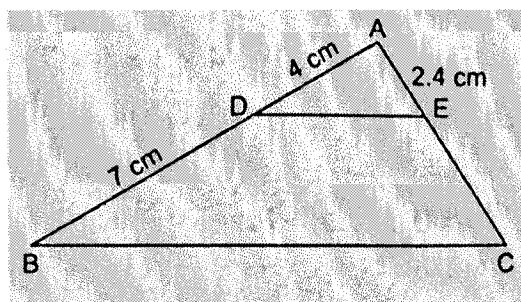
In order to find the mode for the given distribution what is the value of  $2f_1 - f_0 - f_2$

1

Class interval	0-20	20-40	40-60	60-80
frequency	15	8	18	12

9. Given  $\triangle ABC$  is similar to  $\triangle PQR$ , if the ratio of ar ( $\triangle ABC$ ) to ar ( $\triangle PQR$ ) is 121:225, find the

1



ratio of PR to AC

**OR**

If in the given figure,  $DE \parallel BC$ , then find  $EC + AE$

10. In an AP, if the common difference is  $-4$  and the seventh term is 4, find the first term. 1
11. The radius of a circle is 5cm. Find the circumference of the circle whose area is 49 times the area of given circle. 1
12. The mean of a given distribution is 50. If  $\sum fix_i = 5160 + 30p$  and  $\sum fi = 92 + p$ , then what is the value of p? 1
13. Find the radius of a right circular cylinder of height 5cm and volume  $405\pi cm^3$  1
14. TP and TQ are the two tangents to a circle with center O such that  $\angle POQ = (2x+3)^\circ$  and  $\angle PTQ = (3x-8)^\circ$ . What is the value of x? 1
15. Find the distance of  $(-3, 4)$  from the origin. 1
16. Calculate  $\alpha^2 + \beta^2$  for the polynomial  $3x^2 - 4x + 2$  where alpha and beta are the zeroes of the polynomial. 1

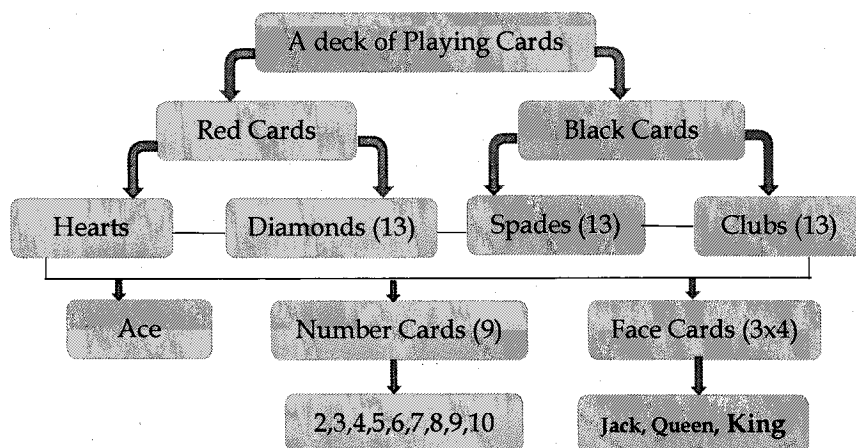
## Section - II

**Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark**

17. **Case Study Based- 1**

### Playing with Cards

A pack of playing cards consists of 52 cards which are divided into 4 suits of 13 cards each. Each unit consists of one ace, one king, one queen, one jack and 9 other cards numbered from 2 to 10. Four suits are named as spades ( $\spadesuit$ ), hearts ( $\heartsuit$ ), diamonds ( $\diamondsuit$ ) and clubs ( $\clubsuit$ ). Observe the following



- (i) A card is drawn at random from a well – shuffled pack of 52 cards.

1

The probability of getting a red king card is

- (a)  $\frac{1}{52}$       (b)  $\frac{1}{13}$       (c)  $\frac{1}{26}$       (d)  $\frac{3}{13}$

- (ii) What is the probability of getting a queen or a jack card?

1

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

- (iii) The king, queen and jack of clubs are removed from a deck of 52 playing cards and remaining are shuffled. The probability of getting a card of queen is

1

- (a)  $\frac{4}{51}$       (b)  $\frac{3}{49}$       (c)  $\frac{3}{29}$       (d)  $\frac{10}{49}$

- (iv) The probability the card drawn is '10' of a black suit, is

1

- (a)  $\frac{2}{13}$       (b)  $\frac{1}{13}$       (c)  $\frac{1}{26}$       (d)  $\frac{3}{13}$

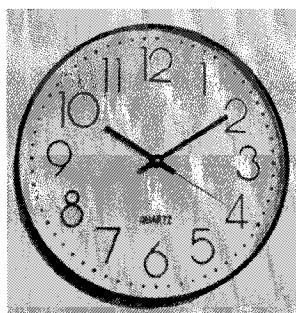
- (v) The probability that the card drawn neither a jack nor a king is

1

- (a)  $\frac{9}{13}$       (b)  $\frac{7}{13}$       (c)  $\frac{8}{13}$       (d)  $\frac{11}{13}$

#### 18. Case Study Based- 2

Student of class 10<sup>th</sup> decided to create a model of a circular wall clock and try to paste the numbers from 1 to 12 on its dial. But he is facing some problems. Give solutions to his problems by looking at the figure.

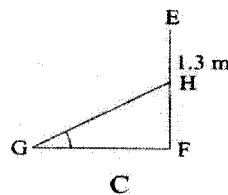
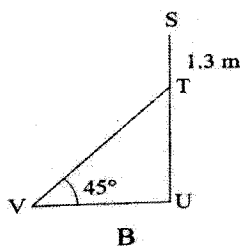
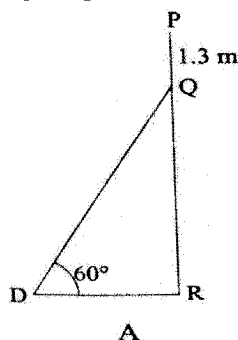


- (i) The angle between two consecutive points showing an hour is 1
- (a)  $15^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $60^\circ$
- (ii) What is the angle made by the two hands at the centre when minute hand is at 12 and hour hand is at 3? 1
- (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- (iii) Find the area covered by minute hand of a clock from 12 to 3 if the radius of the clock is 14 cm. 1
- (a) 164 sq.cm (b) 77 sq.cm (c) 154 sq.cm (d) 308 sq.cm
- (iv) The formula used in finding the area of sector with radius  $r$  and angle at the centre  $\theta$  is 1
- (a)  $\frac{\pi r^2 \theta}{360^\circ}$  (b)  $\frac{\pi r^2 \theta}{180^\circ}$  (c)  $\frac{2\pi r \theta}{180^\circ}$  (d)  $\frac{\pi \theta}{360^\circ}$
- (v) The arc length between the region 12 and 3 if the radius of the clock is 14 cm. 1
- (a) 22 cm (b) 44 cm (c) 66 cm (d) 88 cm

### 19. Case Study Based- 3

#### Application of Trigonometry – Height of Tree/Tower

Mr. Suresh is an electrician. He receives a call regarding a fault on a pole from the three different colonies A, B, C. he reaches one-by-one to each colony to repair that fault. He needs to reach a point 1.3 m below the top of each pole to undertake the repair work. Observe the following diagrams



(i) **Refer to Diagram A** 1

What should be the length of ladder DQ that enable him to reach the required position if height of the pole is 4 m?

- (a)  $\frac{5\sqrt{3}}{7} m$  (b)  $\frac{9\sqrt{3}}{5} m$  (c)  $\frac{7\sqrt{2}}{5} m$  (d)  $\frac{4\sqrt{3}}{5} m$

(ii) **Refer to Diagram A** 1

What is the distance of the point D ,where the ladder is placed on the ground, from R, if the height of pole is 4 m?

- (a) 2.5 m (b) 3.8 m (c) 1.56 m (d) 5.3 m

(iii) **Refer to Diagram B** 1

Given that, the length of ladder is  $4\sqrt{2} m$ . What is height of pole?

- (a)  $4\frac{1}{2} m$  (b)  $4\sqrt{5} m$  (c)  $5\sqrt{5} m$  (d) 5.3 m

(iv) **Refer to Diagram B** 1

(a) The distance of the point where the ladder lies on the ground is

- (a)  $3\sqrt{5} m$  (b)  $4\sqrt{2} m$  (c) 4 m (d)  $4\sqrt{7} m$

(v) **Refer to Diagram C**

(a) The angle of elevation of reaching point of ladder at pole ,i.e., H, if the height of the pole is 8.3 m and the distance GF is  $7\sqrt{3} m$ , is

- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $45^\circ$  (d)  $90^\circ$

20. **Case Study Based- 4**  
**Auto and Taxi Fare**



The state government revise fares from time to time based on various factors such as inflation,

fuel price, demand from various quarters etc. the government notifies different fares for different types of vehicles like Auto Rickshaws, Taxis, Radio Cab, etc.

The auto charges in a city comprise of a fixed charge together with the charge for the distance covered. Study the following situations:

**Situation – I:** In city A, for a journey of 10km, the charge paid is Rs.75 and for a journey of 15 km, the charge paid is R.110.

**Situation –II:** In city B, for a journey of 8 km, the charge is paid is Rs. 91 and for journey of 14 km, the charge paid is Rs. 145.

- (i) If the fixed charges of auto rickshaw be Rs.  $x$  and the running charges be Rs.  $y$  km/hr, the pair of linear equations representing the situation is 1

(a)  $x + 10y = 110, x + 15y = 75$

(b)  $x + 10y = 75, x + 15y = 110$

(c)  $10x + y = 110, 15x + y = 75$

(d)  $10x + y = 75, 15x + y = 110$

- (ii) What will a person have to pay for travelling a distance of 25 km? 1

(a)160 (b)280 (c)180 (d)260

- (iii) A person travels a distance of 50 km. The amount he has to pay is 1

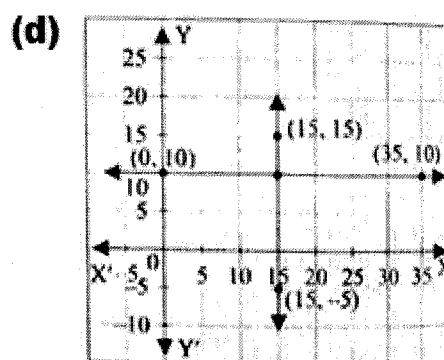
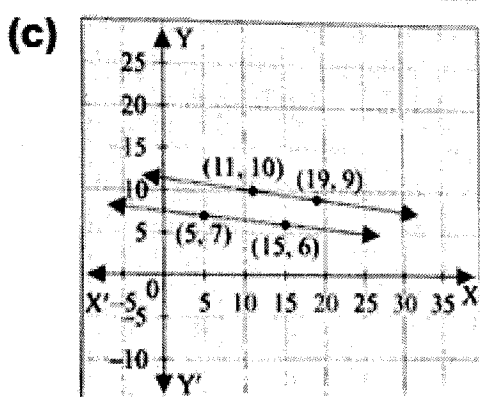
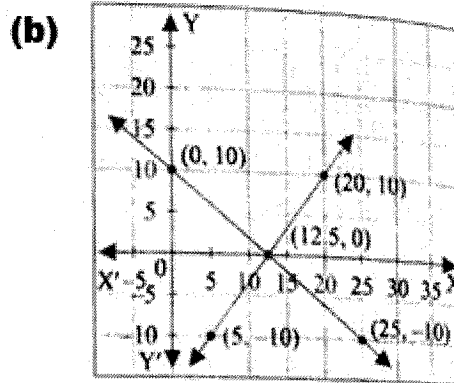
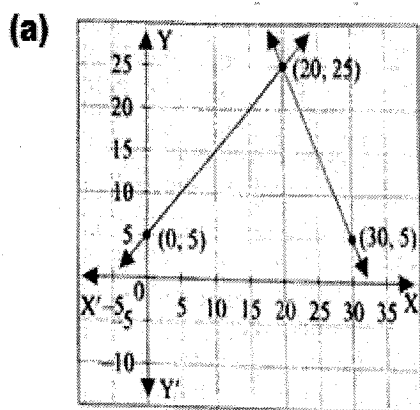
(a)155 (b)255 (c)355 (d)455

- (iv) **Refer Situation – II** 1

What will a person have to pay for travelling a distance of 30 km?

(a)185 (b)289 (c)275 (d)305

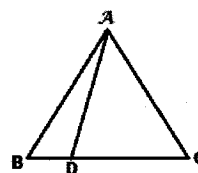
- (v) The graphs of lines representing the situation II are 1



### Part -B

All questions are compulsory. In case of internal choices, attempt any one.

21. D is a point on side BC of a  $\triangle ABC$  such that  $\angle ADC = \angle BAC$ .  
Prove that  $\frac{CA}{CD} = \frac{CB}{CA}$



2

OR

ABC is an isosceles triangle with  $AC = BC$ . If  $AB^2 = 2AC^2$ , Prove that ABC is a right triangle

22. 3 bells ring at an interval of 4, 7 and 14 minutes. All three bells rang at 7 am, when the three bells will ring together again? 2
23. In a rectangle ABCD,  $AB = 28$  cm,  $BC = x - y$ ,  $DC = x + y$  and  $AD = 16$  cm. Find  $x$  and  $y$ . 2
24. Find  $k$ , if the sum of the zeroes of the polynomial  $x^2 - (k + 6)x + 2(2k - 1)$  is half of their product. 2

OR



If 2 and -3 are the zeroes of the polynomial  $x^2 + (a + 1)x + b$  then find the values of a and b

25. A quadrilateral is drawn to circumscribe a circle. Prove that  $AB + CD = AD + BC$  2

26. The x coordinate of point P is twice the y coordinate. If P is equidistant from Q (2, -5) and R (-3, 6), find the coordinates of point P. 2

27. Find the value of:  $(5\cos^2 60^\circ + 4\cos^2 30^\circ - \tan^2 45^\circ) \div (\sin^2 30^\circ + \cos^2 60^\circ)$  3

28. The  $\frac{3}{4}$ th part of a conical vessel of internal radius 5cm and height 24cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10cm. Find the height of the water in the cylindrical vessel 3

29. Find the greatest number of 5 digits exactly divisible by 24, 15 and 36. 3

**OR**

Find the largest positive integer that will divide 100, 245 and 343 leaving remainders 4, 5 and 7 respectively.

30. Draw a circle of radius 3cm. Construct a pair of tangents to this circle inclined to each other an angle of  $90^\circ$ . 3

31. Solve for y:  $(y - 2) + \frac{2}{(y-2)} = 3$  ;  $y \neq 2$  3

**OR**

If 3 is a root of the equation  $x^2 + px - 6 = 0$  and the equation  $x^2 - px + q = 0$  has equal roots, find the values of p and q.

32. If the second term of an AP is 4 and the seventh term is -11, find its 16<sup>th</sup> term. 3

33. Find the ratio in which the point (-3, p) divides the line segment joining the points (-5, -4) and (-2, 3). Hence find the value of p. 3

34. State and prove Basic proportionality theorem 5

35. Two poles of equal heights are standing opposite to each other on either side of a road 300m. From a point between them on a road, the angles of elevation of their tops are  $30^\circ$  and  $60^\circ$ . Find the position of the point and also the heights of the poles.  $(\sqrt{3} = 1.73)$  5

**OR**

From the top of a building 50m high the angles of depression of the top and the bottom of a tower are observed to be  $30^\circ$  and  $60^\circ$ . Find the height of the tower.

36. The mode of the following series is 154. Find the missing frequency f. 5

Class interval	120-130	130-140	140-150	150-160	160-170
frequency	2	8	f	20	8

**End of the Question Paper**