

KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS HYD - 32
SAMPLE PAPER TEST 11 FOR CLASS X BOARD EXAM 2021

CLASS: X
SUBJECT: MATHEMATICS (BASIC)

MAX. MARKS: 80
DURATION: 3 hrs

General Instruction:

1. This question paper contains two parts A and B.
2. 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 choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.
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PART - A
SECTION-I

Questions 1 to 16 carry 1 mark each.

1. Express 156 as the product of primes.
2. Check whether 6^n can end with the digit 0 for any natural number n.

OR

The decimal representation of $\frac{14587}{2 \times 5^4}$ will terminate after how many decimal places?

3. For what values of p does the pair of equations $4x + py + 8 = 0$ and $2x + 2y + 2 = 0$ has unique solution?
4. If 3 chairs and 1 table costs Rs. 1500 and 6 chairs and 1 table costs Rs.2400. Form linear equations to represent this situation.
5. The circumference of two circles are in the ratio 2 : 3. Find the ratio between their areas.
6. Find the area of the circle that can be inscribed in a square of side 6 cm.

OR

The circumference of a circle is 22 cm. Find the area of its quadrant (in cm^2).

7. Which measure of central tendency represent the point of maximum frequency in a distribution.
8. If one zero of the polynomial $f(x) = 3x^2 + 11x + p$ is reciprocal of the other, find the value of p.

OR

Find the quadratic polynomial having zeroes as -2 and 1.

9. State Pythagoras theorem.
10. Find the probability of drawing a king of spade from a deck of 52 playing cards.

11. In a circle of diameter 42cm, if an arc subtends an angle of 60° at the centre where $\pi = 22/7$, then what will be the length of arc.
12. Given that HCF (96,404) is 4, find the LCM (96, 404).
13. Two different coins are tossed simultaneously. Then, find the probability of getting at least one tail.

OR

Mohan has a block in the shape of a cube with one letter written on each face as follows: The cube is thrown by him once. What is the probability of getting A by Mohan?



14. A point P is at a distance of 13 cm from the centre of a circle of radius 5 cm. Find the length of the tangent.
15. A tower AB is 20 m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. Find the Sun's altitude.
16. A bridge across a river makes an angle of 45° with the river bank. If the length of the bridge across the river is 50 m, then what is the width of the river?

OR

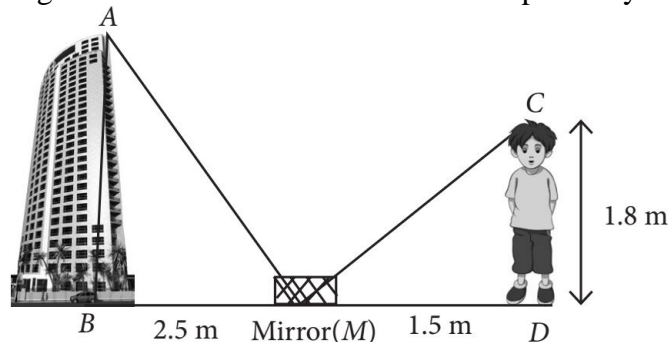
If a pole casts a shadow of length $5\sqrt{3}$ m on the ground, when the sun's elevation is 60° , then find the height of the pole.

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:

Mohan's father is a mathematician. One day he gave Mohan an activity to measure the height of building. Mohan accepted the challenge and placed a mirror on ground level to determine the height of building. He is standing at a certain distance so that he can see the top of the building reflected from mirror. Mohan eye level is at 1.8 m above ground. The distance of Mohan from mirror and that of building from mirror are 1.5 m and 2.5 m respectively. A



Based on the above information, answer the following questions.

- (i) Two similar triangles formed in the above figure is
 (a) $\triangle ABM$ and $\triangle CMD$ (b) $\triangle AMB$ and $\triangle CDM$ (c) $\triangle ABM$ and $\triangle CDM$ (d) None of these
- (ii) Which criterion of similarity is applied here?
 (a) AA similarity criterion (b) SSS similarity criterion (c) SAS similarity criterion (d) ASA similarity criterion
- (iii) Height of the building is
 (a) 1 m (b) 2 m (c) 3 m (d) 4 m

(iv) In $\triangle ABM$, if $\angle BAM = 30^\circ$, then $\angle MCD$ is equal to

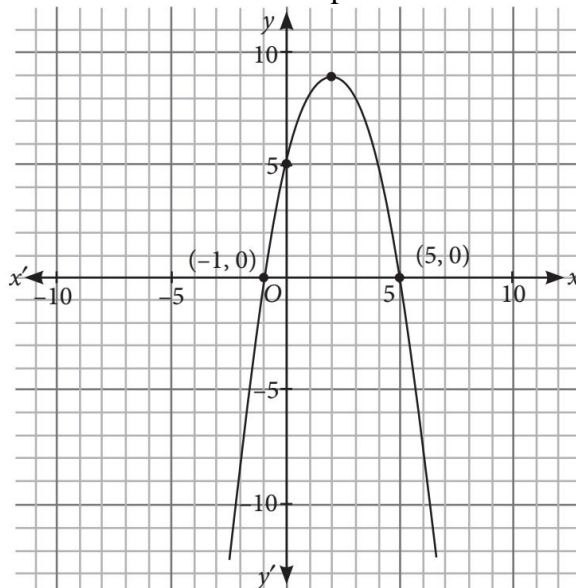
- (a) 40° (b) 30° (c) 65° (d) 90°

(v) If $\triangle ABM$ and $\triangle CDM$ are similar where $CD = 6$ cm, $MD = 8$ cm and $BM = 24$ cm, then AB is equal to

- (a) 16 cm (b) 18 cm (c) 12 cm (d) 14 cm

18. Case Study based-2:

Anita tied a rope between two poles for drying clothes in her garden. She was very happy that the rope is working fine but One day due to heavy storm the rope bent as shown in the below figure. The bent shape followed a mathematical shape.



Based on the above information, answer the following questions.

(i) The polynomial represented by the graph can be polynomial.

- (a) Linear (b) Quadratic (c) Cubic (d) Zero

(ii) The zeroes of the polynomial represented by the graph are

- (a) 1, 5 (b) 1, -5 (c) -1, 5 (d) -1, -5

(iii) The sum of zeroes of the polynomial represented by the graph are

- (a) 4 (b) 5 (c) 6 (d) 7

(iv) If α and β are the zeroes of the polynomial represented by the graph such that $\beta > \alpha$, then find the value of $-(8\alpha + \beta)$.

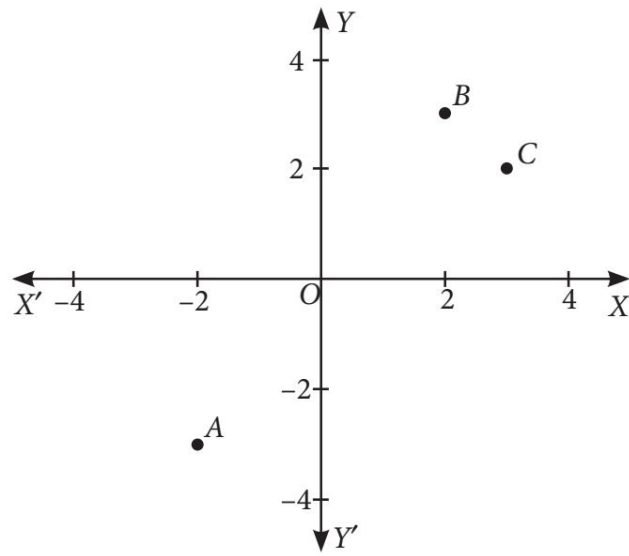
- (a) 1 (b) 2 (c) 3 (d) 4

(v) The expression of the polynomial represented by the graph is

- (a) $-x^2 - 4x - 5$ (b) $x^2 + 4x + 5$ (c) $x^2 + 4x - 5$ (d) $-x^2 + 4x + 5$

19. Case Study based-3:

There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented in the following graph:



Based on the above information. answer the following questions.

(i) The distance between A and B is

- (a) 13 km (b) 26 km (c) $\sqrt{13}$ km (d) none of these

(ii) The distance between A and C is

- (a) 5 km (b) 2 km (c) $\sqrt{5}$ km (d) $5\sqrt{2}$ km

(iii) If it is assumed that both buses have same speed, then by which bus do you want to travel from A to B?

- (a) First bus (b) Second bus (c) Any of them (d) None of these

(iv) If the fare for first bus is Rs. 10/km, then what will be the fare for total journey by that bus?

- (a) Rs. 83 (b) Rs. 38 (c) Rs. 45 (d) none of these

(v) If the fare for second bus is Rs. 15/km. then what will be the fare to reach to the destination by this bus?

- (a) Rs. 105 (b) Rs.108 (c) Rs. 110 (d) Rs.115

20. Case Study based-4:

Shwetha and Aditi have 12 and 8 coins respectively each of radius 3.5 cm and thickness 0.5 cm. They place their coins one above the other to form solid cylinders.



Based on the above information, answer the following questions.

(i) Curved surface area of the cylinder made by Shwetha is

- (a) 144 cm^2 (b) 132 cm^2 (c) 154 cm^2 (d) 142 cm^2

(ii) The ratio of curved surface area of the cylinders made by Shwetha and Aditi is

- (a) 2 : 5 (b) 3 : 2 (c) 1 : 2 (d) 2 : 7

(iii) The volume of the cylinder made by Aditi is

- (a) 154 cm^3 (b) 144 cm^3 (c) 132 cm^3 (d) 142 cm^3

(iv) The ratio of the volume of the cylinders made by Shwetha and Aditi is

(a) 1 : 2 (b) 2 : 5 (c) 3 : 2 (d) 4:3

(v) When two coins are shifted from Shwetha's cylinder to Aditi's cylinder, then

(a) Volume of two cylinder become equal

(b) Volume of Shwetha's cylinder > Volume of Aditi's cylinder

(c) Volume of Aditi's cylinder > Volume of Shwetha's cylinder

(d) None of these

PART – B

(Question No 21 to 26 are Very short answer Type questions of 2 mark each)

21. How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?

22. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

OR

Find the ratio in which the line segment joining the points (–3, 10) & (6, –8) is divided by (–1, 6).

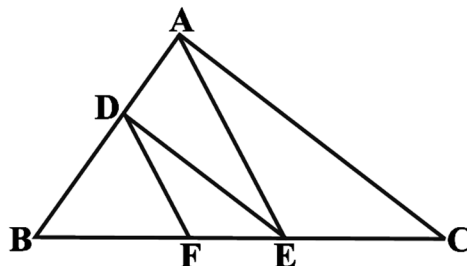
23. If $4\sin A = 3$, calculate $\cos A$ and $\tan A$.

OR

In ΔPQR , right-angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Determine the values of $\sin P$ and $\cos P$.

24. Draw a line segment of length 10 cm and divide it internally in the ration 3 : 5.

25. In the below figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



26. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

(Question no 27 to 33 are Short Answer Type questions of 3 marks each)

27. Prove that $\sqrt{5}$ is an irrational number.

28. The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

29. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.

30. All the black face cards are removed from a pack of 52 playing cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting a (i) face card, (ii) red card.

OR

A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5.

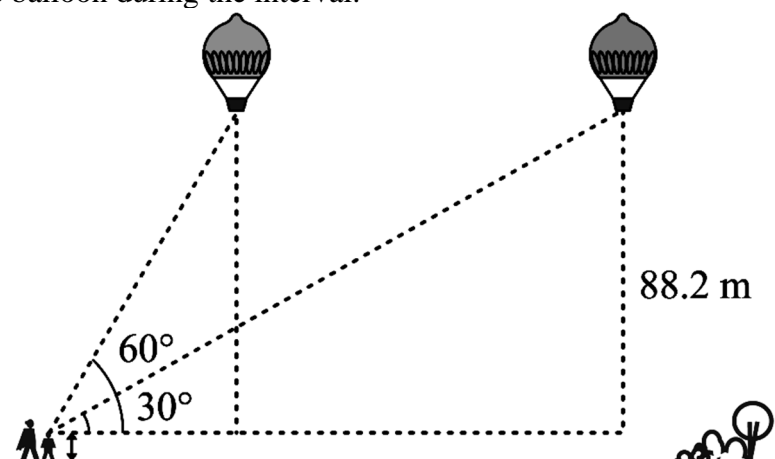
31. Prove that: $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \sec \theta + \tan \theta$
32. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.
33. Prove that the tangent to a circle is perpendicular to the radius through the point of contact.

(Question no 34 to 36 are Long Answer Type questions of 5 marks each.)

34. A survey regarding the heights in (cm) of 51 girls of class X of a school was conducted and the following data was obtained. Find the median height and the mean using the formulae.

Height (in cm)	Number of Girls
Less than 140	4
Less than 145	11
Less than 150	29
Less than 155	40
Less than 160	46
Less than 165	51

35. The p th, q th and r th terms of an A.P. are a , b and c respectively. Show that $a(q - r) + b(r - p) + c(p - q) = 0$
36. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After some time, the angle of elevation reduces to 30° (see the below figure). Find the distance travelled by the balloon during the interval.



OR

As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. (Use $\sqrt{3} = 1.732$)