

CLASS X (2020-21)
MATHEMATICS STANDARD (041)
SAMPLE PAPER-08

Time : 3 Hours

Maximum Marks : 80

General Instructions :

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

Part–B :

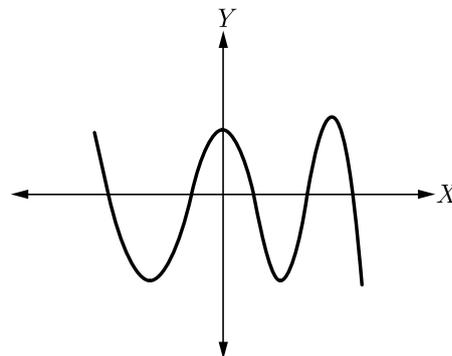
1. Question no. 21 to 26 are very short answer type questions of 2 mark each.
 2. Question no. 27 to 33 are short answer type questions of 3 marks each.
 3. Question no. 34 to 36 are long answer type questions of 5 marks each.
 4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.
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PART - A

SECTION - I

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

- Q1. Find the smallest positive rational number by which $\frac{1}{7}$ should be multiplied so that its decimal expansion terminates after 2 places of decimal.
- Q2. The graph of $y = p(x)$, where $p(x)$ is a polynomial in variable x , is as follows.



The number of zeroes of $p(x)$ is

OR

If one root of the equation $(k-1)x^2 - 10x + 3 = 0$ is the reciprocal of the other then the value of k is

Q3. If sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then find the value of k .

OR

If -1 is a zero of the polynomial $f(x) = x^2 - 7x - 8$, then calculate the other zero.

Q4. If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of k .

OR

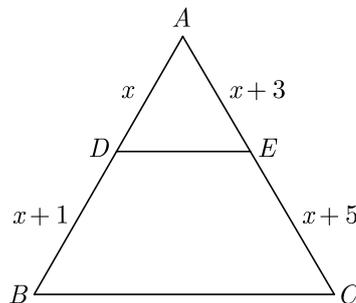
Find the value(s) of k if the quadratic equation $3x^2 - k\sqrt{3}x + 4 = 0$ has real roots.

Q5. If the common difference of an AP is -6 , find $a_{16} - a_{12}$.

OR

For what value of k will the consecutive terms $2k + 1$, $3k + 3$ and $5k - 1$ form an AP?

Q6. In $\triangle ABC$, $DE \parallel BC$, find the value of x .



Q7. Write the coordinates of a point P on x -axis which is equidistant from the points $A(-2, 0)$ and $B(6, 0)$.

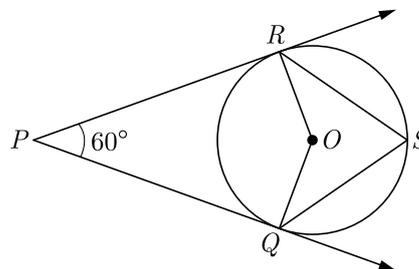
Q8. Find the perpendicular distance of $A(5, 12)$ from the y -axis.

Q9. If $\tan 2A = \cot(A + 60^\circ)$, find the value of A where $2A$ is an acute angle.

Q10. If $\cos A = \frac{2}{5}$, find the value of $4 + 4 \tan^2 A$.

Q11. If $\sin A = \frac{1}{2}$, then what is the value of $\cot A$?

Q12. In the given figure, find $\angle QSR$.



Q13. What is the name of a line which intersects a circle at two distinct points?

OR

What is the perimeter of a sector of a circle whose central angle is 90° and radius is 7 cm?

Q14. Volume of two spheres are in the ratio $64 : 27$, find the ratio of their surface areas.

- Q15. Find the mean of first odd multiples of 5.
- Q16. What is the probability that a non-leap year has 53 Mondays ?

OR

Two different dice are tossed together. Find the probability that the product of the number on the top of the dice is 6.

SECTION II

Case study-based questions are compulsory. Attempt any 4 sub parts from each question. Each question carries 1 mark.

- Q17. Lavanya wants to organize her birthday party. She is very happy on her birthday. She is very health conscious, thus she decided to serve fruits only in her birthday party.



She has 36 apples and 60 bananas at home and decided to serve them. She wants to distribute fruits among guests. She does not want to discriminate among guests, so she decided to distribute fruits equally among all.

- (i) How many maximum guests Shalvi can invite?
- (a) 12 (b) 120
(c) 6 (d) 180
- (ii) How many apples and bananas will each guest get?
- (a) 3 apple 5 banana (b) 5 apple 3 banana
(c) 2 apple 4 banana (d) 4 apple 2 banana
- (iii) Lavanya decide to add 42 mangoes also. In this case how many maximum guests Lavanya can invite ?
- (a) 12 (b) 120
(c) 6 (d) 180
- (iv) How many total fruits will each guest get?
- (a) 6 apple 5 banana and 6 mangoes
(b) 6 apple 10 banana and 7 mangoes
(c) 3 apple 5 banana and 7 mangoes
(d) 3 apple 10 banana and 6 mangoes
- (v) If Lavanya decide to add 3 more mangoes and remove 6 apple in total fruits, in this case how many maximum guests Lavanya can invite ?
- (a) 12 (b) 30
(c) 15 (d) 24

- Q18. Mr. RK Agrawal is owner of a famous amusement park in Delhi. The ticket charge for the park is Rs 150 for children and Rs 400 for adult.



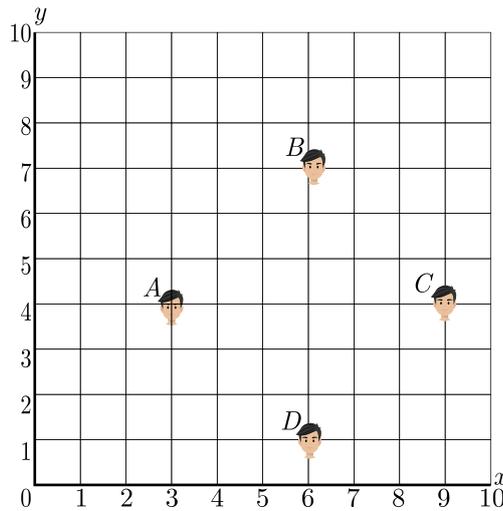
Generally he does not go to park and it is managed by team of staff. One day Mr Agrawal decided to random check the park and went there. When he checked the cash counter, he found that 480 tickets were sold and Rs 134500 was collected.

- (i) Let the number of children visited be x and the number of adults visited be y . Which of the following is the correct system of equations that model the problem ?
- (a) $x + y = 480$ and $3x + 8y = 2690$
 (b) $x + 2y = 480$ and $3x + 4y = 2690$
 (c) $x + y = 480$ and $3x + 4y = 2690$
 (d) $x + 2y = 480$ and $3x + 8y = 2690$
- (ii) How many children visited the park ?
- (a) 250 (b) 500
 (c) 230 (d) 460
- (iii) How many adults visited the park?
- (a) 250 (b) 500
 (c) 230 (d) 460
- (iv) How much amount collected if 300 children and 350 adults visited the park?
- (a) Rs 225400 (b) Rs 154000
 (c) Rs 112500 (d) Rs 185000
- (v) One day total visited children and adults together is 750 and the total amount collected is Rs 212500. What are the number of children and adults visited the park ?
- (a) (700, 800) (b) (350, 400)
 (c) (800, 700) (d) (400, 350)

- Q19. Morning assembly is an integral part of the school's schedule. Almost all the schools conduct morning assemblies which include prayers, information of latest happenings, inspiring thoughts, speech, national anthem, etc. A good school is always particular about their morning assembly schedule. Morning assembly is important for a child's development. It is essential to understand that morning assembly is not just about standing in long queues and singing prayers or national anthem, but it's something beyond just prayers. All the activities carried out in morning assembly by the school staff and students have a great influence in every point of life. The positive effects of attending school assemblies can be felt throughout life.



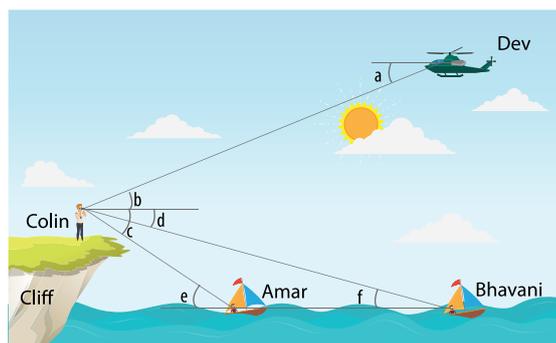
Have you noticed that in school assembly you always stand in row and column and this make a coordinate system. Suppose a school have 100 students and they all assemble in prayer in 10 rows as given below.



Here A, B, C and D are four friend Amar, Bharat, Colin and Dravid.

- (i) What is the distance between A and B ?
 - (a) 8
 - (b) 6
 - (c) $3\sqrt{3}$
 - (d) $2\sqrt{3}$
- (ii) What is the distance between C and D ?
 - (a) 8
 - (b) 6
 - (c) $3\sqrt{3}$
 - (d) $2\sqrt{3}$
- (iii) What is the distance between A and C ?
 - (a) 8
 - (b) 6
 - (c) $3\sqrt{3}$
 - (d) $2\sqrt{3}$
- (iv) What is the distance between D and B ?
 - (a) 8
 - (b) 6
 - (c) $3\sqrt{3}$
 - (d) $2\sqrt{3}$
- (v) These 4 friends seating arrangement make a
 - (a) square
 - (b) rhombus
 - (c) parallelogram
 - (d) rectangle

Q20. Navy officer Mr. Colin is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Dev is on a chopper in the sky. When Mr. Colin looks down below the cliff towards the sea, he has Bhawani and Amar in boats positioned to get a good vantage point. Bhawani boat is behind the Amar boat.



Following angle have been measured :

From Colin to Bhawani : 30°

From Dev to Colin : 60°

From Amar to Colin : 60°

- (i) Which of the following is a pair of angle of elevation?
 (a) $(\angle a, \angle e)$ (b) $(\angle b, \angle e)$
 (c) $(\angle c, \angle d)$ (d) $(\angle a, \angle f)$
- (ii) Which of the following is a pair of angle of depression?
 (a) $(\angle a, \angle e)$ (b) $(\angle b, \angle e)$
 (c) $(\angle c, \angle d)$ (d) $(\angle a, \angle f)$
- (iii) If angle of elevation of Amar to Colin is 60° , what is the distance of Amar boat from the base of hill ?
 (a) $\frac{\sqrt{3}h}{2}$ (b) $\frac{h}{\sqrt{3}}$
 (c) $\frac{2h}{\sqrt{3}}$ (d) $\sqrt{3}h$
- (iv) If angle of depression of Colin to Bhawani is 30° , what is the distance of Amar boat from the Bhawani boat?
 (a) $\frac{\sqrt{3}h}{2}$ (b) $\frac{h}{\sqrt{3}}$
 (c) $\frac{2h}{\sqrt{3}}$ (d) $\sqrt{3}h$
- (v) If angle of depression of Dev to Colin is 60° , what is the height of Dev from base of hill ?
 (a) h (b) $2h$
 (c) $3h$ (d) $4h$

PART - B

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

Q21. If p and q are the zeroes of polynomial $f(x) = 2x^2 - 7x + 3$, find the value of $p^2 + q^2$.

OR

Find the value of k if -1 is a zero of the polynomial $p(x) = kx^2 - 4x + k$.

Q22. Solve : $99x + 101y = 499$, $101x + 99y = 501$

OR

Solve the following system of linear equations by substitution method:

$$2x - y = 2$$

$$x + 3y = 15$$

Q23. Find the roots of the following quadratic equation :

$$\frac{2}{5}x^2 - x - \frac{3}{5} = 0$$

Q24. $ABCD$ is a trapezium in which $AB \parallel CD$ and its diagonals intersect each other at the point O . Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

Q25. Evaluate : $\frac{5 \cos^2 60^\circ + 4 \cos^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 60^\circ}$

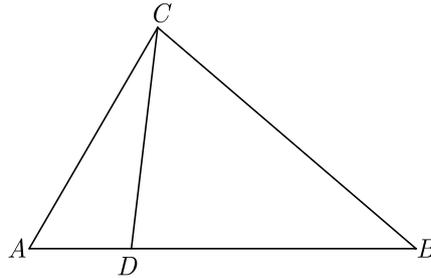
Q26. Find the sum of the lower limit of the median class and the upper limit of the modal class :

Classes	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	3	5	9	7	3

Q27. If α and β are the zeroes of the polynomial $f(x) = 5x^2 - 7x + 1$ then find the value of $(\frac{\alpha}{\beta} + \frac{\beta}{\alpha})$

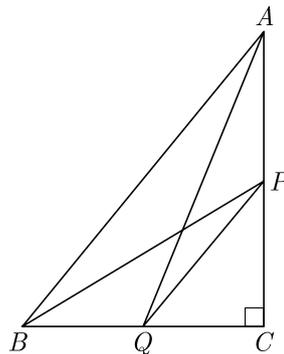
Q28. The 17th term of an AP is 5 more than twice its 8th term. If 11th term of AP is 43, then find its n^{th} term.

Q29. In the given figure, if $\angle ACB = \angle CDA$, $AC = 6$ cm and $AD = 3$ cm, then find the length of AB .



OR

If P and Q are the points on side CA and CB respectively of ΔABC , right angled at C , prove that $(AQ^2 + BP^2) = (AB^2 + PQ^2)$



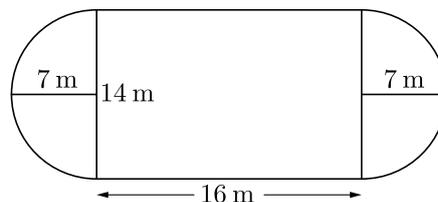
Q30. If $1 + \sin^2\theta = 3 \sin\theta \cos\theta$, prove that $\tan\theta = 1$ or $\frac{1}{2}$.

OR

Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

Q31. Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as center, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle.

Q32. Find the area of the adjoining diagram.



Q33. The mean of the following distribution is 53. Find the missing frequency p :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	12	15	32	p	13

Q34. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Q35. A solid is consisting of a right circular cone of height 120 cm and radius 60 cm standing on hemisphere of radius 60 cm. It is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

Q36. A bag contains 20 balls out of which x balls are red.

(i) If one ball is drawn at random from the bag, find the probability that it is not red.

(ii) If 4 more red balls are put into the bag, the probability of drawing a red ball will be $\frac{5}{4}$ times the probability of drawing a red ball in the first case. Find the value of x .

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