

KENDRIYA VIDYALAYA SANGATHAN MUMBAI REGION

PRE –BOARD II (SESSION : 2024-25)

MATHEMATICS – STANDARD (041)/SET A

Time Allowed: 3 Hours

Maximum Marks :80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

SECTION – A (MCQ)

(1x10 = 10)

Q.1 An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

- a)8 b)7 c)6 d)9

Q.2 If α and β are the zeroes of the polynomial $x^2 + 2x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to

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

Q.3 . In $\triangle ABC$, $DE \parallel BC$ and $AD = 4\text{cm}$, $AB = 9\text{cm}$. $AC = 13.5\text{ cm}$ then the value of EC is

- (a) 6 cm (b) 7.5 cm (c) 9 cm (d) none of these

Q.4 The quadratic equation has $x^2 + 3x + 2\sqrt{2} = 0$

- (a) two distinct real roots (b) two equal real roots
(c) no real roots (d) more than 2 real roots

Q.5 If -1 is a zero of the polynomial $p(x) = kx^2 - 4x + k$, the value of k is

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

Q.6 The point on X- axis which is equidistant from (2, -5) and (-2, 9) is:

- (a) (-2,7) (b) (-7,0) (c) (-1,0) (d) (7,0)

Q.7. If a pair of linear equations is consistent, then the lines will be:

- (a) Parallel (b) Always coincident (c) Intersecting or coincident (d) Always interesting

Q.8 If $\triangle ABC \sim \triangle DEF$, $AB = 4\text{ cm}$, $DE = 6\text{ cm}$. $EF = 9\text{ cm}$ and $FD = 12\text{ cm}$, find the perimeter of $\triangle ABC$.

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

Q.9 The 10th term from the end of A.P. -5,-10,-15... -1000 is

- (a) -955 (b) -945 (c) -950 (d) -965

Q.10 The value of $\sin^2 60^\circ - \tan^2 45^\circ - \cos^2 30^\circ$ is

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

Q.11 $9\sec^2 A - 9\tan^2 A =$

- (a) 1 (b) 9 (c) 8 (d) 0

Q.12 If angle between two radii of a circle is 130° , the angle between the tangents at the ends of the radii is

- (a) 90° (b) 50° (c) 70° (d) 40°

Q.13 A deck of cards contains 52 cards. What is the probability of drawing a red face card?

- a) $12/52$ (b) $1/26$ (c) $3/26$ (d) $1/13$

Q.14 Two cubes each of volume 8cm^3 are joined end to end, then the surface area of the resulting cuboid is

- (a) 80cm^2 (b) 64cm^2 (c) 40cm^2 (d) 8cm^2

Q.15 The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3.

Ratio of Their Volumes (a) 27 : 20 (b) 20 : 27 (c) 9 : 4 (d) 4 : 9

Q.16 Which of the following is true?

- a. Mode = 2 Median – Mean b. Mode = 3 Median + 2 Mean
c. Mode = 3 Median – 2 Mean d. None of the these

Q.17 In the following distribution, the sum of lower limit of median class and the upper limit of the modal class is

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	1	3	5	9	7	3

- (a) 80 (b) 70 (c) 90 (d) 60

Q.18 In a circle of radius 14 cm, an arc subtends an angle of 30° at the center, the length of the arc is

- (a) 44 cm (b) 28 cm (c) 11 cm (d) $22/3$ cm

In the following questions 19 and 20, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Q.19 **Assertion:** Three points A, B, C are such that $AB + BC > AC$, then they are collinear.

Reason: Three points are collinear if they lie on a straight line

Q.20 **Assertion (A)** The Probability of getting atleast one head when three coins are tossed is $7/8$.

Reason (R) There is only one outcome where no head appears when three coins are tossed.

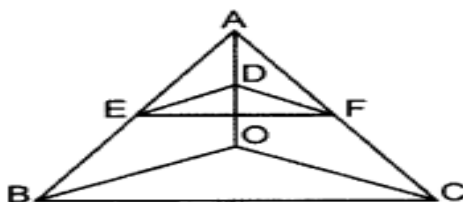
SECTION – B (SA-I)**(2x5 = 10)**

Q.21. Prove that $3 + 2\sqrt{5}$ is irrational.

OR

Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.

Q.22 In the figure, if $DE \parallel OB$ and $EF \parallel BC$, then prove that $DF \parallel OC$.



Q.23 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.

Q.24 . In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of:

$$\sin A \cos C + \cos A \sin C.$$

Q.25. A group consists of 12 persons, out of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is

(i) extremely patient (ii) extremely kind or honest.

OR

What is the probability for a leap year having 53 Sundays?

SECTION – C (SA-II)**(3x6 = 18)**

Q.26 Find a quadratic polynomial, the sum and product of whose zeroes are -8 and 12 respectively. Hence find the zeroes.

Q.27. Find the largest number that will divide 398, 436 and 542 leaving remainders 7, 11, and 15 respectively

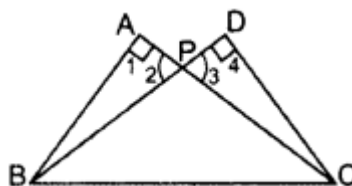
Q.28 Find the value of m such that the quadratic equation $(m-12)x^2 + 2(m-12)x + 2 = 0$, has equal roots.

Q.29 Prove the identity $\frac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = \operatorname{Cosec}\theta + \cot\theta$

Q.30 Prove that If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

OR

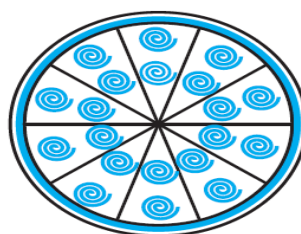
In the figure ABC and DBC are two right triangles. Prove that $AP \times PC = BP \times PD$.



Q.31 A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$).

OR

. A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in Fig. Find : (i) the total length of the silver wire required. (ii) the area of each sector of the brooch.?



SECTION – D (LA)

(5*4=20)

Q.32 Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Q 33. The mean of the following frequency distribution is 62.8 and the sum of frequencies is 50. Find the missing frequencies f_1 and f_2 :

Classes	Frequencies
0-20	5
20-40	f_1
40-60	10
60-80	f_2
80-100	7
100-120	8

OR

100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows:

Number of letters	1-4	4-7	7-10	10-13	13-16	16-19
Number of surnames	6	30	40	16	4	4

Determine the median number of letters in the surnames. Find the mean number of letters in the surnames? Also, find the modal size of the surnames.

Q.34. . Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide . From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles..

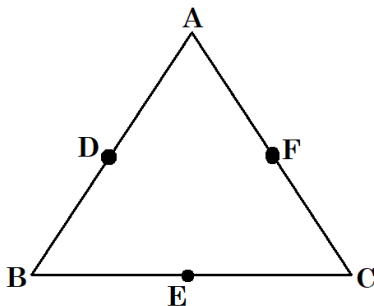
Q.35 A train covered a certain distance at uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And if the train was slower by 6 km/h, it would have taken 6 hours more than the scheduled time. Find the length of the journey..

OR

Students of a class are made to stand in rows. If three students are extra in each row, there would be 1 row less. If three students are less in each row, there would be 2 rows more. Find the number of students in the class.

SECTION – E (CASE STUDY) (4x3 = 12)

Q.36 Three persons A, B and C are sitting at (3, 2), (5, 6) and (8, 1) respectively
Persons D, E and F are sitting at midpoints of AB, BC and CA respectively.



- (i) Find the distance between A and D.
- (ii) Find the distance between E and F.
- (iii) Find the coordinates of D, E and F.

OR

- (iii) Find the mid point of AE also find length of AE.

Q.37 To make the learning process more interesting creative and innovative Shavya's class teacher brings clay in the classroom, to teach the topic. Surface Areas and Volumes. With clay, she forms a solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 3 cm and diameter of the base of cone is 8 cm. Answer the following questions.

- i) Find the slant height of the cone.
- (ii) Find the curved surface area of the hemisphere . ($\pi = 3.14$)
- iii) Determine the volume of the toy.

OR

- iii) Determine the total surface area of the toy.

Q.38. A bike manufacturing company planned to produce 1000 bikes in fifth year and 1800 bikes in ninth year. Assume that the production increases uniformly by a fixed number every year.

- (i) Find the production in the first year.
- (ii) Find the production in the 12th year.
- (iii) Find the total production in first ten years.

OR

- (iii) In how many years will the total production reach 42000 bikes?



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PRE –BOARD II (SESSION : 2024-25)

MATHEMATICS – STANDARD (041)/SET B

Time Allowed: 3 Hours

Maximum Marks :80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
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6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

SECTION – A (MCQ)

(1x10 = 10)

1. 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) $a = 0, b = -6$
2. Express 98 as a product of its primes
a) 2×7^2 b) $2^2 \times 7^2$ c) $2^2 \times 7$ d) $2^3 \times 7$
3. The point of intersection of the lines represent by $3x - y = 3$ and Y axis is given by
a) $(0, -3)$ b) $(0, 3)$ c) $(2, 0)$ d) $(-2, 0)$
4. In a triangle ABC, $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, the value of x is:
a) 2 b) 4 c) 3 d) 1
5. The roots of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ are
a) Not real b) real and equal c) rational and distinct d) Irrational
6. The distance between the point P(1, 4) and Q(4, 0) is
(a) 4 (b) 5 (c) 6 (d) $3\sqrt{3}$
7. The n^{th} term of an A.P. 5, 2, -1, -4, -7 ... is
a) $2n + 5$ b) $2n - 5$ c) $8 - 3n$ d) $3n - 8$
8. If the points A(6, 1), B(8, 2), C(9, 4) and D(p, 3) are the vertices of a parallelogram, taken in order, then the value of p is
a) 4 b) -6 c) -2 d) 7
9. In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$, and $AB = 3DE$. Then the two triangles are
a) congruent but not similar b) similar but not congruent
c) neither congruent nor similar d) congruent as well as similar

10 If the sum and product of the roots of the equation $3x^2 - 8x + 2k = 0$ are equal, then the value of k is

- a) 6 b) 3 c) 4 d) 8

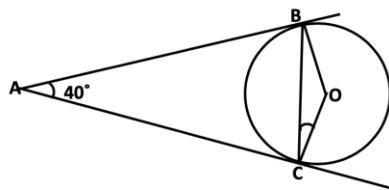
11. A deck of cards contains 52 cards. What is the probability of drawing a red face card?

- a) $12/52$ (b) $1/26$ (c) $3/26$ (d) $1/13$

12. Given that $\sin \theta = a / b$, then $\tan \theta =$

- (a) $\frac{b}{\sqrt{b^2 - a^2}}$ (b) $\frac{\sqrt{b^2 - a^2}}{b}$
(c) $\frac{a}{\sqrt{b^2 - a^2}}$ (d) $\frac{\sqrt{b^2 - a^2}}{a}$

13. In the given figure, AB and AC are tangents to a circle with centre O such that $\angle BAC = 40^\circ$, then $\angle BCO$ is equal to



- a) 40° b) 20° c) 140° d) 70°

14. If $x \tan 60^\circ \cos 30^\circ = \sin 60^\circ \cot 30^\circ$, then the value of x is equal to

- a) $\cos 30^\circ$ b) $\tan 30^\circ$ c) $\tan 45^\circ$ d) $\cot 30^\circ$

15. If a cylinder is covered by two hemispheres shaped lid of equal shape, then the total curved surface area of the new object will be

- (a) $4\pi rh + 2\pi r^2$ (b) $4\pi rh - 2\pi r^2$ (c) $2\pi rh + 4\pi r^2$ (d) $2\pi rh + 4\pi r$

16. The total surface area of a solid sphere of diameter 14 cm is :

- a) $196\pi \text{ cm}^2$ b) $56\pi \text{ cm}^2$ c) $112\pi \text{ cm}^2$ d) $147\pi \text{ cm}^2$

17. For the following distribution, the sum of upper limits of the median and modal class is

Class	0-5	5-10	10-15	15-20	20-25
Frequency	11	28	24	18	19

- a) 25 b) 20 c) 15 d) 30

18. The probability of getting 53 Sundays in a leap year is

- a) $\frac{1}{365}$ b) $\frac{1}{7}$ c) $\frac{2}{7}$ d) $\frac{1}{366}$

**The following are the options for the Assertion and Reasoning questions

- a) Both assertion and reason are correct and the reason is the correct explanation for the assertion .
- b)Both assertion and reason are correct and the reason is not the correct explanation for the assertion
- c)The assertion is true but the reason is false.
- d)The assertion is false but reason is true

19. Assertion:- If the radius of sector of a circle is reduced to its half and angle is doubled then the perimeter of the sector remains the same.

Reason :- The length of the arc subtending angle θ at the centre of a circle of radius $r = \frac{\pi r \theta}{180}$

20. Assertion:- If the difference of Mode and Median of a data is 24, then the difference of median and mean is 12.

Reason : The Empirical relationship between Mean, Median and Mode is $\text{Median} = 2 \text{ Mode} + 3 \text{ Mean}$

SECTION – B (SA-I)

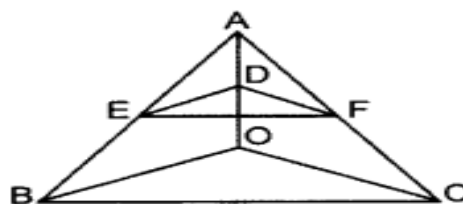
(2x5 = 10)

Q.21 A group consists of 12 persons, out of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (i) extremely patient (ii) extremely kind or honest.

or

What is the probability for a leap year having 53 Sundays?

Q 22.In the figure, if $DE \parallel OB$ and $EF \parallel BC$, then prove that $DF \parallel OC$.



Q.23. In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$ find the value of:

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Q.24. 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.

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Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.

SECTION – C (SA-II)

(3x6 = 18)

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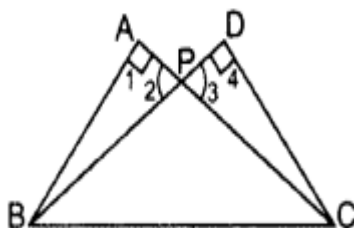
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SECTION – D (LA)**(5*4=20)**

Q.32 The mean of the following frequency distribution is 62.8 and the sum of frequencies is 50. Find the missing frequencies f_1 and f_2 :

<i>Classes</i>	<i>Frequencies</i>
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OR

Students of a class are made to stand in rows. If three students are extra in each row, there would be 1 row less. If three students are less in each row, there would be 2 rows more. Find the number of students in the class.

SECTION – E (CASE STUDY)**(4x3 = 12)**

Q.36 To make the learning process more interesting creative and innovative Shavya's class teacher brings clay in the classroom, to teach the topic. Surface Areas and Volumes. With clay, she forms a solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 3 cm and diameter of the base of cone is 8 cm. Answer the following questions.

i) Find the slant height of the cone.

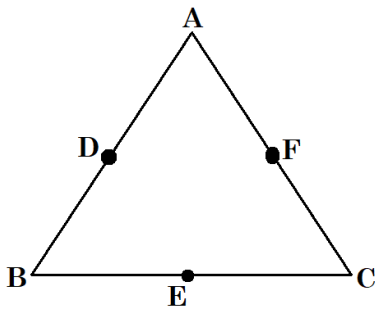
(ii) Find the curved surface area of the hemisphere . ($\pi = 3.14$)

iii) Determine the volume of the toy.

OR

iii) Determine the total surface area of the toy.

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Persons D, E and F are sitting at midpoints of AB, BC and CA respectively.



(i) Find the distance between A and D.

(ii) Find the distance between E and F.

(iii) Find the coordinates of D, E and F.

OR

(iii) Find the mid point of AE also find length of AE.

Q.38. A bike manufacturing company planned to produce 1000 bikes in fifth year and 1800 bikes in ninth year. Assume that the production increases uniformly by a fixed number every year.

(i) Find the production in the first year.

(ii) Find the production in the 12th year.

(iii) Find the total production in first ten years.

OR

(iii) In how many years will the total production reach 42000 bikes?



KENDRIYA VIDYALAY SANGHATHATN, MUMBAI REGION

PRE BOARD - 2 (SESSION: 2024-2025)

MATHEMATICS - STANDARD (041)/SET C

Time allowed: 3:00 Hours

Maximum marks: 80

Class: X

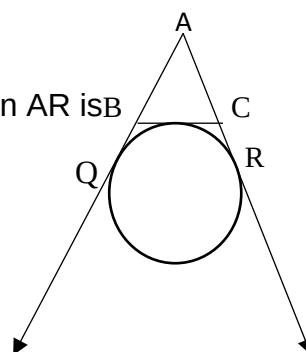
GENERAL INSTRUCTIONS:

- (i) This question paper contains 38 questions. All questions are compulsory.
- (ii) The question paper is divided into five sections A, B, C, D and E. Each section is compulsory.
- (iii) In section A, question numbers 1 to 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion-Reasoning based questions of 1 mark each.
- (iv) In section B question numbers 21 to 25 are very short answer (VSA) type questions carrying 2 marks each.
- (v) In section C question numbers 26 and 31 are short answer (SA) type questions carrying 3 marks each.
- (vi) In section D question numbers 32 and 35 are long answer (LA) type questions carrying 5 marks each.
- (vii) In section E question numbers 36 – 38 are case-study based integrated carrying 4 marks each. Internal choice is provided in 2 marks question in each case study.
- (viii) Use of calculator is not allowed and draw neat and clean figure if necessary.

Section - A

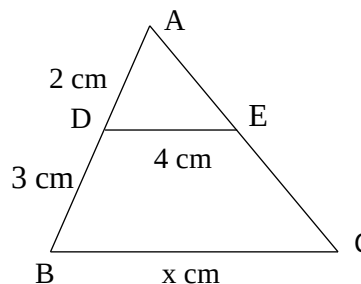
Section A consists of 20 questions of 1 mark each.

1. The sum of two zeroes is -1 and their product is -12, then the quadratic polynomial is
 - a) $x^2 - x - 12$
 - b) $x^2 - x + 12$
 - c) $2x^2 - x - 1$
 - d) $x^2 + x - 12$
2. The value of k for which the pair of equations $kx = y + 2$ and $6x = 2y + 3$ has no solutions.
 - a) is $k = 3$
 - b) does not exist
 - c) is $k = -3$
 - d) is $k = 4$
3. The roots of the quadratic equation $x^2 + x - 11 = 0$ are:
 - a) irrational and distinct
 - b) not real
 - c) rational and distinct
 - d) real and equal
4. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is
 - a) 4
 - b) ± 4
 - c) -4
 - d) 0
5. For the AP: $\sqrt{2}, \sqrt{8}, \sqrt{18}, \dots$ 7th term is
 - a) $3\sqrt{2}$
 - b) $\sqrt{89}$
 - c) $2\sqrt{7}$
 - d) $7\sqrt{2}$
6. In the given figure, if the perimeter of triangle ABC is 12 cm, then AR is
 - a) 6 cm
 - b) 10 cm
 - c) 8 cm
 - d) 12 cm



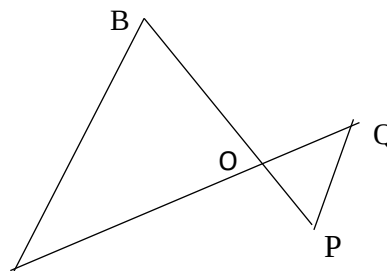
7. In the given figure, $DE \parallel BC$. The value of x is

- a) 6
- b) 12.5
- c) 8
- d) 10



8. In the given figure, $AB \parallel PQ$. If $AB = 6$ cm, $PQ = 2$ cm and $OB = 3$ cm, then the length of OP is

- a) 9 cm
- b) 3 cm
- c) 4 cm
- d) 1 cm



9. The distance between the points $(-a, b)$ and $(a, -b)$ is ^A

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

10. If $(\frac{a}{3}, 4)$ is the mid-point of the segment joining the points $P(-6, 5)$ and $R(-2, 3)$, then the value of 'a' is

- a) 12
- b) -6
- c) -12
- d) -4

11. If $\theta = 30^\circ$ then the value of $3\tan\theta$ is

- a) 1
- b) $\frac{1}{\sqrt{3}}$
- c) $\sqrt{3}$
- d) not defined

12. Length of an arc of a sector of angle θ and radius r of a circle, is:

- a) $\frac{\pi r^2 \theta}{360^\circ}$
- b) $\frac{\pi r \theta}{180^\circ}$
- c) $\frac{2\pi r \theta}{180^\circ}$
- d) None of these

13. The volume of solid hemisphere is $\frac{396}{7} \text{ cm}^3$, the radius of the solid hemisphere is

- a) 9 cm
- b) 3 cm
- c) 4 cm
- d) 1 cm

14. The curved surface area of a cone having height 24 cm and radius 7 cm, is

- a) 528 cm^2
- b) 1056 cm^2
- c) 550 cm^2
- d) 500 cm^2

15. The upper limit of median class of given distribution of 45 observation

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency	5	9	15	10	6

- a) 20
- b) 30
- c) 40
- d) 10

16. If the mean and median of data are 12 and 15 respectively, then its mode is

- a) 13.5
- b) 21
- c) 6
- d) 14

17. A bag contains 5 pink, 8 blue and 7 yellow balls. One ball is drawn at random from the bag, what is the probability of getting neither a blue nor a pink ball?

- a) $\frac{1}{4}$ b) $\frac{2}{5}$ c) $\frac{7}{20}$ d) $\frac{13}{20}$

18. A bag contains 100 cards numbered 1 to 100. A card is drawn at random from the bag. What is the probability that the number on the card is a perfect cube?

- a) $\frac{1}{20}$ b) $\frac{3}{50}$ c) $\frac{1}{25}$ d) $\frac{7}{100}$

In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correction option.

- Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- Assertion (A) is true but reason (R) is false.
- Assertion (A) is false but reason (R) is true.

19. Assertion(A): $\sin^2 67^\circ + \cos^2 67^\circ = 1$

Reasoning(R): For any value of θ , $\sin^2 \theta + \cos^2 \theta = 1$

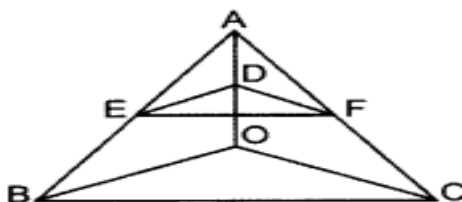
20. Assertion (A): The number 5^n can end with digit 0, where n is a natural number.

Reason(R): Any number ends with digit zero, if its prime factor is of the form $2^m \times 5^n$, where m and n are natural numbers.

SECTION – B (SA-I)

(2x5 = 10)

Q.21. In the figure, if $DE \parallel OB$ and $EF \parallel BC$, then prove that $DF \parallel OC$.



Q.22. In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$ find the value of:

$$\sin A \cos C + \cos A \sin C$$

Q.23. 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.

Q.24 A group consists of 12 persons, out of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (i) extremely patient (ii) extremely kind or honest.

OR

What is the probability for a leap year having 53 Sundays?

Q.25 Prove that $3 + 2\sqrt{5}$ is irrational.

OR

Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.

SECTION – C (SA-II)

(3x6 = 18)

Q.26 Find the largest number that will divide 398, 436 and 542 leaving remainders 7, 11, and 15 respectively.

Q.27 Find a quadratic polynomial, the sum and product of whose zeroes are -8 and 12 respectively. Hence find the zeroes.

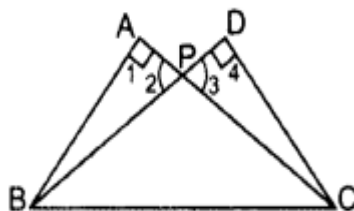
Q.28 Find the value of m such that the quadratic equation $(m-12)x^2 + 2(m-12)x + 2 = 0$, has equal roots.

Q.29 Prove the identity $\frac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = \operatorname{Cosec}\theta + \cot\theta$

Q.30 Prove that If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

OR

In the figure ABC and DBC are two right triangles. Prove that $AP \times PC = BP \times PD$.

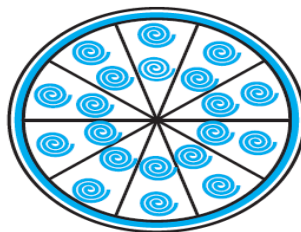


Q.31 A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$).

OR

. A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in Fig. Find :

- (i) the total length of the silver wire required.
- (ii) the area of each sector of the brooch.?



SECTION – D (LA)**(5*4=20)**

Q.32 The mean of the following frequency distribution is 62.8 and the sum of frequencies is 50. Find the missing frequencies f_1 and f_2 :

<i>Classes</i>	<i>Frequencies</i>
0-20	5
20-40	f_1
40-60	10
60-80	f_2
80-100	7
100-120	8

OR

100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows:

Number of letters	1-4	4-7	7-10	10-13	13-16	16-19
Number of surnames	6	30	40	16	4	4

Determine the median number of letters in the surnames. Find the mean number of letters in the surnames? Also, find the modal size of the surnames.

Q.33. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Q.34. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles.

Q.35 A train covered a certain distance at uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And if the train was slower by 6 km/h, it would have taken 6 hours more than the scheduled time. Find the length of the journey..

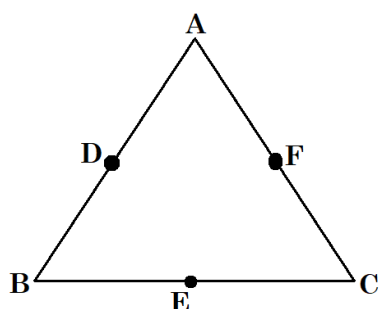
OR

Students of a class are made to stand in rows. If three students are extra in each row, there would be 1 row less. If three students are less in each row, there would be 2 rows more. Find the number of students in the class.

SECTION – E (CASE STUDY)**(4x3 = 12)**

Q.36. Three persons A, B and C are sitting at (3, 2), (5, 6) and (8, 1) respectively

Persons D, E and F are sitting at midpoints of AB, BC and CA respectively.



(i) Find the distance between A and D.

(ii) Find the distance between E and F.

(iii) Find the coordinates of D, E and F.

OR

(iii) Find the mid point of AE also find length of AE.

Q.37. A bike manufacturing company planned to produce 1000 bikes in fifth year and 1800 bikes in ninth year. Assume that the production increases uniformly by a fixed number every year.

(i) Find the production in the first year.

(ii) Find the production in the 12th year.

(iii) Find the total production in first ten years.

OR

(iii) In how many years will the total production reach 42000 bikes?



Q.38 .To make the learning process more interesting creative and innovative Shavya's class teacher brings clay in the classroom, to teach the topic. Surface Areas and Volumes. With clay, she forms a solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 3 cm and diameter of the base of cone is 8 cm. Answer the following questions.

i) Find the slant height of the cone.

(ii) Find the curved surface area of the hemisphere . ($\pi = 3.14$)

iii) Determine the volume of the toy.

OR

iii) Determine the total surface area of the toy.