CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-19

Time : 3 Hours **Maximum Marks : 80**

General Instructions :

(i) All questions are compulsory.
(ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

Q1. If the points $\mathrm{A}(1,2)$, $\mathrm{O}(0,0)$ and $\mathrm{B}(a,b)$ are collinear, then [1]

(a) $a = b$ (b) $a = 2b$
(c) $2a = b$ (d) $a = -b$

Q2. The point which divides the line segment joining the points (7,-6) and (3,4) in the ratio 1:2 internally lies in the [1]

(a) Ist quadrant (b) IInd quadrant
(c) III quadrant (d) IVth quadrant

Q3. $n^2 - 1$ is divisible by 8, if n is [1]

(a) an integer (b) a natural number
(c) an odd integer (d) an even integer

Q4. The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the number get reversed. The number is [1]

(a) 27 (b) 72
(c) 63 (d) 36

Q5. Two APs have the same common difference. The first term of one AP is -1 and that of the other is -8, Then the difference between their 4th term is [1]

(a) -1 (b) -8
(c) 7 (d) -9

Q6. In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$ and $AB = 3DE$, then the two triangles are [1]

(a) congruent but not similar (b) similar but not congruent
(c) neither congruent not similar (d) congruent as well as similar

Q7. If $\Delta ABC \sim \Delta PQR$, area of $\Delta ABC = 81\text{cm}^2$, area of $\Delta PQR = 144\text{cm}^2$ and $QR = 6$ cm, then the length of BC is[1]

(a) 4 cm (b) 4.5 cm
(c) 9 cm (d) 12 cm

Q8. If $P(A)$ denotes the probability of an event A, then [1]

(a) $P(A) = 0$ (b) $P(A) > 0$
(c) $0 \leq P(A) \leq 1$ (d) $-1 \leq P(A) \leq 1$

Q9. If a fair die is rolled once, then the probability of getting an even number or a number greater than 4 is [1]

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$

(c) $\frac{5}{6}$ (d) $\frac{2}{3}$

Q10. The probability of getting a bad egg in a lot of 400 eggs is 0.035. The number of bad eggs in the lot is [1]

(a) 7 (b) 14

(c) 21 (d) 28

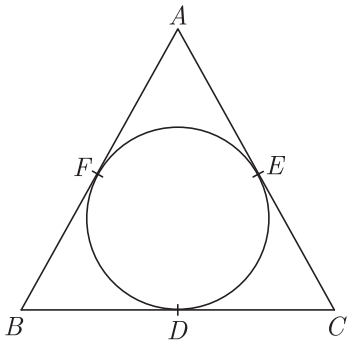
(Q.11-Q.15) Fill in the blanks.

Q11. If the lines represented by $3x+2y+5=0$ and $kx-6y+4=0$ are parallel, then $k=$..... [1]

OR

The solution of the pair of linear equations $x+2y=5$ and $2x-y=5$ is.....

Q12. If the given figure, sides BC,CA and AB of ΔABC touch a circle at point D,E and F respectively. If $BD=4\,\text{cm}$, $DC=3\,\text{cm}$ and $CA=8\,\text{cm}$, then the length of side AB is..... [1]



Q13. The probability of an event that cannot happen is..... [1]

Q14. The length of a rope by which a cow must be tethered in order that it may be able to graze an area of $616\,\text{m}^2$ is..... [1]

Q15. The distance of a point (2,-3) from the $x-axis$ is..... [1]

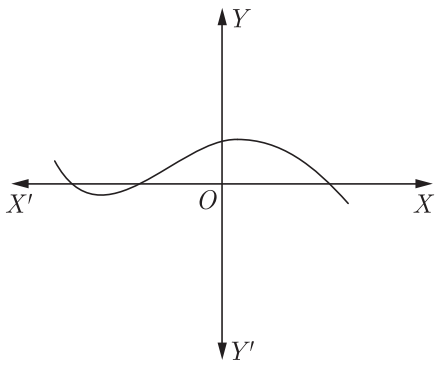
(Q.16-Q.20) Answer the following

Q16. Explain why 13233343563715 is a composite number? [1]

OR

If HCF $(a,8)=4$ and LCM $(a,8)=24$, then find the value of a.

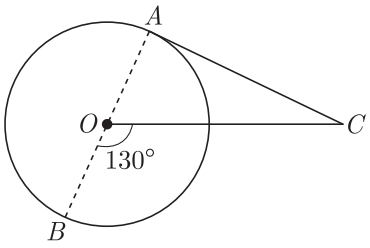
Q17. Write number of zeroes of the polynomial $y=f(x)$ whose graph is given alongside. [1]



Q18. If $(x+a)$ is a factor of $2x^2+2ax+5x+10=0$, then find the value of a. [1]

Q19. If $\tan\theta + \cot\theta = 5$, find the value of $\tan^2\theta + \cot^2\theta$. [1]

Q20. In the given figure, AOB is a diameter of a circle with centre O and AC is a tangent to the circle at A. If $\angle BOC = 130^\circ$, then find $\angle ACO$ [1]



SECTION B

Q21. Two cubes, each of side 4 cm are joined end to end. Find the surface area of the resulting cuboid. [2]

Q22. If the product of zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of a. [2]

Q23. The first and last term of an AP are 5 and 45 respectively. If the sum of all its terms is 400, find its common difference.[2]

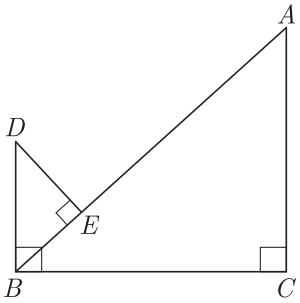
OR

Find the sum of all 13 terms of an AP whose middle term is 42.

Q24. In ΔABC, $\angle BAC = 90^\circ$ and $AD \perp BC$. Prove that $AD^2 = BD \times DC$. [2]

OR

In the given figure, $DB \perp BC$, $DE \perp AB$ and $AC \perp BC$. Prove that $\frac{BE}{DE} = \frac{AC}{BC}$.



Q25. If $\cos(A+B) = 0$ and $\sin(A-B) = \frac{1}{2}$, then find the values of A and B, where A and B are acute angles. [2]

Q26. If $x = p\sec\theta + q\tan\theta$ and $y = p\tan\theta + q\sec\theta$, then prove that $x^2 - y^2 = p^2 - q^2$. [2]

SECTION C

Q27. $A(6,1)$, $B(8,2)$ and $C(9,4)$ are the three vertices of a parallelogram ABCD. If E is the mid-point of DC, find the area of ΔADE. [3]

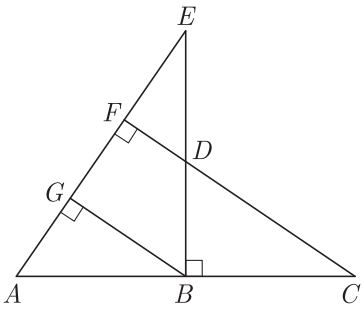
OR

Points $A(-1,y)$ and $B(5,7)$ lie on a cicrle with centre $O(2,-3y)$. Find the value of y. Hence, find the radius of the circle.

Q28. In the given figure, $EB \perp AC$, $BG \perp AE$ and $CF \perp AE$. Prove that: [3]

(i) $\Delta ABG \sim \Delta DCB$

(ii) $\frac{BC}{BD} = \frac{BE}{AB}$

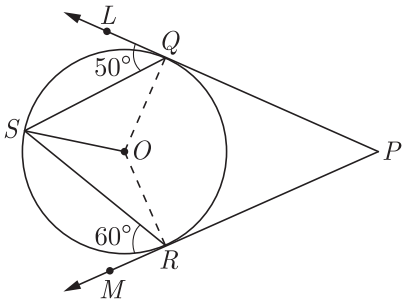


Q29. If S_n denotes the sum of first n terms of an AP, prove that $S_{12} = 3(S_8 - S_4)$. [3]

OR

The sum of the first five terms and the sum of first seven terms of the same AP is 167. If the sum of first ten terms of this AP is 235, find the sum of its first twenty terms.

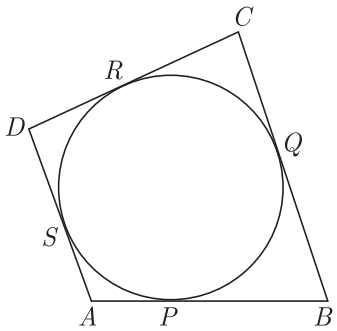
Q30. In the given figure, PQL and PRM are tangents to the circle with centre O at the points Q and R, respectively and S is a point on the circle such that $\angle SQL = 50^\circ$ and $\angle SRM = 60^\circ$. Find $\angle QSR$. [3]



Q31. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. [3]

OR

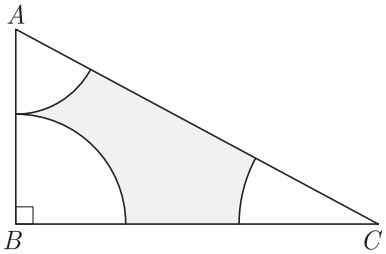
In the given figure, a quadrilateral ABCD circumscribes a circle. Prove that $AB + CD = AD + BC$



Q32. Prove that:

$$\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{2}{2\sin^2\theta - 1}$$ [3]

Q33. In the given figure, ABC is a triangle right angled at B with $AB = 14\,\text{cm}$ and $BC = 24\,\text{cm}$. With vertices A, B and C as centers, arcs are drawn, each of radius 7 cm. Find the area of the shaded region. [3]



Q34. Find the mean of the following data: [3]

Class	Less than 20	Less than 40	Less than 60	Less than 80	Less than 100
Frequency	15	37	74	99	120

SECTION D

Q35. Prove that one and only one out of $n, n+2$ or $n+4$ is divisible by 3, where n is any positive integer. [4]

Q36. Draw the graphs of the equations $x-y+1=0$ and $3x+2y-12=0$. Determine the coordinates of the vertices of the triangle formed by these lines and $x-$ axis. [4]

Q37. .Two water pipes together can fill a tank $9\frac{3}{8}$ hours. The pipe of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each pipe can fill the tank separately. [4]

OR

Solve the following equation:

$\frac{3x-4}{7}+\frac{7}{3x-4}=\frac{5}{2}, x \neq \frac{4}{3}$.

Q38. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. [4]

OR

A well of diameter 4 m is dug 14 m deep. The earth taken out is spread evenly all around the well to form a 40 cm high embankment. Find the width of the embankment.

Q39. The angles of elevation and depression of the top and the bottom of a tower from the top of a building, 60 m high, are 30° and 60° respectively. Find the difference between the height of the building and tower and the distance between them. $(use \sqrt{3}=1.732)$. [4]

OR

From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45° and 60°.If the cars are 100 m apart, find the height of the balloon.

Q40. Find the median of the following data: [4]

Marks	**0 or above**	**10 or above**	**20 or above**	**30 or above**	**40 or above**	**50 or above**	**60 or above**	**70 or above**	**80 or above**	**90 or above**	**100 or above**
Number of students	80	77	72	65	55	43	28	16	10	8	0