Sample Question Paper - 1 (TERM - I)

Class X (Session - 2021-22)

Subject- Mathematics (Standard)

Time Allowed: 90 minutes **Maximum Marks: 40**

General Instructions:

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

SECTION A

Q1. The ratio of LCM and HCF of the least composite and the least prime numbers is

(a) 1: 2

(b) 2: 1

(c) 1: 1

(d) 1: 3

Q2. Find the largest number which divide the numbers 615 and 963 leaving remainder 6 in each case.

(a) 87

(b) 75

(c) 56

(d) 88

Q3. A girl walks 200 m towards East and then 150 m towards North. The distance of the girl from the starting point is

(a) 350 m

(b) 250 m

(c) 300 m

(d) 225 m

Q4. Find the value of p for which the following pair of linear equations have infinitely many solutions?

$(p-3)x+3y=p\ ,px+py=12$

(a) -6

(b) 0

(c) 6

(d) 12

Q5. Two fair coins are tossed. What is the probability of getting at the most one head?

(a) $3/4$

(b) $1/4$

(c) $1/2$

(d) $3/8$

Q6. For what value(s) of x, the distance between the points $P(2,-3)$ and $Q(x,5)$ is 10?

(a) 9,2

(b) $-4,8$

(c) 10,1

(d) 6,3

Q7. If $2\sin^2\beta-\cos^2\beta=2$, then β is

(a) $0°$

(b) $90°$

(c) $45°$

(d) $30°$

Q8. Evaluate the zeroes of the polynomial $2x^2 - 16$.

(a) $2\sqrt{2}, -2\sqrt{2}$

(b) $\sqrt{2}, -\sqrt{2}$

(c) $4, -4$

(d) $2, -2$

Q9. The lines $x = a$ and $y = b$, are

(a) intersecting

(b) parallel

(c) overlapping

(d) (None of these)

Q10. If point P(4,2) lies on the line segment joining the points A(2,1) and B(8,4) then:

(a) $AP = PB$

(b) $PB = \frac{1}{3}AP$

(c) $AP = \frac{1}{2}PB$

(d) $AP = \frac{1}{3}PB$

Q11. Find the value of p if the distance between the points $(4, p)$ and $(1,0)$ is 5.

(a) ± 4

(b) ± 6

(c) ± 8

(d) ± 7

Q12. Evaluate the area of a quadrant of a circle, provided that its circumference is 20 cm.

(a) 127.27 cm^2

(b) 132.27 cm^2

(c) 137.27 cm^2

(d) 122.27 cm^2

Q13. In ΔABC right angled at B, if $\tan A = \sqrt{3}$, then $\cos A \cos C - \sin A \sin C =$

(a) -1

(b) 0

(c) 1

(d) $\sqrt{3}/2$

Q14. Evaluate : $\frac{1+\tan^2 A}{1+\cot^2 A}$

(a) $\sec^2 A$

(b) -1

(c) $\cot^2 A$

(d) $\tan^2 A$

Q15. Evaluate the area of the largest circle that can be inscribed inside a rectangle of sides 7 cm and 3.5 cm.

(a) $\frac{12}{7}$ cm^2

(b) $\frac{17}{7}$ cm^2

(c) $\frac{77}{8}$ cm^2

(d) $\frac{22}{7}$ cm^2

Q16. What is the probability of choosing a vowel from the word MATCH if a letter is chosen randomly from it?

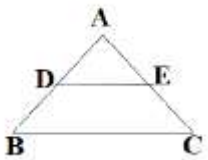
(a) $\frac{2}{5}$

(b) $\frac{1}{5}$

(c) $\frac{3}{5}$

(d) $\frac{4}{5}$

Q17. In the figure, if $DE \parallel BC, AD = 3$ cm, $BD = 4$ cm and $BC = 14$ cm, then DE equals



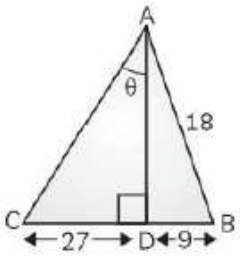
(a) 7 cm

(b) 6 cm

(c) 4 cm

(d) 3 cm

Q18. Find the value of tan θ, by using the following figure:



(a) $\sqrt{3}$

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

(c) $\frac{1}{2}$

(d) $\sqrt{2}$

Q19. If $4\tan\beta = 3$, then $\frac{4\sin\beta - 3\cos\beta}{4\sin\beta + 3\cos\beta} =$

(a) 0

(b) 1/3

(c) 2/3

(d) 3/4

Q20. Find the value of ∠BAD in △ ABC, if D is a point on side BC such that $\frac{AB}{AC} = \frac{BD}{DC}$, $\angle B = 70°$ and $\angle C = 50°$.

(a) 30°

(b) 45°

(c) 60°

(d) 75°

SECTION B

Q21. If sum of two numbers is 1215 and their HCF is 81 , then the possible number of pairs of such numbers are

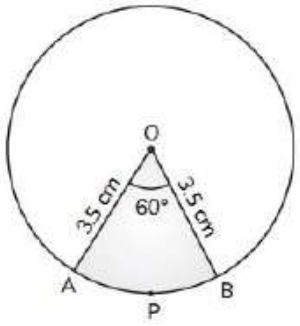
(a) 2

(b) 3

(c) 4

(d) 5

Q22. What is the length of OAPB, in the given figure? (Use $\pi = 3.14$)



(a) 22 cm

(b) 11 cm

(c) 13 cm

(d) 17 cm

Q23. If $\tan\alpha + \cot\alpha = 2$, then $\tan^{20}\alpha + \cot^{20}\alpha =$

(a) 0

(b) 2

(c) 20

(d) 2^{20}

Q24. Consider the two numbers whose sum is 135 and their HCF is 27 .

If their LCM is 162 , then what will be the larger number?

(a) 81

(b) 78

(c) 57

(d) 54

Q25: The LCM of two prime numbers p and q($p > q$) is 221 . Find the value of $3p - q$.

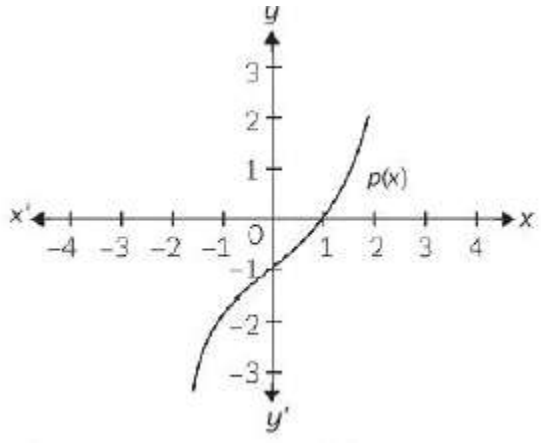
(a) 4

(b) 28

(c) 38

(d) 48

Q26. Find the number of zeroes, for the polynomial p(x) shown in the graph below:



(a) 0

(b) 1

(c) 2

(d) 3

Q27. Two fair dice are rolled simultaneously.

The probability that 5 will come up at least once is

(a) 5/36

(b) 11/36

(c) 12/36

(d) 23/36

Q28. What is the measure of the hypotenuse of a right triangle, when its medians, drawn from the vertices of the acute angles, are 5 cm and $2\sqrt{10}$ cm long?

(a) $5\sqrt{8}$ cm

(b) $2\sqrt{13}$ cm

(c) $6\sqrt{10}$ cm

(d) $2\sqrt{7}$ cm

Q29. The vertices of a parallelogram in order are $A(1,2), B(4, y), C(x, 6)$ and $D(3,5)$. Then (x, y) is

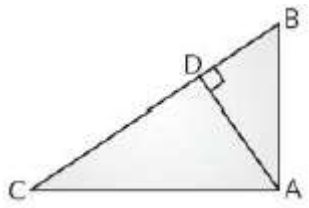
(a) (6,3)

(b) (3,6)

(c) (5,6)

(d) (1,4)

Q30. Evaluate the value of $AB^2 + CD^2$ in the given figure, if $AD \perp BC$ and $BD = 2$, $AC = 4$.



(a) 16

(b) 20

(c) 4

(d) 6

Q31. The equation of the perpendicular bisector of line segment joining points $A(4,5)$ and $B(-2,3)$ is

(a) $2x - y + 7 = 0$

(b) $3x + 2y - 7 = 0$

(c) $3x - y - 7 = 0$

(d) $3x + y - 7 = 0$

Q32. What are the coordinates of the point C, such that B $\left(\frac{1}{2}, 6\right)$ divides the line segment joining the points A(3,5) and C in the ratio of 1: 3 ?

(a) (0,0)

(b) (7,9)

(c) $(7, -9)$

(d) $(-7,9)$

Q33. The smallest number by which $1/13$ should be multiplied so that its decimal expansion terminates after two decimal places is

(a) $13/100$

(b) $13/10$

(c) $10/13$

(d) $100/13$

Q34. If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$, if we add 1 to the denominator only. Then the required fraction is:

(a) $\frac{2}{9}$

(b) $\frac{3}{5}$

(c) $\frac{4}{7}$

(d) $\frac{5}{13}$

Q35. Point P divides the line segment joining R$(-1,3)$ and S(9,8) in ratio k: 1.

If P lies on the line $x - y + 2 = 0$, then value of k is

(a) $2/3$

(b) $1/2$

(c) $1/3$

(d) $1/4$

Q36. Find the value of $\frac{3-4\sin^2 A}{4\cos^2 A-3}$, if $\sec A = \frac{17}{8}$.

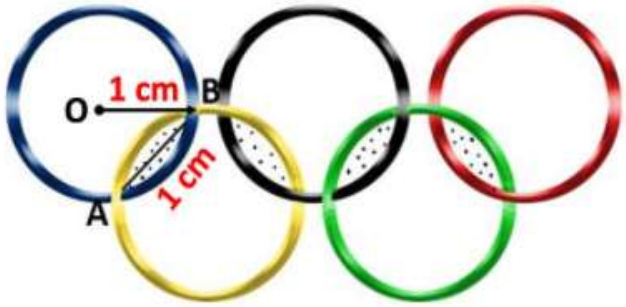
(a) $\frac{33}{611}$

(b) $\frac{53}{78}$

(c) $\frac{2}{\sqrt{3}}$

(d) $\frac{17}{64}$

Q37. Given below is the picture of the Olympic rings made by taking five congruent circles of radius 1 cm each, intersecting in such a way that the chord formed by joining the point of intersection of two circles is also of length 1 cm. Total area of all the dotted regions assuming the thickness of the rings to be negligible is



(a) $4(\pi/12 - \sqrt{3}/4)\text{cm}^2$

(b) $(\pi/6 - \sqrt{3}/4)\text{cm}^2$

(c) $4(\pi/6 - \sqrt{3}/4)\text{cm}^2$

(d) $8(\pi/6 - \sqrt{3}/4)\text{cm}^2$

Q38. What is the relation between x and y, if the point P(x, y) is equidistant from the points A(7,0) and B(0,5)?

(a) $x + 2y = 9$

(b) $7x - 5y = 12$

(c) $5x + 2y = 15$

(d) $3x - 2y = 7$

Q39. The circumference of a circle is 100 cm. The side of a square inscribed in the circle is

(a) $50\sqrt{2}$ cm

(b) $100/\pi$cm

(c) $50\sqrt{2}/\pi$cm

(d) $100\sqrt{2}/\pi$cm

Q40. What is the ratio in which point P(1,2) divides the join of A$(-2,1)$ and B(7,4)?

(a) 1: 2

(c) 3: 4

(b) 2: 1

(d) 2: 3

SECTION C

Q41 – Q45 are based on Case Study-1

Case Study-1:

Three friends Ramesh, Suresh and Rajesh step off together. Their steps measuring 240 cm, 90 cm, 120 cm respectively. They went to Rajiv juice shop for getting juice, which is situated nearby.

Q41. What is the minimum distance of the shop from the point where they start to walk together, so that one can cover the distance in complete steps?

(a) 740 cm

(b) 640 cm

(c) 700 cm

(d) 720 cm

Q42: What is the number of common steps cover by all of them to reach the juice shop?

(a) 40

(b) 45

(c) 30

(d) 20

Q43. If a and b are two numbers, then find the correct relation between their LCM and HCF.

(a) $a \times LCM(a, b) = b \times HCF(a, b)$

(b) $\frac{a}{b} = LCM(a, b) \times HCF(a, b)$

(c) $a \times b = LCM(a, b) \times HCF(a, b)$

(d) $b \times LCM(a, b) = a \times HCF(a, b)$

Q44. What name is given to a largest positive integer that divides given two positive integers completely?

(a) Coprime

(b) HCF

(c) LCM

(d) Twin Prime

Q45. Factor tree is a chain of factors, which is represented in the form of a:

(a) flower

(b) division

(c) tree

(d) leaf

Q46 – Q50 are based on Case Study-2

Case Study 2:

Rajesh want to choose a best plan for his mobile phone. He has 2 options available with him. The first plan of company A, cost Rs 20 per month, with costing an additional 25 paise per minute.

The second plan of company B charges Rs 40 per month, but calls cost 8 paise per minute.

These two situations are shown below in the form of linear equations.

$y = 0.25x + 20$

And, $y = 0.08x + 40$

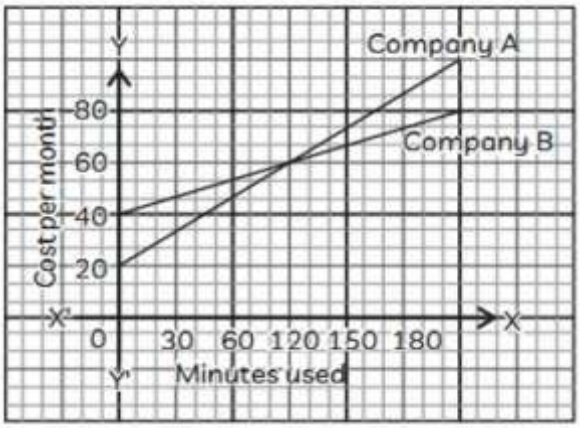
Where, x is the minutes used and y is the total cost per month

Cost : Plans prices range from under 10 to over 100

Types of Plan : Prepaid and post-paid or phone on a plane

Network : Coverage

Other benifits : Calls. SMS, Data and other extras



Q46. If Rajesh decides to take first plan and calls for 90 minutes in a month, then how much amount will he has to pay?

(a) Rs 45

(b) Rs 42.5

(c) Rs 40

(d) Rs 20

Q47. Rajesh's friend takes second plan and also calls for 90 minutes in a month. Then how much amount will he has to pay?

(a) Rs 47

(b) Rs 47.20

(c) Rs 45

(d) Rs 45.20

Q48. What are the values of x and y in the system of linear equations

$x + 2y = -1$ and $2x - 3y = 12$?

(a) $(-3, -2)$

(b) (3,2)

(c) $(-3,2)$

(d) $(3, -2)$

Q49. If the system of pair of linear equations $kx + 2y = 5$, $3x + y = 1$ has a unique solution, then the value of k is:

(a) $k = 6$

(b) $k \neq 6$

(c) $k \neq \frac{3}{2}$

(d) $k \neq \frac{2}{3}$

Q50. Which type of lines is represented by the system of linear equations

$x + 2y - 4 = 0$, $2x + 4y - 12 = 0$?

(a) Coincident lines

(b) Parallel lines

(c) Intersecting lines

(d) Can't say