

SECOND PREBOARD EXAMINATION (2019-20)
CLASS: X

Subject: MATHEMATICS (BASIC - 241)

Date: 15.01.2020

Time allowed: 3 Hours.

Maximum Marks: 80

General instructions:

- (1) **All** questions are **compulsory**.
- (2) The question paper consists of **40** questions divided into four sections **A, B, C and D**.
- (3) 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 **3** marks each . Section **D** comprises of **6** questions of **4** marks each.
- (4) There is no overall choice. However, internal choices have been provided in **TWO** questions of 1mark 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.
- (5) Use of calculators is not permitted.
- (6) Please check that this question paper contains **8** printed pages only.

SECTION A - (20 X 1 = 20)

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

1.If the HCF of 65 and 117 can be expressed in the form $65m - 117$, then the value of m is

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

2. The mean of the first five prime numbers is

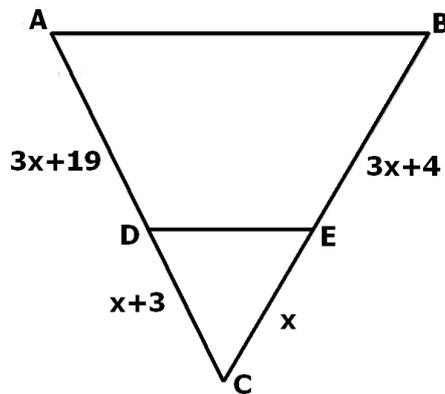
- a) 5.0 b) 4.5 c) 5.6 d) 6.5

3. From a point Q, length of tangent to a circle is 40cm and the distance of the point Q from the centre is 41cm. The radius of this circle is
 a) 4cm b) 3cm c) 6cm d) 9cm
4. Which one of the following rational numbers has a non terminating decimal expansion
 a) $\frac{33}{50}$ b) $\frac{66}{180}$ c) $\frac{6}{15}$ d) $\frac{41}{1000}$
5. A die is thrown twice . The probability of getting a doublet is
 a) $\frac{6}{12}$ b) $\frac{1}{6}$ c) $\frac{5}{6}$ d) $\frac{5}{12}$
6. Which of the following is a polynomial ?
 a) $x^2 + 1/x$ b) $2x^2 - 3\sqrt{x} + 1$ c) $x^2 + x^{-2} - 24$ d) $3x^2 + 3x + 1$
7. Given that $\text{HCF} (1152, 1664) = 128$, $\text{LCM} (1152, 1664) =$
 a) 1664 b) 1152 c) 14976 d) 14796
8. The number of zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can have is
 a) 1 b) 2 c) 0 d) 3
9. The distance between (0,5) and (-5,0) is
 a) $5\sqrt{2}$ b) $2\sqrt{5}$ c) 25 d) 10
10. If P(-1,1) is the midpoint of the line segment joining A(-3,b) and B (1, b + 4), then the value of b is
 a) 1 b) -1 c) 2 d) 0

(11 - 15) Fill in the blanks:

11. The ratio in which x - axis divides the line segment joining the points (5, 4) and (2, -3) is _____ .
12. If $2x+3y = 0$ and $4x - 3y = 0$, then $x + y =$ _____ .
13. If $\sin (A + B) = 1$ and $\cos(A - B) = 1$, then the value of A is _____ and B is _____ .

14. If $DE \parallel AB$, find x



15. The value of $2 \cos^2 60^\circ + 3 \sin^2 45^\circ + 3 \sin^2 30^\circ + 2 \cos^2 90^\circ$ is

_____.

(16 - 20) Answer the following :

16. In $\triangle ABC$, right-angled at B , $AB = 5$ cm and $\angle ACB = 30^\circ$ then find the length of the side BC .

17. The circumference of a circle is 88 cm. Find the area of the sector whose central angle is 72° . (Use $\pi = 22/7$).

18. A bag contains 4 blue, 5 black, 6 red and 5 white balls. One ball is taken out of the bag at random. What is the probability that it will be (i) black or blue (ii) white or blue

(OR)

One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting (i) a queen of black suit (ii) a red face card

19. The corresponding sides of two similar triangles are in the ratio of $2 : 3$. If the area of the smaller triangle is 48 cm^2 , find the area of the larger triangle.

20. How many terms are there in the AP $6, 3, 0, -3, \dots, -36$?

(OR)

Find the 20th term from last term of AP 3, 8, 13.....253 ?

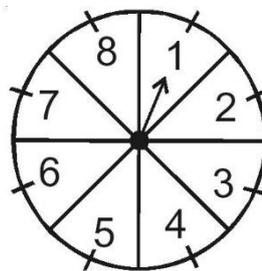
SECTION -B (6 x 2 = 12 Marks)

21. Three coins are tossed simultaneously. What is the probability of getting **i)** exactly two heads **ii)** at least two heads

22. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ?
(ii) She will not buy it ?

(OR)

A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see Fig.), and these are equally likely outcomes. What is the probability that it will point at (i) 8 ? (ii) a prime number?



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

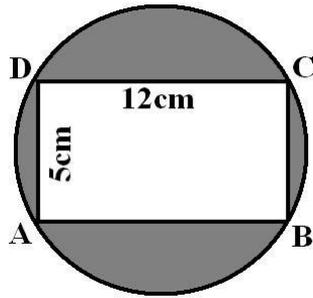
24. Express $\sin 67^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .

(OR)

Evaluate $\frac{\sin 18^\circ}{\cos 72^\circ} + \sqrt{3} (\tan 10^\circ \tan 30^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ)$

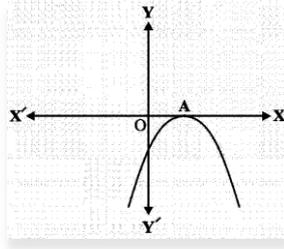
25. Find the area of the shaded region in the above sided figure.

Take $\pi = 3.14$

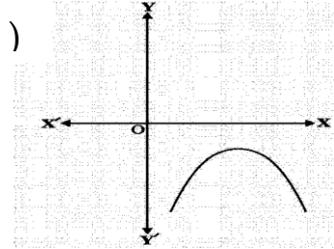


26. a) Find the number of zeroes in each of the following:

(i)



(ii)



a) What are the above shapes called ?

b) Which type of equation is represented by the above shapes ?

i) Linear ii) Quadratic iii) Cubic iv) None of these

SECTION - C (8 x 3 = 24 Marks)

27. On dividing $f(x) = x^3 - 3x^2 + x + 2$ by $g(x)$, the quotient $q(x)$ and remainder $r(x)$ were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.

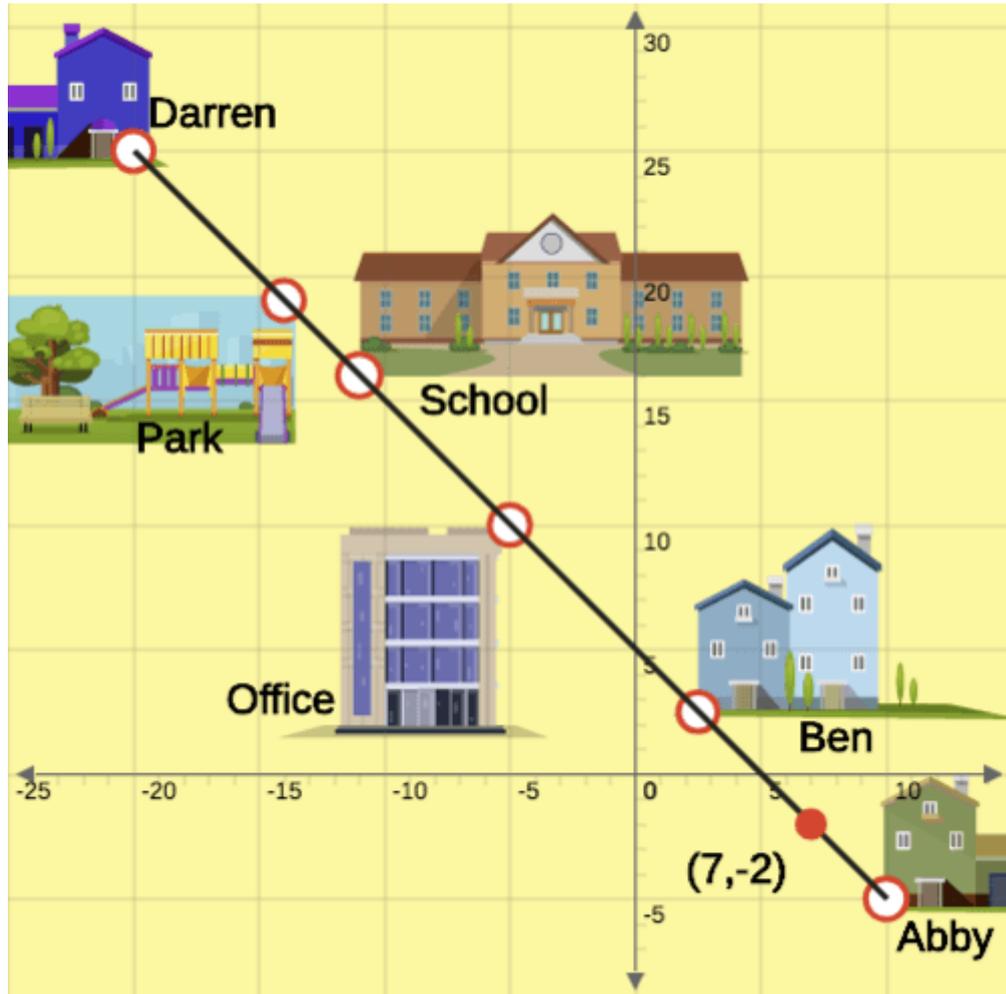
28. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

(OR)

Draw a line segment AB of length 10 cm. Divide it in the ratio 5:3. Measure the lengths of each segment.

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

30. Look at the picture given below and answer the following questions:



- (i) What is the distance between Abby and Darren's homes?
- (ii) Can we say Darren and Abby are equidistant from the office? Justify.

31. Prove that $7 - 2\sqrt{3}$ is irrational, given that $\sqrt{3}$ is irrational.

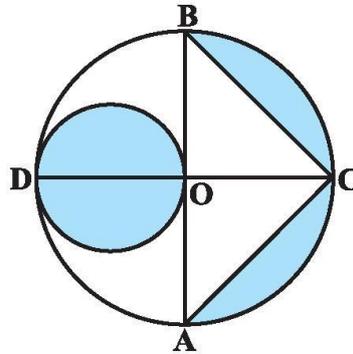
(OR)

A merchant has 120 litres of oil of one kind, 180 litres of another kind and 240 litres of third kind. He wants to sell the oil by filling the three kinds of oil in tins of equal capacity. What would be the greatest capacity of such a tin?

32. In the Fig., AB and CD are two diameters of a circle (with

centre O) perpendicular to each other and OD is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region.

($\pi = 22/7$)



33. Prove that $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2 \sec A$

(OR)

Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$

34. Find the value of k so that the following system of equations has no solution :

$$3x - y - 5 = 0 ; 6x - 2y - k = 0$$

SECTION - D (6 x 4 = 24 Marks)

35. The sum of the squares of the two positive integers is 208. If the square of the larger number is 18 times the smaller number, find the numbers.

(OR)

The sum of the areas of two squares is 640 m². If the difference in their perimeters be 64 m, find the sides of the two squares.

36. State and prove Pythagoras Theorem .

