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FIRST TERM EVALUATION 2022
MATHEMATICS

E 1003

Standard: X

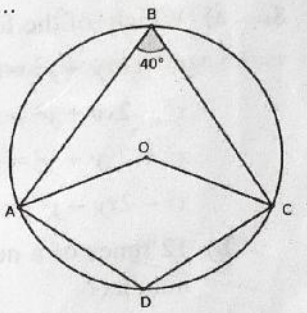
Time: 2½hours
Score : 80

Instructions

- Read the instructions before answering the questions
- Give explanations wherever necessary
- Simplifications using approximate values of $\sqrt{2}$, $\sqrt{3}$, π need to be done only if specifically asked.
- First 15 minutes time is cool – off time

Answer any 3 Questions from 1 to 4. Each question carries 2 scores. **(3 x 2 = 6)**

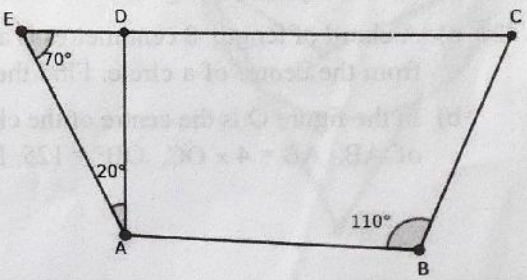
1. a) Which is the 100th term of the arithmetic sequence 1, 2, 3,...
   b) What is the position of 100 in the arithmetic sequence 2, 4, 6...
2. In the figure, O is the centre of the circle.
   A, B, C, and D are points on the circle and $\angle ABC = 40°$
   a) What is the measure of $\angle AOC$?
   b) What is the measure of $\angle ADC$?



3. A student is asked to say an one digit number.
   a) What is the probability of it being a multiple of 3?
   b) What is the probability of it being a perfect square?
4. a) The sum of a number and its square is 2. Which of the following is the algebraic form of this statement.
   $(x^2 + x = 2, x^2 - x = 2, x^2 + 2 = x, x^2 - 2 = x)$
   b) What is the number?

Answer any 4 Questions from 5 to 10. Each question carries 3 scores **(4 x 3 = 12)**

5. In the figure $\angle EAD = 20°$, $\angle E = 70°$, $\angle B = 110°$.
   a) Find the measure of $\angle ADC$.
   b) What is $\angle DAB + \angle BCD$?
   c) If a circle is drawn through A, B and C , which among the following is true
   - D is a point on the circle
   - E is a point on the circle



- E is a point inside the circle
- D is a point outside the circle

6. a) Find the value of $1 - \frac{1}{2}$

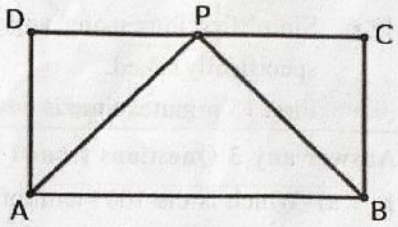
   b) Is the Sequence 1, $\frac{1}{2}$, $\frac{1}{3}$, ... (sequence of reciprocals of natural numbers) an arithmetic sequence.? Justify.

7. In the figure ABCD is a rectangle. P is the midpoint of DC. The area of the rectangle is 40 square centimetres.

   a) What is the area of triangle ABP?

   b) If a dot is put in the rectangle without looking, what is the probability that it would be in the triangle ABP?

   c) What is the probability that it would be in the triangle APD?



8. a) Which of the following is true ?

   $x^2 + 2xy - y^2 = (x - y)^2$

   $x^2 - 2xy + y^2 = (x - y)^2$

   $x^2 + 2xy + y^2 = (x - y)^2$

   $x^2 - 2xy - y^2 = (x - y)^2$

   b) 12 times of a number subtracted from the square of that number gives 13. What is the number?

9. Draw a triangle with two angles 30°, 75° and circum radius 4 centimetres.

10. a) $2\sqrt{3} + \sqrt{3} =$ _____

    b) Write the fourth term of the arithmetic sequence $1, 1 + \sqrt{3}, 1 + 2\sqrt{3}, \ldots\ldots$

    c) Write the common difference of this arithmetic sequence.

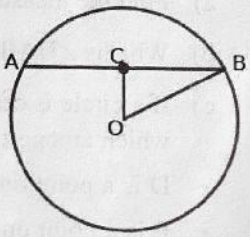
Answer any 8 Questions from 11 to 21. Each question carries 4 scores **(8 x 4 = 32)**

11. a) Draw a rectangle of length 5 centimetres and breadth 3 centimetres.

    b) Draw a square having the same area

12. a) A chord of length 8 centimetres is at a distance 3 centimetres from the centre of a circle. Find the radius of the circle.

    b) In the figure O is the centre of the circle and C is the midpoint of AB. $AB = 4 \times OC$, $OB^2 = 125$. Find the length of OC.



13. a) What is the common difference of the arithmetic sequence 15, 14, 13, ...?

    b) Find the 15th term of this sequence.

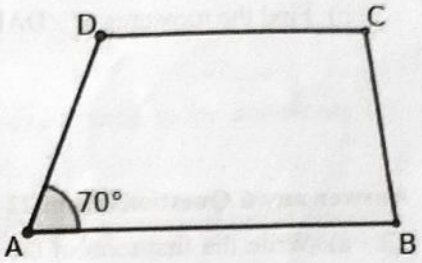
    c) Find the sum of first 31 terms of the arithmetic sequence 15, 14, 13,...

14. In a bag there are 4 red and 8 green beads. In another bag there are 5 red and 9 black beads.

    a) What is the probability of getting a green bead from the first bag?

    b) Probability of getting a red bead from which bag is more? Justify

15. In the figure, lines AB and DC are parallel. AD = BC and $\angle A = 70°$.



    a) What are the measures of $\angle B$ and $\angle D$?

    b) Is ABCD a cyclic quadrilateral? Justify.

16. a) Which is the decimal form of $\frac{1}{3}$?

    (0.111... ; 0.222... ; 0.333... ; 1.333...)

    b) Write the algebraic form of the arithmetic sequence 1.333..., 2.333..., 3.333.....

    c) Find the sum of first 21 terms of the arithmetic sequence 1.333..., 2.333..., 3.333.....

17. A box contains four paper slips numbered 1, 3, 6, and 9. Another box contains three paper slips numbered 1, 2, and 4. One paper slip is taken from each box.

    a) How many pairs of numbers are possible?

    b) What is the probability of both being even?

    c) What is the probability of one being even and the other odd?

    d) What is the probability of getting at least one even number?

18. a) Find the sum of first 20 odd numbers?

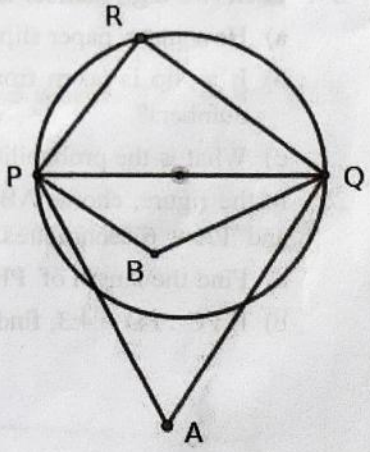
    b) Find the sum of first 20 even numbers?

    c) What is the sum of first 40 natural numbers?

    d) Find the sum of first 40 terms of the arithmetic sequence

    $\frac{1}{40}, \frac{2}{40}, \frac{3}{40}, \ldots\ldots$

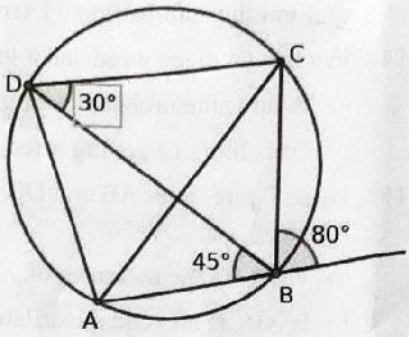
19. In the figure PQ is the diameter of the circle. R is a point on the circle. The measures of $\angle PQR$, $\angle A$, $\angle R$, $\angle B$ are in arithmetic sequence. One of the angles is 120°.



    Find the measures of $\angle PQR$, $\angle A$, $\angle R$, $\angle B$.

20. a) What is the remainder when 100 is divided by 7?
    b) Write the sequence of all three digit numbers which are the multiples of 7.
    c) How many multiples of 7 are there below 100?

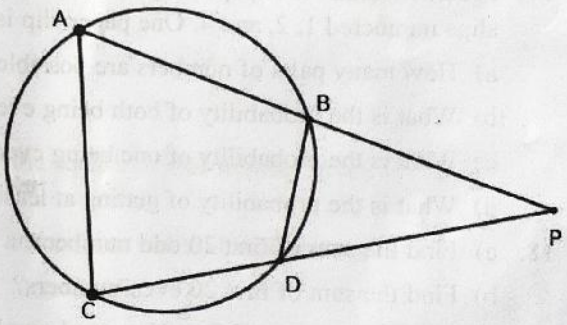
21. In the figure, ABCD is a cyclic quadrilateral.
    $\angle CBE = 80°$, $\angle BDC = 30°$, $\angle ABD = 45°$
    a) Find the measure of $\angle ABC$
    b) Find the measures of $\angle DAB$, $\angle DCB$?



Answer any 6 Questions from 22 to 29. Each question carries 5 scores **(6 x 5 = 30)**

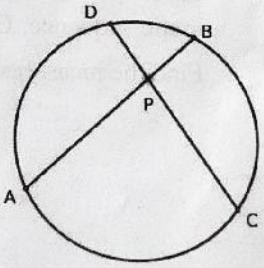
22. a) Write the first term of the arithmetic sequence $3n + 1$.
    b) Is 16 a term in this arithmetic sequence? Why?
    c) Prove that the squares of all terms of the sequence $3n + 1$ belongs to this arithmetic sequence.

23. In the figure, the chords AB and CD are extended to meet at P.
    a) If $\angle A = 70°$, $\angle C = 80°$, find the measures of $\angle P$ and $\angle PBD$
    b) If $\angle P = 30°$, and PB = PD, then what is the measure of $\angle A$?
    c) If PB = 3 centimeters, AB = 5 centimeters and PD = 4 centimeters, then find the length of the chord CD?



24. Each two digit number is written on paper slips and these are all put in a box.
    a) How many paper slips are there in the box?
    b) If a slip is taken from the box what is the probability that both the digits are prime numbers?
    c) What is the probability for the product of digits is a prime number?

25. In the figure, chords AB and CD meet at P. AB = 8 centimetres and PA = 6 centimetres.
    a) Find the length of PB
    b) If PC : PD = 4:3, find the length of CD.



26. The sum of n terms of an arithmetic sequence is $4n^2 + 2n$

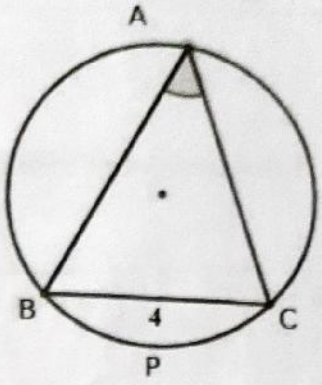
a) What is its common difference?

b) Write the second term of this arithmetic sequence?

c) Find the sum of first 25 terms of this arithmetic sequence?

d) Is the sum of some terms of this arithmetic sequence be 7321? Justify.

27. In the figure BC = 4 centimetres and the length of arc BPC is $\frac{1}{6}$ of the perimeter of the circle.



a) What is the central angle of arc BPC?

b) Find the measure of $\angle A$.

c) Find the radius of the circumcircle of the triangle ABC ?

28. A number pattern is given below

2

4 6

8 10 12

14 16 18 20

.....

.....

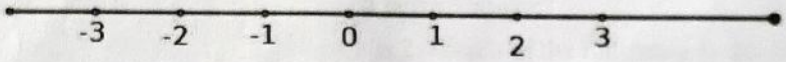
a) Write the numbers in the next line?

b) What is the first number in the 10^{th} line?

c) Find the sum of all numbers in the first 10 lines?

29. Read the given passage and answer the questions given below.

The following is a number line



The points on this line are represented by natural numbers , fractions, irrational numbers negatives of these numbers and zero. The distance between 3 and 0 is 3 and the distance between –2 and 0 is 2. In short, it is written as $|3| = 3$ and $|-2| = 2$. Similarly we can write $|4| = 4$ and $|-4| = -(-4) = 4$. If x is a positive number then $|x| = x$ and if , x is a negative number, then $|x| = -x$ and , $x = 0$, $|x| = 0$

1. $|5|$ = ...

2. $|4| + |-3|$ = ...

3. $|4 + (-3)|$ = ...

4. $|x| = 1$, $|y| = 3$, and $|x|$, $|y|$, $|z|$ are in arithmetic sequence . What are the numbers z ?