

ROLL NO. :

ARYABHATTA INTER - SCHOOL MATHS COMPETITION - 2000

SUMMER FIELDS SCHOOL (MIDDLE)

CLASS VIII

Time : 2½ Hrs.

M.M. : 100

GENERAL INSTRUCTIONS :

1. The participant should not write his / her name on the questionnaire.
2. Write your Roll No. on all pages of the paper.
3. All questions are compulsory.
4. Read your questions carefully. Think twice before you write the answer. Another copy of the questionnaire will not be provided.
5. Marks are indicated at the end of each question.
6. Do your rough work on the separate sheet supplied to you and pin up the same with the questionnaire.
7. The use of eraser is not allowed.

PART - I

Answer to Question Nos. 1, 2 and 3 are to be given in the space provided in the question.

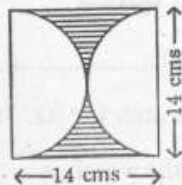
1. Fill in the blanks (10)
- (i) The number which is neutral to multiplication is
 - (ii) The sum of all integers from -50 to +50 is
 - (iii) $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3$ is
 - (iv) $n-2, n, n+2$ form prime triplets. So 'n' is
 - (v) 6, 12, 21, 33,,, 87 are in series.
 - (vi) The minimum number of acute angles that a triangle has
 - (vii) If $x * y = \sqrt[3]{x(y-2)}$
then $12 * 20 = \dots\dots\dots$
 - (viii) $\sqrt{248 + \sqrt{52 + \sqrt{144}}} = \dots\dots\dots$
 - (ix) Replace * in the number $13 * 60$ by the smallest digit so that the number has 3, 4, 5, 7, 9 and 11 as its factors.
The number is 1360.
 - (x) A man sold his watch for Rs. 75 and got a percentage of profit equal to the cost price.
The cost price of the watch is

2. State TRUE & FALSE. (10)

- (i) $\frac{2^0 \times 5^0 \times 8^0}{2^0 + 5^0 + 8^0} = 1$
- (ii) $(x^a)^{b \cdot c} \cdot (x^b)^{c \cdot a} \cdot (x^c)^{a \cdot b} = 0$
- (iii) If x is any point on the side BC of ΔABC then $2Ax > (AB + BC + CA)$
- (iv) The mean of upper and lower limits of a class interval is called class size
- (v) π is an irrational number
- (vi) Two quantities x and y vary (indirectly) (inversely) if the ratio $\frac{x}{y}$ remains constant
- (vii) The circumcentre and the incentre of a triangle coincide if the triangle is equilateral.....
- (viii) If $1 + \frac{x}{13} = \sqrt{\frac{169 + 27}{169}}$, then $x = 3$
- (ix) The point of intersection of non-parallel and non-concurrent four lines in a plane is 6
- (x) If V be the volume and S is the surface area of a cuboid of dimensions a, b, c , then is $\frac{1}{V} = \frac{2}{S} \left(\frac{a + b + c}{abc} \right)$

3. Tick against the correct answer :-

- (i) In a ΔABC , $AB = AC$ and $\angle A = 30^\circ$. Side BC is produced to D, then $\angle ACD$ is
 - (a) 90° (b) 105° (c) 115° (d) 125°
- (ii) Square root of 0.000001 is
 - (a) 0.1 (b) 0.01 (c) 0.001 (d) 0.0001
- (iii) The area of a circle is
 - (a) $\frac{\text{Circumference} \times 2 \text{ radius}}{\text{diameter}}$ (b) $\frac{\text{Circumference} \times \text{diameter}^2}{2 \text{ radius}}$
 - (c) $\frac{\text{Circumference} \times \text{radius}^2}{\text{diameter}}$ (d) None of these
- (iv) A cone and a hemisphere are standing on the opposite sides of a common base of radius 20 cms. The vertical angle of the cone is a right angle. The ratio of the volume of cone and hemisphere is
 - (a) 1 : 2 (b) 1 : 3 (c) 2 : 3 (d) 2 : 1
- (v) The area of the shaded portion is



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- (a) 21 cm^2 (b) 42 cm^2 (9) 84 cm^2 (d) None of these
- (vi) If the mean of five observations $x, x + 2, x + 4, x + 6$ and $x + 8$ is 11. Then the mean of first three observations is
- (a) 7 (b) 9 (c) 11 (d) 13
- (vii) If 45% of a number added to 11% of 200 is the number itself, then the number is
- (a) 30 (b) 35 (c) 40 (d) 45
- (viii) $9\sqrt{x} = \sqrt{12} + \sqrt{147}$, then x is
- (a) 2 (b) 3 (c) 4 (d) None of these
- (ix) If $\frac{4}{9}$ of a bucket is filled in 1 minute, then the rest of it will be filled in
- (a) 1 min (b) $\frac{9}{4}$ mins (c) $\frac{5}{9}$ mins (d) None of these
- (x) A sum of money doubles itself in 16 yrs and it will treble itself in
- (a) 24 yrs (b) 30 yrs (c) 32 yrs (d) None of these

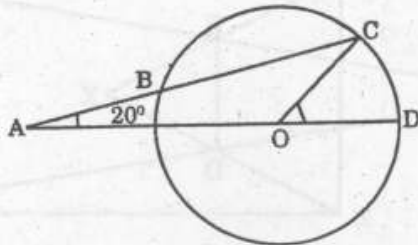
PART - II

Answer to question Nos. 4 to 10 are to be given in the space provided for their answers after question No. 10.

4. (a) Simplify :- (3)

$$1 + [3 - 1 + \{2 - 1 + (1 - \frac{1}{4})\} - 1]$$

- (b) In the adjacent figure $AB =$ radius of the circle and $\angle BAO = 20^\circ$ (3)
Calculate the measure of $\angle COD$

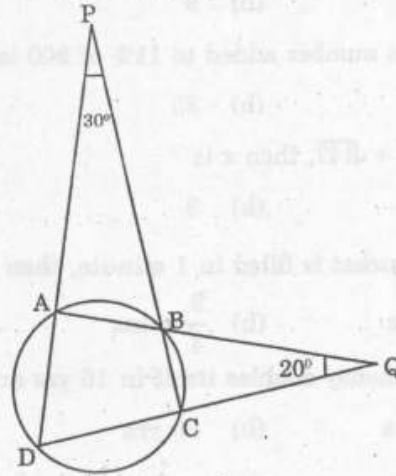


- (c) The partners Ram and Shyam together lend Rs. 13540 at 8% per annum compounded annually. The amount Ram gets at the end of three years is the same as Shyam gets after 5 yrs. Determine the share of each in the money lent. (4)
5. (a) In 1985, the population of a small village was 6000 and the land available for agriculture was 500 hectares. In 1995, the population became 9000 and the agricultural land utilized for housing and other development purposes was 100 hectares. Find the percentage decrease in agricultural land available per person. (4)

(b) Factorise $x^2 + \frac{1}{x^2} - 3$ (2)

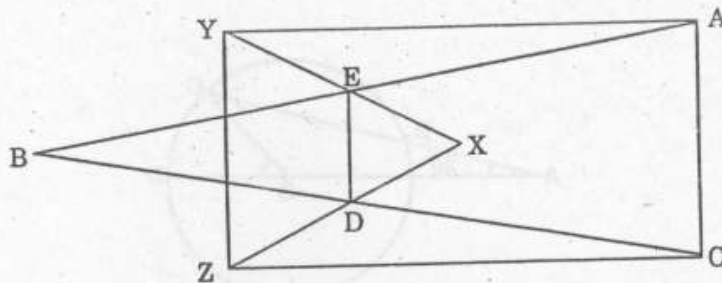
(c) ABCD is a cyclic quadrilateral as shown in the figure.

If $\angle P = 30^\circ$ and $\angle Q = 20^\circ$. Calculate the angles of cyclic quadrilateral ABCD. (4)



6. (a) Sita and Gita can embroider a saree in 10 days and 12 days respectively. Both of them start embroidering the saree together but after 3 days Gita falls sick. So the work was completed by Rita's help. Both Rita and Sita completed the embroidery in 3 days. How long will Rita take to complete the work alone. (5)

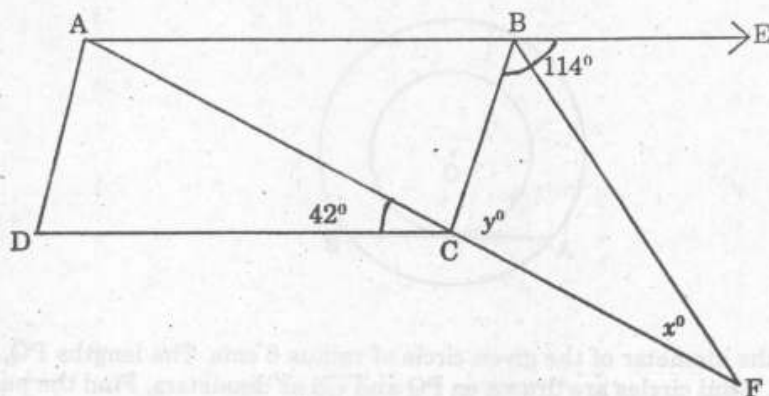
(b) In the given figure E is the midpoint of segment AB and XY. D is the midpoint of segment BC and XZ. Prove AC is parallel and equal to YZ. (3)



(c) Simplify: $\frac{3^{-4} - 5^{-4}}{3^{-2} - 5^{-2}}$ (2)

7. (a) There is a square field whose side is 44 cms. A square flower bed is prepared in its centre leaving a gravel path all round the flower bed. The total cost of laying the flower bed and gravelling the path at Rs. 2.75 and Rs. 1.50 per square meter respectively is Rs. 4904. Find the width of the gravel path. (5)

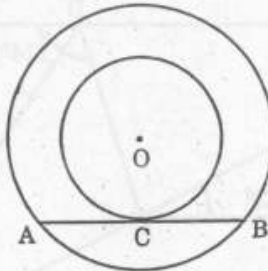
- (b) In the figure given below ABCD is a parallelogram. $BC = CF$, $\angle ACD = 42^\circ$, $\angle EBC = 114^\circ$. Find x° and y° . (3)



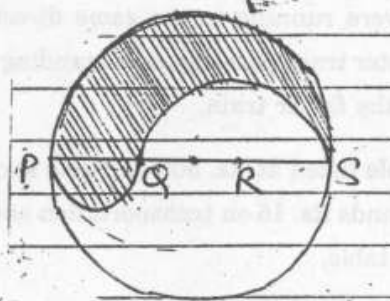
- (c) Factorise : $a^{4x} - b^{2y}$ (2)

8. (a) When two trains were running in the same direction at 80 Km/hr. and 60 Km/hr. respectively, the faster train passed a man standing in the slower train in 27 seconds. Find the length of the faster train. (3)
- (b) A dealer buys a table listed at Rs. 500 and gets successive discounts of 20% and 10% respectively. He spends Rs. 15 on transportation and sells it at a gain of 20%. Find the selling price of the table. (3)
- (c) Akshit bought 20 tables for Rs. 12,000 and sold them at a profit equal to the S.P. of 4 tables. Find the S.P. of 1 table. (4)
9. (a) A drum contains 20 liters of a mixture of alcohol and water. 40% of the mixture being alcohol. How much mixture should be removed and replaced by an equal volume of water so that the percentage of water in the resulting solution increases by 15%. (4)
- (b) The water bills (in rupees) of 32 houses in a certain locality for the period 1.12.99 to 31.12.99 are given below :
- | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 56, | 43, | 32, | 38, | 56, | 24, | 68, | 85, | 52, | 47, | 35 |
| 58, | 63, | 74, | 27, | 84, | 69, | 35, | 44, | 75, | 55, | 30, |
| 65, | 45, | 67, | 95, | 72, | 43, | 65, | 35, | 59, | 54 | |
- Tabulate the data and present the data as a cumulative frequency table using 70-79 as one of the class. (4)

- (c) A chord AB of the larger circle of the two concentric circles is a tangent to the smaller circle at C. Prove that C is the midpoint of chord AB. (2)



10. (a) PQRS is the diameter of the given circle of radius 6 cms. The lengths PQ, QR and RS are equal. Semi circles are drawn on PQ and QS as diameters. Find the perimeter and area of the shaded region. (5)



- (b) In the given figure find :

$$\angle A + \angle B + \angle C + \angle D + \angle E =$$

