

ROLL NO.....

ARYABHATTA INTER-SCHOOL MATHS COMPETITION 2005

SUMMER FIELDS SCHOOL (MIDDLE)
CLASS VIII

Time allowed : 2½ hrs.

M.M. : 100

GENERAL INSTRUCTIONS:

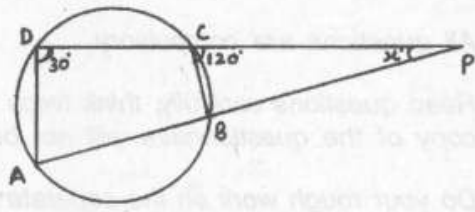
1. Participant should not write his/her name on the questionnaire.
2. Write your roll no. on each page of the questionnaire.
3. All questions are compulsory.
4. Read questions carefully, think twice before you write the answer. Another copy of the questionnaire will not be provided.
5. Do your rough work on the separate sheet supplied to you and pin up the same with the questionnaire.
6. Q. Nos. 1 to 3 carry 10 marks each.
Q. Nos. 4 to 13 carry 3 marks each and
Q. Nos. 14 to 23 carry 4 marks each.
7. Answers to Q. Nos. 1, 2 and 3 are to be given in the space provided with the questions.
8. Q. Nos. 4 to 23 are to be answered in the space provided after Q. No. 23.
9. Use of calculator is not allowed.

PART-I

1. Fill in the blanks :
 - (i) The next number in the series 1, 3, 9, 19, 33, is
 - (ii) If $a * b = a - b$, $x \oplus y = x^2 + xy + y^2$,
then $(4 * 2) (4 \oplus 2) = \dots\dots\dots$
 - (iii) 6, $3x + 1$, 15, $6x+7$ are in proportion then $x = \dots\dots\dots$
 - (iv) If $3^{-n+1} = \sqrt[4]{81^{-3}}$, then $2^{n-1} = \dots\dots\dots$

- (v) In $\triangle ABC$, $\angle B=90^\circ$, $AB=15$ cm, $BC = 20$ cm, then the radius of the circumcircle of $\triangle ABC$ is.....
- (vi) 15 dozen : scores = 9 : 7
- (vii) 20% of a number is smaller than 25% of the number by 10. The number is
- (viii) The difference between the smallest perfect square of four-digits and next perfect square is
- (ix) Coefficient of xy in $-3x^2y$ is

(x) In adjacent figure,
 $x =$



2. State True or False :
- (i) If $(a+b)^2 = 3ab$ then $a^3 - b^3 = 0$
 - (ii) If a, b, c form a pythagorean triplet, then na, nb, nc also form a pythagorean triplet.
 - (iii) Place value of 5 in 24.3572 is 500.
 - (iv) Every quadrilateral whose diagonals are equal, is a square.
 - (v) In $\triangle ABC$, $\angle B=90^\circ$ then B is the orthocentre of $\triangle ABC$.
 - (vi) If the height of a cylinder is doubled and its diameter is halved, then its curved surface area remains same.
 - (vii) HCF of two coprime numbers is always equal to their product.
 - (viii) x and y are consecutive natural numbers, then $x^2 - y^2 = x + y$.
 - (ix) Perimeters of a square and a circle are equal, then the area of the square is greater than the area of the circle.
 - (x) If b is mean proportional between a and c , then $a^2 + 2b^2 + c^2 = (a+c)^2$

3. Tick (✓) against the correct answer :

- (i) $\triangle ABC \cong \triangle QPR$, $\angle B=60^\circ$, $Q=75^\circ$ then $\angle R$ is
 (a) 60° (b) 45° (c) 135° (d) 175°
- (ii) $0.\bar{2} + 0.\bar{3} + 0.\bar{4} + 0.\bar{5}$ is equivalent to
 (a) $1.\bar{6}$ (b) $1.\bar{5}$ (c) $1.\bar{7}$ (d) 1.5
- (iii) Cube root of $\frac{0.216}{27}$ is
 (a) 0.2 (b) 0.02 (c) 0.002 (d) 0.06
- (iv) The number of 4-digit numbers formed by the digits 5, 6, 6, 0 is
 (a) 8 (b) 9 (c) 10 (d) none of the above
- (v) In $\triangle ABC$, the medians AD and BE intersect in O and $AO = 5$ cm, then OD is equal to
 (a) 7.5 cm (b) 5 cm (c) 2.5 cm (d) 10 cm
- (vi) The number of triangles formed by joining 5 points (no three of them are collinear) is
 (a) 10 (b) 9 (c) 8 (d) None of the above
- (vii) The sum of all two digit numbers that give a remainder 3, when divided by 7 is
 (a) 656 (b) 684 (c) 687 (d) 676
- (viii) The mean of 9 observations is 13. The mean of first 5 observations is 11 and the mean of last 5 observations is 14, then 5th observation is
 (a) 11 (b) 12 (c) 8 (d) 13
- (ix) An angle is 20° less than $\frac{1}{3}$ rd of its supplement. The angle is equal to
 (a) 120° (b) 30° (c) 60° (d) 150°
- (x) Three bells begin tolling at the same time and they toll at intervals 21 sec., 28 sec. and 30 sec. respectively. The bells will toll together again after
 (a) 3 min. (b) 7 min. (c) 15 min. (d) 14 min.

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14. Prove that

$$(a+b+c) [(a-b)^2 + (b-c)^2 + (c-a)^2] = (a+b)^3 + (b+c)^3 + (c+a)^3 - 3(a+b)(b+c)(c+a)$$

15. A shopkeeper sells an article at a loss of 12.5%. Had he sold that article for Rs. 51.80 more, he would have earned a profit of 6%. Find the cost price of that article.

16. Three horses are tied with ropes of 7 m length each at three corners of a triangular field whose sides are 40m, 45m and 60m. Find the area of the field grazed by the horses.

17. A 100m long train passed a man walking along the track in the direction of the train at 6 kmph in 10 seconds. Find the speed of the train.

18. In $\triangle ABC$, $AB = AC$, Prove that the median $BE =$ median CF .

19. $OABC$ is a rhombus whose three vertices A , B and C lie on a circle with centre O . If the radius of the circle is 20 cm, Find the area of the rhombus $OABC$.

20. In $\triangle ABC$, AD and BE are the medians of $\triangle ABC$. F is a point on AC such that $DF \parallel BE$. Prove that $CF = \frac{1}{4} BC$.

21. Find the volume of a cube whose base is a square of perimeter equal to the circumference of a circle of area 154 cm^2 .

22. From a circular cylinder of base diameter 10 cm and height 12 cm, the largest cone is carved out. Find the volume and the whole surface area of the remaining solid.

23. Marks obtained by a group of 30 students in a test are given below :

62, 57, 35, 40, 42, 39, 59, 80, 84, 73, 38, 58, 60, 38, 71, 83, 45, 38, 72, 65, 80, 54, 77, 40, 32, 39, 50, 44, 40, 76.

Prepare a cumulative frequency table of class size 12 and with one of class interval whose class mark is 54.