



**27<sup>th</sup> ARYABHATTA INTER-SCHOOL MATHEMATICS COMPETITION – 2010**  
**CLASS = VIII**

**Time Allowed:**  $2\frac{1}{2}$  Hours

**Max. Marks:** 100

**Roll No. of the Participant:** \_\_\_\_\_

**GENERAL INSTRUCTIONS :**

- Participant should not write his/her name on the questionnaire.
- Write your roll no. on each page of the questionnaire.
- All the questions are compulsory.
- Read questions carefully; think twice before you write the answer. Another copy of the questionnaire will not be provided.
- Do your rough work on the separate sheet supplied to you and attach the same with the questionnaire.
- Q. Nos. 1 and 2 carry 15 marks each.  
Q. Nos. 3 carries 10 marks.  
Q. Nos. 4 to 13 carry 3 marks each and  
Q. Nos. 14 to 19 carry 5 marks each.
- Answer to Q. Nos. 1, 2 and 3 are to be given in the space provided with the questions.
- Q. Nos. 4 to 19 are to be answered in the space provided after Q. No. 19.
- Use of calculator is not allowed.

**SECTION -A**

- Fill in the blanks.
  - If there are 12 one rupee stamps in a dozen then the number of two rupees stamps in a dozen is \_\_\_\_\_.
  - $0.34\overline{67} + 0.13\overline{33} =$  \_\_\_\_\_.
  - If  $a + b = 2$  and  $ab = 1$  then  $a^3 + b^3 =$  \_\_\_\_\_.
  - $(2a - b - c)^3 + (2b - a - c)^3 + (2c - a - b)^3 =$  \_\_\_\_\_.
  - Two \_\_\_\_\_ planes do not intersect.
  - The maximum number of point of intersection of four lines is \_\_\_\_\_.
  - The radius of a circle circumscribing a right angled triangle having dimension 6cms, 8cms and 10cms is \_\_\_\_\_.

- viii. A 20m high pole casts a 5m long shadow. The length of the shadow of the building at that instance is 20m, the height of the building is \_\_\_\_\_.
- ix. The mean of 5 numbers is 18. If one number is excluded, their mean is 16. The excluded number is \_\_\_\_\_.
- x. The unit digit of the number  $(1992)^{1991}$  is \_\_\_\_\_.
- xi. Number of times the minute and hour hands of a clock cross each other in 12 hours is \_\_\_\_\_.
- xii. The number which is nine times the sum of its digits is \_\_\_\_\_.
- xiii. Pipes A and B can fill a tank in 10 hrs and 15 hrs respectively. Both together can fill it in \_\_\_\_\_ hrs.
- xiv. In triangle ABC, AD is the median from A to BC and G is the centroid of triangle. If  $AD = 6$  cms. The length of AG = \_\_\_\_\_.
- xv. Diagonal of a cuboid is given by \_\_\_\_\_.

2). Tick against the correct answer.

i. If  $2.5x = 0.5y$ , then  $\frac{x+y}{x-y} =$

- a) -1.3                  b) -1.5                  c) 1.5                  d) none of these

ii. If  $\sqrt{0.9 \times 0.09 \times x} = 0.9 \times 0.09 \sqrt{z}$  then the value of  $\frac{x}{z}$  is

- a) 0.081                  b) 0.810                  c) 0.81                  d) 8.09

iii. The traffic light at different road crossings changes after every 48sec, 72sec and 108sec respectively. If all change simultaneously at 8:20 hrs, At what time will they again change at the same instant.

- a) 8:25:10                  b) 8:27:12                  c) 8:26:07                  d) none of these

iv. In  $n$  is divided by 4, the remainder is 3. The remainder when  $2n$  is divided by 4 is

- a) 0                  b) 2                  c) 6                  d) 3

v. A's salary is half that of B. If A got a 50% rise in his salary and B got a 25% rise in his salary, then the percentage increase in combined salaries of both is

- a) 25                  b)  $33\frac{1}{3}$                   c) 75                  d) none of these

- vi. If  $3^{x^2-6x+12} = 27$ , then  $x =$
- a) 3                                      b) 1                                      c) 2                                      d) none of these
- vii. If every side of the triangle is doubled then increase in area of the triangle is
- a) 300%                                      b) 275%                                      c) 200%                                      d) 100%
- viii. The point of intersection of the altitudes of the triangle is called its
- a) incentre                                      b) circumcentre                                      c) orthocentre                                      d) centroid
- ix. The difference between the exterior and interior angle of a regular polygon is  $60^\circ$ . The number of sides of the polygon is
- a) 4                                      b) 5                                      c) 6                                      d) 8
- x. Any cyclic parallelogram is a
- a) rhombus                                      b) trapezium                                      c) quadrilateral                                      d) rectangle
- xi.  $\sqrt{2x^2-1+2x\sqrt{x^2-1}}$  is equal to
- a)  $x-\sqrt{x^2-1}$                                       b)  $x+\sqrt{x^2-1}$                                       c)  $x+\sqrt{x^2+1}$                                       d)  $x-\sqrt{x^2+1}$
- xii. Of all quadrilaterals of a given perimeter, which has the largest area?
- a) Square                                      b) Rectangle                                      c) Parallelogram                                      d) Rhombus
- xiii. If PL, QM, and RN are the altitudes of triangle PQR whose orthocenter is O, then P is orthocentre of
- a)  $\Delta PQO$                                       b)  $\Delta PQL$                                       c)  $\Delta QLO$                                       d)  $\Delta QRO$
- xiv. If  $x : y = 2 : 3$  and  $y : z = 4 : 5$  then  $x : z$  will be
- a) 2:5                                      b) 3:5                                      c) 10:12                                      d) 8:15
- xv. If ' $\div$ ' means '-', '-' means ' $\times$ ', ' $\times$ ' means '+', and '+' means ' $\div$ ', then  $20 \times 60 \div 40 - 20 + 10 =$
- a) 40                                      b) 80                                      c) 0                                      d) 60

3). State true or false.

- i. Of three numbers, the first is twice the second and thrice the third, the average of all the three numbers is 88, the smallest number is 48. \_\_\_\_\_

- ii. Two similar triangles are always congruent. \_\_\_\_\_
- iii.  $x^4 + x^2y^2 + y^4 = (x^2 - xy + y^2)(x^2 + xy + y^2)$ . \_\_\_\_\_
- iv. The orthocentre of a triangle always lies in the interior of triangle. \_\_\_\_\_
- v. A can do a work in 9 days. If B is 50% more efficient than A, then B alone can do the same work in 6 days. \_\_\_\_\_
- vi.  $8^{-1} + 1^{-1} = (8+1)^{-1}$ . \_\_\_\_\_
- vii. Three non collinear points determine a plane. \_\_\_\_\_
- viii. The incentre of a triangle is equidistant from its vertices. \_\_\_\_\_
- ix. Two triangles having equal area will be congruent to each other. \_\_\_\_\_
- x. A line drawn parallel to one side of a triangle divides the other two sides of the triangle in the same ratio. \_\_\_\_\_

**SECTION - B**

- 4) Prove that the perimeter of a triangle is greater than the sum of its three medians.
- 5) A 100m long goods train, passed a man walking along the railway track in the direction of the train at 6kmph, in 10 seconds. Find the speed of the train.
- 6) The difference between compound and the simple interest on a certain sum of money for two years at 4% is Rs 20. Find the sum.
- 7) A sphere and a cube have the same surface area. Show that ratio of volume of sphere to that of cube  $\sqrt{6} : \sqrt{\pi}$ .
- 8) Simplify:  
$$\frac{1}{x+a} + \frac{1}{x+b} + \frac{1}{x+c} + \frac{ax}{x^3+ax^2} + \frac{bx}{x^3+bx^2} + \frac{cx}{x^3+cx^2}$$
- 9) Find x if  $\frac{x^3+3x}{3x^2+1} = \frac{14}{13}$ .
- 10) In parallelogram ABCD, E is the mid point of AB and CE bisects  $\angle BCD$ . Prove that  $AD = \frac{1}{2}CD$ .
- 11) The following are the weight (in kg) of 12 boys in the class : 48.2, 50, 44.5, 49.3, 50.4, 45, 51, 42, 46.8, 48.4, 52, 50.8.  
a) Find the mean weight.

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- b) What will be the mean weight if the teacher whose weight is 71.6kg is also included?  
c) One of the boys leaves the class. What will be the mean of the remaining boys if the weight of that boy is 49.3kg?

- 12) The perimeter of a sector of a circle of radius 4.3cm is 18.6cm. Find the area of the sector.  
13) If the altitudes from the two vertices of a triangle to opposite sides are equal. Prove that the triangle is isosceles.

**SECTION – C**

- 14) In a  $\Delta ABC$ ,  $\angle B = 2\angle C$ . D is a point on side BC such that AD bisects  $\angle BAC$  and  $AB = CD$ .  
Prove that  $\angle BAC = \left(\frac{4}{5}\right)^{th}$  of a right angle.  
15) Find real value of  $x$  and  $y$  for which  $(2x - 3y - 13)^2 + (3x + 5y + 9)^2 = 0$ .  
16) From a right circular cylinder of 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.  
17) Two poles of height  $a$  and  $b$  meters ( $b > a$ ), are  $c$  meters apart. Find the height (in meters) of the point of intersection of the line joining the top of each pole to the foot of the opposite pole.  
18) The parallel sides of the trapezium are 75m and 59m and each of the non parallel sides are 10m. Find its area.  
19) A reduction of 25% in the price of the eggs will enable me to buy 4 dozens more eggs for Rs 96. I want to buy 100 more eggs at the reduced price. How much more money will I have to pay?

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***Space for writing the answers from Q. Nos. 4 to 19:-***

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