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ARYABHATTA INTER-SCHOOL MATHS COMPETITION 2007

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 all pages of the paper.
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. 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. Use of eraser is not allowed.

PART A

Answers to question Number 1, 2 and 3 are to be given in the space provided in the questions. 10

1. Fill in the blanks:

(i) The average of two numbers is x y. If the first number is y, then other number is.....

(ii) The average of $\sqrt{.64}$, .85 and $\frac{9}{10}$ is.....

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(iii) A number P equals $\frac{3}{2}$ the average of 10, 12 and q. Then q in terms of P is .....

(iv) If $x^4 = 16$ and $y^2 = 36$, then the maximum possible value for $x - y$ is .....

(v) Three times the first of three consecutive odd integers is 3 more than twice the third. Then third integer is.....

(vi) If the radius of a circle is decreased by 10%. Then decrease in area percentage is.....

(vii) The square root of $(x^2 + 2x + 1)(x^2 - 6x + 9)$ is.....

(viii) The reaction times of an individual to certain injection were found to be 0.53, 0.46, 0.50, 0.49, 0.52, 0.53, 0.44 and 0.55 second respectively. Then mean reaction time of the individual to the injection is.....

(ix) The mean of first five prime numbers is.....

(x) Find the missing numbers in the series:
2, 9, 28, ...,.....217.

2. State True of False:

(i) The area of a pasallelogram PQRS is K cm² and T is a point on QR Such that QT = $\frac{1}{4}$ QR, then area of △ PQT is equal to $\frac{K}{8}$cm².....

(ii) If $2^x = a$, $3^x = b$ and $62^x = c$, then $C = a^2b^2$.....

(iii) $2 + \frac{1}{2 + \frac{1}{2}} = \frac{5}{12}$ .....

(iv) $(x + 5)^2 - (x + 1)^2$ is a multiple of 8 where x is a natural number.....

(v) If A : B = 7 : 9 and B : C = 3 : 5, then A : B : C = 7 : 9 : 5 .....
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(vi) The Orthocentre of a triangle always lies inside it.....

(vii) The difference between the squares of two consecutive numbers is always the sum of the numbers.....

(viii) The numbers which are neither prime nor composite are –1, 0, +1. .....

(ix) The sum of the digits of a number is subtracted from the number. The resulting number is always divisible by 9. .....

(x) Zero has no reciprcal in the set of fractional numbers.....

3. **Tick (√) against the correct answer:**

(i) Garima travels a cestain distance at the speed of 20 Km per hour and returns to the same point at the speed of 30 Km per hour. Her average speed for both the trips will be

(a) 25 Km an hour

(b) 24 Km an hour

(c) 22 Km an hour

(d) $27\frac{1}{2}$ Km an hour

(ii) A truck can run 10 Km in a litre of diesel oil. If a new carburator is attached to the truck, it will use $(5/6)^{th}$ of diesel. The number of kms which truck can go in a litre of diesel with new carburator will be

(a) 11

(b) $8\frac{1}{3}$

(c) 12

(d) $10\frac{2}{3}$

(iii) A sum of money on simple interest becomes double in 12½ years. It becomes five times in

(a) $62\frac{1}{2}$ years

(b) 50 years

(c) $31\frac{1}{4}$ years

(d) 60 years

(iv) AB is a diameter of a circle and C is any point on the circumference of the circle. Then

(a) The perimeter of △ ABC is minimum when it is isosceles.

(b) The area of △ ABC is minimum when it is isosceles.

(c) The area of △ ABC is maximum when it is isosceles.

(d) None of these

(v) The perimeter of a rectangle is 30 Cm. Its area will be maximum when its sides are

(a) 8 Cm, 7 Cm.

(b) 7.5 Cm, 7.5 Cm.

(d) 10 Cm, 5 Cm.

(e) 9 Cm, 6 Cm.

(vi) Two towns A and B are 60 Km apart. A school is to be built to serve 150 students in town A and 50 students in town B. If the total distance to be travelled by all 200 students is to be as small as possible, then the school should be built at

(a) town A

(b) 45 Km from town A

(c) town B

(d) 45 Km from town B.

(vii) If $x = \frac{2}{1+t^2}$, $y = \frac{1-t^2}{1+t^2}$ then the value of $x^2 + y^2$ is

(a) t^2

(b) 1

(c) 0

(d) t^4

(viii) If $x - \frac{1}{x} = \frac{1}{2}$, then $4x^2 + \frac{4}{x^2}$ is

(a) –7

(b) 7

(c) 9

(d) –9

(ix) A litre of water evaporated from 6 litres of sugar solution containing 8% of sugar. The sugar contents in the remaining solution are

(a) $2\frac{4}{5}\%$

(b) $8\frac{1}{5}\%$

(c) $9\frac{3}{5}\%$

(d) $6\frac{3}{5}\%$

(x) One side of a right angled triangles is 126 Cm. The difference between the hypotenuse and the other side is 42 Cm. The length of the hypotenuse is

(a) 168 Cm

(b) 189 Cm

(c) 210 Cm

(d) 378 Cm

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4. (i) Two pipes A and B are attached to a cistern. Pipe A can fill the cistern in 4 hours while pipe B is a waste pipe which can empty it in 6 hours. Whenboth the pipes are opened together, then in how much time the cistern will be filled completely. 3

(ii) Three bottles are filled with a mixture of milk and water. The ratio of milk to water in different bottles is 5 : 4, 6 : 5 and 8 : 7 respectively. If the contents of three bottles are poured into a single vessel the what will be ratio of milk to the water. 3

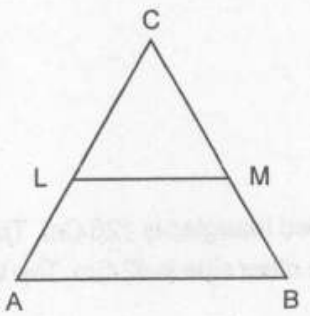
(iii) The diameter of a sphere is decreased by 25% by what percent does its surface area decrease ? 3

5. (i) A dome of a building is in the form of a hemisphere. Total cost of getting it white washed inside it, is Rs. 498.96. If the rate of white washing is Rs. 2.00 per square metre, find the

(i) inside surface area of the dome.

(ii) Volume of the air inside the dome. 3

(ii) In the following fig. LM||AB. If AL = $x - 3$, AC = $2x$, BM = $x - 2$, BC = $2x + 3$, find the value of x.



(iii) A Circle is divided into three parts in the ratio 3 : 4 : 5. Find the angles of the triangle formed by joining the points of division.

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6. (i) Dinesh bought 16 dozen ball pens and sold them at a loss equal to S.P. of 8 ball pens

Find (a) his loss percent

(b) S.P. of 1 dozen ball pens, if he purchased these 16 dozen ball pens for Rs. 576.

3

(ii) The sum of the ages of father and son is 50 years. When the son will attain the father's present age then the sum of their ages will be 102 years. Find the present age of father and son.

3

(iii) If 20 men working 12 hours a day can complete a piece of work in 60 days. How many men can complete the same work in 90 days working 8 hours a day.

3

(iv) The mean income of a group of 50 persons working in a factory is calculated to be Rs. 169. It was later discovered that one figure was wrongly taken as 134 instead of the correct value 143. Find the correct mean income.

3

7. (i) A dealer buys 30 chairs, all at the same price. He sells 20 of them at a profit of 16% and sells the remaining 10 at a loss of 4%. Find his profit or loss percent in the deal.

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(ii) The difference of compound and simple interests on a certain sum of money for 2 years at 4 % is Rs. 20. Find the sum.

4

(iii) The internal length, breadth and height of an open box are 95 Cm, 75 Cm and 97.5 Cm respectively. If the wood is 25 mm thick, calculate the cost of painting the outside of the box (the bottom is not to painted) at 50 paise per sq. cm.

4

8. (i) The volumes of two spheres are in the ratio 64 : 27. Find the difference of their surface areas, if the sum of their radii is 7 Cm.

4

(ii) Two circles of radii 10 cm and 8 cm intersect and the length of the common chord is 12 cm. Find the distance between their centres.

4

(iii) AB and CD are two chords of a circle such that AB = 6 cm, CD = 12 cm and ABIICD. If the distance between AB and CD is 3 cm, find the radius of the circle.

4

9. (i) Let x be any point on the side BC of a triangle ABC. If XM, XN are drawnparalled to BA and CA meeting CA, BA in M, N respectively, MN meets CB produced in T, Prove that $TX^2 = TB.TC$.

4

(ii) A lady went for shopping and spent half of what she had on buying hankies and gave a rupee to a begger waiting outside the shop. She spent half of what was left, on lunch and followed that up with a two rupee tip. She spent half of the remaining amount on a book and three rupees on bus fare. When she reached home, she found that she had exatly one rupee left. How much money did she start with?

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(iii) Divide $x^{4a} + x^{2a} y^{2b} + y^{4b}$
by $x^{2a} + x^a y^b + y^{2b}$

4

(iv) A sold a cycle to B and earns 10% profit. B sold it to C at a profit of 15% and C sold it to D earning a profit of 25%. Find the amount paid for cycle by A if D paid Rs. 1256 for it.

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