ARYABHATTA INTER-SCHOOL MATHS COMPETITION-2001

SUMMER FIELDS SCHOOL (MIDDLE)
CLASS VIII

Time Allowed : $2\frac{1}{2}$ Hrs.   M. M. 100

GENERAL INSTRUCTIONS:

1. *Participants 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-I

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

1. Fill in the blanks:

   (i) $1 - 2 + 3 - 4 + \ldots\ldots\ldots\ldots\ldots - 16 + 17 = \ldots\ldots\ldots\ldots\ldots$

   (ii) $\ldots\ldots\ldots\ldots\ldots$ is the four digit number using the digits 3, 4, 5 and 6 without repetition which is divisible by 66.

   (iii) Pairs of prime numbers which differ by 2 are called$\ldots\ldots\ldots\ldots$ primes.

   (iv) $\left(p^a - \dfrac{1}{p^a} \right)\left(p^{2a} + \dfrac{1}{p^{2a}} + 1 \right) = \ldots\ldots\ldots\ldots\ldots$

(v) If ＊ is an operation such that $a ＊ b = a^2 - 2ab + b^2$ then $3 ＊ (-4)$ is.................. .

(vi) Difference of the squares of two consecutive natural numbers is equal to their ....

(vii) If $2^y = 0.125$ then $y = $ ....

(viii) In an...................... triangle, the controid, the ortho centre, the circum-centre and the incentre all lie on the median to the base.

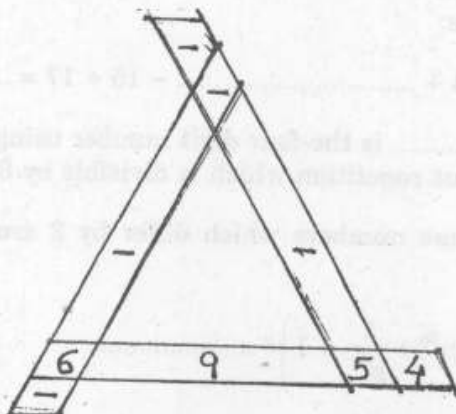(ix) In the following figure

$AB \parallel CD \parallel EF$
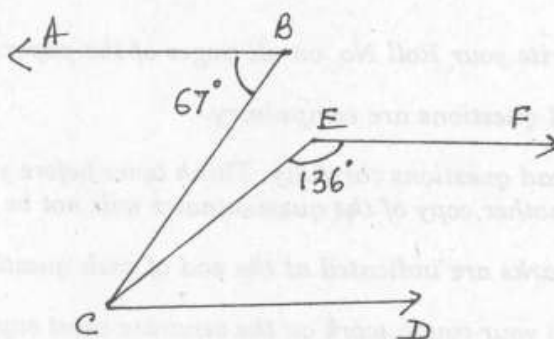

$m\,(\angle ABC) = 67°$

$m \angle (CEF) = 136°$

then $m\,(\angle BCE) = $ ....

(x) In the figure given below. Using digits from 2 to 10 without repitition, obtain a total of 24 from every side.

2. State True or False

(i) The sum of the opposites of two integers equals the opposite of their sum ....

(ii) The orthocentre of an equilateral triangle bisects its altitude ....

(iii) $\sqrt{\sqrt{16}} + \sqrt{25}$ is an irrational number ....

(iv) There cannot be a horizontal line in a vertical plane ....

(v) 9 is the smallest odd composite number. ....

(vi) The two tangents drawn to a circle from an external point are equally inclined to the line joining the point to the centre of the circle. ....

(vii) $2^{n+1} \cdot \dfrac{1}{2} \cdot 8^2 = 128$, then $n = 2$.. .

(viii) The product of four consecutive numbers is always divisible by 24 ....

(ix) If $x + y = 6$, $x^2 + y^2 = 20$, then $xy = 10$.. .

(x) In the given figure.
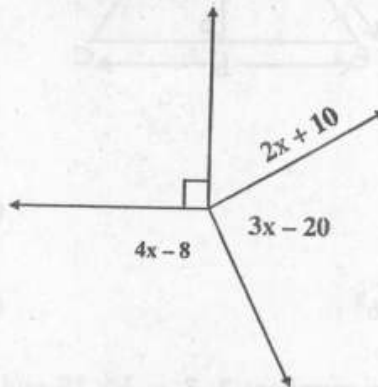
Then $x = 35°$ ....

3. Tick (√) against the correct answer.

(i) The maximum number of intersection of 5 lines in a plane are

(a) 6   (b) 8

(c) 10   (d) None of these.

(ii) 0.08 is equal to

(a) 80%

(b) 8%

(c) 0.8%

(d) 0.08%

(iii) The sum of any ten consecutive integers is always divisible by

(a) 4

(b) 5

(c) 10

(d) 20

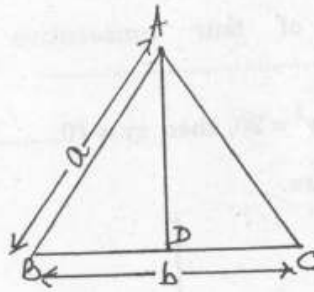(iv) If the radius of a sphere be doubled, then its volume will be

(a) doubled

(b) tripled

(c) four times

(d) eight times.

(v) Area of an isoseeles triangle ABC when $AB = AC = a$ and $BC = b$ is

(a) $\frac{1}{2} ab$

(b) $\frac{1}{4} b \sqrt{a^2 - b^2}$

(c) $\frac{1}{4} b \sqrt{4a^2 - b^2}$

(d) $\frac{1}{4} b \sqrt{a^2 - 4b^2}$

(vi) The mean of six numbers 3, 7, x, 10, 15 and 5 is 8, then x is

(a) 4

(b) 6

(c) 8

(d) 12.

(vii) The area of a square with diagonal $\sqrt{128}$ is

(a) 128 cm^2

(b) $8\sqrt{2}$ cm^2

(c) 64 cm^2

(d) 16 cm^2

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(viii) The value of $(1.425 \times 1.425 - 2 \times 1.425 \times 0.325 + 0.325 \times 0.325)$ is

(a) 1.21

(b) 2.44

(c) 2.650

(d) None of these.

(ix) Two men take 8 days to complete a work. If one of them does it in 12 days alone, then the other one will do it alone in

(a) 4 days

(b) 16 days

(c) 20 days

(c) 24 days.

(x) If V and C stand respectively for the volume and curved surface area of a cylinder with base of radius r, then

(a) $VC = \pi r$

(b) $2V = Cr$

(c) $2C = Vr$

(d) $2r = V.C.$

PART — II

Note : Answer to Q. Nos. 4, 5, 6, 7, 8 and 9 are to be given in the space provided from page 8 onwards.

4. (a) Simplify:

$$\left(1 + \frac{1}{2}x + \sqrt{2}\,x^2\right) + \left(5 - \frac{2}{3}x + \sqrt{2}\,x^2\right)$$ (3)

(b) Divide Rs. 3600 among A, B and C such that A's share : B's share; C's share

$$= \frac{1}{3} : \frac{1}{4} : \frac{1}{6}$$ (3)

(c) Divide Rs. 9000 into two parts so that the Simple Interest on the first part for 3 yrs at 12% per annum may be equal to the simple interest on the second part for 4.5 yrs at 16% per annum.   (4)

5. (a) There are books numbered from 1 to 160. Ramesh reads every fourth book. Vikram reads every eighth book and Kamlesh reads every twentieth book.

(i) Find the number of the books which are read by all of them.

(ii) Find the number of books which are not read by any one of them. (4)

(b) Factorise:—

$$4x^2 + \frac{1}{x^2} - 8$$

(3)

(c) A shopkeeper bought 16 dozen pens and sold them by and by. Due to a calculation mistake in fixing the selling price, he lost an amount equal to the S.P. of 4 dozen pens. Find his loss %. Find the S.P. of one dozen pens if he purchased these 16 dozen pens for Rs. 240. (5)

6. (a) A certain sum of money at compound interest becomes Rs. 2205 in 2 yrs and Rs. 2315.25 in 3 yrs. Find the rate of interest per cent per annum and Principal. (5)

(b) If $x^2 + \frac{1}{x^2} = 7$ find the value of $x^3 + \frac{1}{x^3}$. (4)

(c) In the given figure $\overline{PR} \parallel \overline{QS}$ and $\overline{QS} \perp \overline{PQ}$. PS and $\overline{RQ}$ intersect at L. $\overline{LM} \perp PQ$. If $PL = 4.6$ cms, $LS = 6.9$ cms. and $LQ = 2.7$ cms. Find the length of $\overline{RL}$, giving reason. (3)
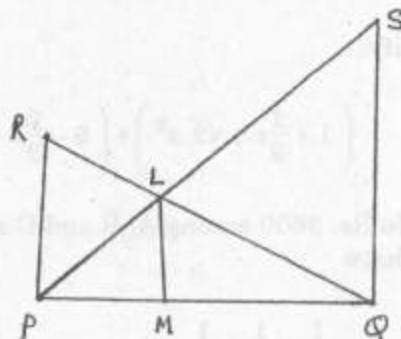
7. (a) An alloy of copper and zinc weighs 40 gms in air and 34 gms in water. If copper loses one eighth of its weight and zinc loses one sixth of its weight when completely immersed in water. Calculate the weight of copper in the alloy. (4)

(b) The height (in cms) of 35 persons are given below : 162, 160, 168, 173, 170, 162, 152, 154, 160, 157, 159, 151, 159, 164, 165, 166, 165, 164, 169, 172, 150, 159, 164, 165, 166, 170, 179, 165, 167, 165, 167, 166, 164, 169, 172.

(i) Prepare a frequency table with class interval of size 5.

(ii) What is the height (in cms) of majority of persons. (5)

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(iii) Find Range and class Mark.

(c) In the given figure $\overline{AB}$ is a diameter of the circle. ST is a tangent at P. O is the centre of the circle. If $m\,(\angle SPA) = 70°$. Calculate $m(\angle BAP)$ and $m\,(\angle BTP)$, giving reason. (3)
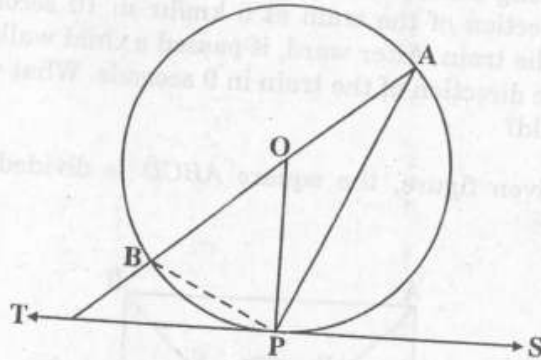
8. (a) In the given figure $OA \parallel CB$. COD is the diameter of the circle and $m\,(\angle OCB) = 64°$. Find the measurement of $\angle DBA$.
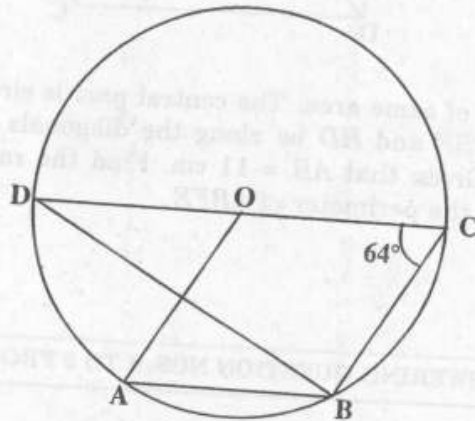

(b) The sum of length, breadth and depth of a cuboid is 19 cm and the length of its diagonal is 11 cm. Find the surfae area of the cuboid. (4)

(c) A school has a circular playground. A wading pool in the shape of a rhombus is to be made inside the playground using maximum area. The shorter diagonal of the rhombus in 12m. The radius of the circular playground is 8 meter. Find the area of the playground left for playing. (5)

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9. (a) Simplyfy:

$$\frac{(7.5)^3 + (2.2)^3 + (0.2)^3 - 3 \cdot (7.5) \cdot (2.2) \cdot (0.3)}{(7.5)^2 + (2.2)^2 + (0.3)^2 - (7.5)(2.2) - (2.2)(0.3) - (0.3)(7.5)}$$ (3)

(b) A 100 m long train passed a man walking along the railway line in the direction of the train at 6 km/hr in 10 seconds. Find the speed of the train. After ward, it passed a child walking along the line in the direction of the train in 9 seconds. What was the speed of the child? (4)

(c) In the given figure, the square ABCD is divided into 5 equal
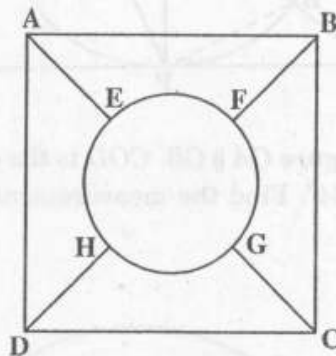
parts, all of same area. The central part is circular and the lines AE, CG, BF and HD be along the diagonals AC and BD of the square. Given that AB = 11 cm. Find the radius of the central part and the perimeter of ABFE.

SPACE FOR ANSWERING QUESTION NOS. 4 TO 9 FROM HERE ONWARDS