



## MATHS

### BOOKS - ICSE

### ICSE EXAMINATION PAPER 2020

#### Section A

1. Rationalize the denominator and simplify to find the value of

$$\frac{4}{\sqrt{5} + \sqrt{3}}$$

(Given :  $\sqrt{5} = 2.236$  and  $\sqrt{3} = 1.732$ )



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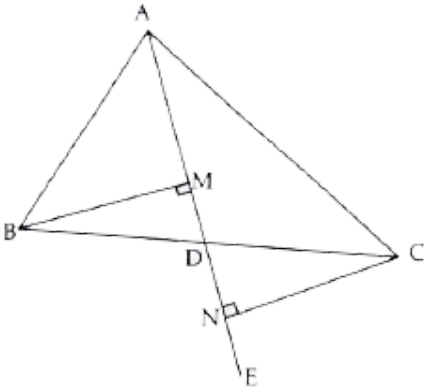
2. If  $x - \frac{1}{x} = \frac{1}{3}$

evaluate  $x^3 - \frac{1}{x^3}$

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3. In the given figure ABC is a triangle and D is the mid-point of BC. AD is produced to E. BM and CN are two perpendiculars dropped from B and C respectively on AE.

Prove that : (i)  $\triangle BMD \cong \triangle CND$  (ii)  $BM = CN$



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4. Evaluate :  $\left[\frac{1}{4}\right]^{-2} - 3(8)^{\frac{2}{3}} \times 4^0 + \left[\frac{9}{16}\right]^{-\frac{1}{2}}$

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5. Using ruler and compass only :

Construct a rhombus ABCD with AB = 6 cm and diagonal AC = 7 cm.

Hence measure and write down the length of the diagonal BD.



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6. Mr. Ram borrows Rs. 20,000 for 2 years compounded annually. The rate of interest for the two successive years are 9% and 10% respectively. If he repays Rs. 1,200 at the end of the first year, Rs. 1,660 at the end of second year, find the amount outstanding at the beginning of the third year.



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7. using trigonometric tables evaluate the following :

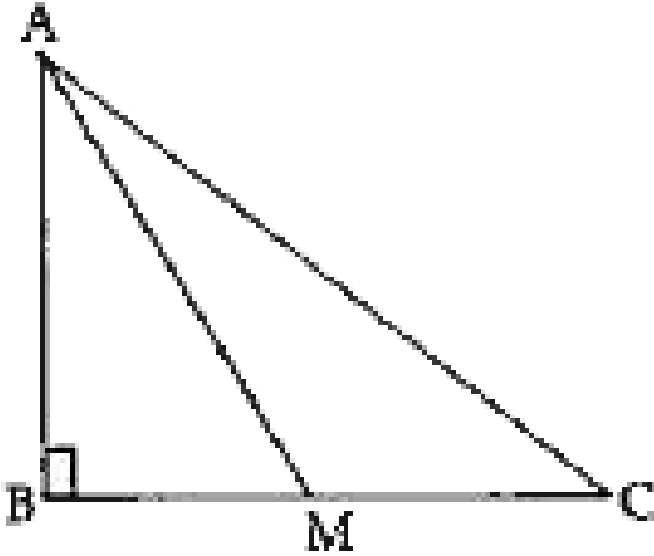
$$\frac{\cot 30^\circ}{\sec 30^\circ} + \frac{\operatorname{cosec} 30^\circ}{\tan 45^\circ} - \frac{2\cos 0^\circ}{\sin 30^\circ} + \cos^2 45^\circ$$



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8. ABC is a triangle, right angled at B, M is a point on BC. Prove that :

$$AM^2 + BC^2 = AC^2 + BM^2$$



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9. Construct a frequency polygon for the following distribution, using a graph sheet :

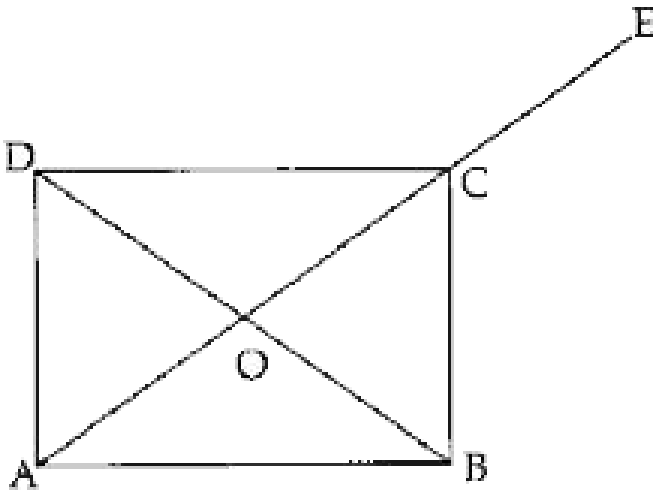
Marks	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
No. of students	6	15	28	34	18	8

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10. A is a point on the x-axis and B is (-7, 9). Distance between the points A and B is 15 units. Find the coordinates of point A.

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11. In the given figure, ABCD is a rectangle, whose diagonals intersect at 'O'. Diagonal AC is produced to E and  $\angle DCE = 145^\circ$ .



Find : (i)  $\angle CAB$  (ii)  $\angle AOB$

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12. Find the altitude and area of an isosceles triangle whose perimeter is 64 cm and whose base is 24 cm.



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## Section B

1. If  $13 \sin A = 12$

Find  $\sec A - \tan A$ .



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2. A sum of Rs. 10,000 yields Rs. 3310 as compound interest in 3 years. If interest is compounded yearly, find the :

(i) amount

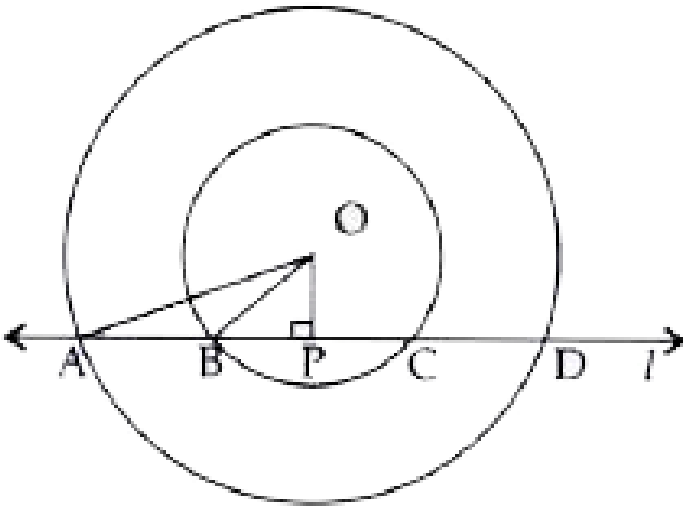
(ii) rate of interest



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3. In the given figure  $O$  is the centre of the two concentric circles. A line 'l' cuts the circles at  $A, B, C$  and  $D$  as shown in the figure.  $OP$  is perpendicular to  $AD$ . Given  $OA = 34$  cm,  $OP = 16$  cm and  $AB = 18$  cm.

Find : (i) length of chord  $AD$ , (ii) length of chord  $BC$ , (iii) radius of the smaller circle



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4. If the mean of the observations  $a, a + 6, a + 2, a + 8$  and  $a + 4$  is 11, find :

(i) the value of 'a'

(ii) the median



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5. Factorize :  $25a^2 - 9b^2 + 12bc - 4c^2$



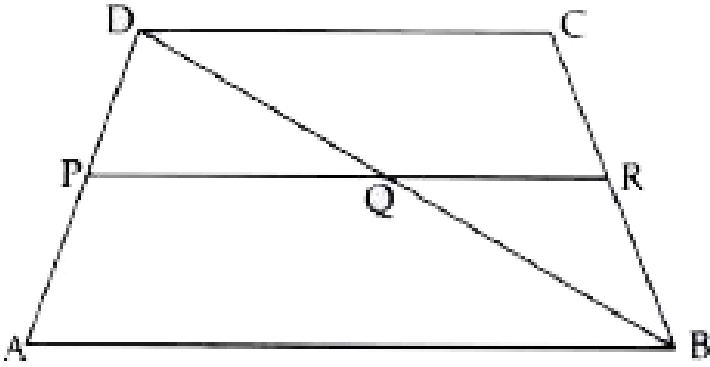
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6. In the given figure ABCD is trapezium, P is the mid-point of side AD and  $PR \parallel AB \parallel DC$ .

(i) Prove that R is the mid-point of side BC



(ii) Find the length of PR, if  $AB = 12$  cm and  $DC = 8$  cm



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7. Solve the following pair of linear equations using cross multiplication method :

$$2x - 5y = 14$$

$$x + 2y = -2$$

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8. In the given figure ABCD is a quadrilateral. BP is drawn parallel to AC and BP meets DC produced at P. Prove that :

(i) area of  $\triangle AOB = \text{Area of } \triangle COP$

(ii) area of quadrilateral ABCD = area of  $\triangle APD$ .



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**9.** The cost of moving a circular field at Rs. 16 per sq m is Rs. 2464, find :

(i) the total area of the field.

(ii) the radius of the circular field.

(iii) cost of fencing the field at Rs. 12 per metre.



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**10.** In the given triangle ABC,  $AD \perp BC$ .  $AB = 13$  cm,  $BD = 5$  cm,  $DC = 4$  cm.

Find the value of :



(i) AD

(ii)  $\tan x^\circ + \cot y^\circ$

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11.  $\log_2 a = 3, \log_3 b = 2, \log_4 c = 1$

Find the value of  $3a + 2b - 10c$

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12. Use graph paper for this equation. Draw the graph of  $3x - 2y = 5$  and  $2x = 3y$  on the same axes. Use  $2\text{cm} = 1$  unit on the both the axes and plot only 2 points per line. Write down the coordinates of the point of intersection of the two lines. Also find the area of the triangle formed by the lines and the y-axis.

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13. Solve for x.

$$\left(\sqrt[3]{\frac{3}{5}}\right)^{2x+1} = \frac{125}{27}$$

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14. If 1 is subtracted from the numerator of a fraction it becomes  $\frac{2}{3}$ , but if 5 is added to the denominator of the fraction it becomes  $\frac{1}{2}$ . Find the fraction ?

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15. In the given figure, PQR is a triangle where PS, QS and RS are the bisectors of  $\angle P$ ,  $\angle Q$  and  $\angle R$  respectively.



(i) If  $\angle PRQ > \angle PQR$ , prove that  $SQ > SR$

(ii) If  $\angle PRQ = 110^\circ$  and  $\angle PQR = 40^\circ$ , prove that  $SP > SQ$

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16. Evaluate without using trigonometric tables :

$$\tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ$$

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17. Factorize :  $x^3 - 3x^2 + x - 3$

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18. In the given figure, 'O' is the centre of the circle, Arc AB = Arc BC = Arc CD. If  $\angle OAB = 48^\circ$ , find :



(i)  $\angle AOB$

(ii)  $\angle BOD$

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19. ABCD is a parallelogram in which  $\angle DAB = 80^\circ$ . Bisector of  $\angle A$  and  $\angle B$  meets CD at P. Prove that :



(i)  $AD = DP$

(ii)  $CP = CB$

(iii)  $DC = 2AB$



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20. Given three points  $P(-1, 2)$ ,  $A(2, k)$  and  $B(k, -1)$ . Given that  $PA = PB$ . Find the value of  $k$ .



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21. The length, breadth and height of a closed wooden box are 20 cm, 12 cm and 8 cm. The thickness of the wood used to make the box is 10 mm. Find :

(i) the volume of the wood.

(ii) the cost of the wood required to make the box, if  $1 \text{ cm}^3$  of wood costs Rs. 8.50.



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