



## MATHS

### BOOKS - UNITED BOOK HOUSE

### SOLPARA HIGH SCHOOL

#### Exercise

1. If the ratio of principal and annual interest is 4:1, then rate of interest is

A. 0.25

B. 0.2

C. 0.15

D. 0.24

**Answer:**



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2. If one root of the equation  $x^2 - 3x + k = 0$  is reciprocal to each other then  $k = 1$ .

A. 0

B.  $-1$

C. 1

D. 3

**Answer:**



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3. Two circles of radii 10cm and 7 cm touch each other internally. The distance between their centres is

A. 3 cm

B. 17 cm

C. 6 cm

D. 4 cm

**Answer:**



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**4.** The end point of a minute hand of a clock moves in 1 hour is

A.  $\frac{\pi^c}{4}$

B.  $\frac{\pi^c}{2}$

C.  $\pi^c$

D.  $2\pi^c$

**Answer:**



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5. If the base radius and height of solid hemisphere and a solid right circular cylinder are equal, then the ratio of their volume is

A. 3 : 2

B. 11 : 3

C. 2 : 3

D. 4 : 3

**Answer:**



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6. If the mode of the data 16,15,17,16,15,x,19,17,14 is 15 then  $x=$

A. 15

B. 16

C. 17

D. 19

**Answer:**



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### 7. Fill in the blanks

If the rate of compound interest Rs P is  $r\%$  per annum and the interest is compound quarterly, the amount after n years is \_\_\_\_\_.



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### 8. Fill in the blanks

IF the sum and product of two roots of the equation  $kx^2 - 6x + 12k = 0 (k \neq 0)$  are equal then  $k =$  \_\_\_\_\_.



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9. Two circles touch each other externally at point A and PQ is a direct common tangent which touches the circles at P and Q respectively. Then  $\angle PAQ =$

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10. Fill in the blanks

If  $\cos \theta = \sqrt{1 - a^2}$  then  $\cot \theta =$ \_\_\_\_\_.

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### 11. Fill in the blanks

If the number of vertices and number of diagonals of a cuboid are  $a$  and  $b$  respectively, then find the value of  $3a+2b$  is \_\_\_\_.



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### 12. Fill in the blanks

If the mean marks of mathematics of  $n_1$  students is  $\bar{x}_1$  and that of  $n_2$  students is  $\bar{x}_2$ , then the mean marks of total students is \_\_\_\_.



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### 13. Write True or False

In a business X invests Rs  $(a+3)$  for  $(a-4)$  months and Y invests Rs  $(a-2)$  for  $(a+6)$  months. The profit share of X is greater than the profit share of Y.



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14.  $6 \times \sqrt[3]{4} \times 3 \times \sqrt[3]{2} = 36.$



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15. If the circle drawn with hypotenuse of a right angles triangle as diameter. Then the circle passes

through the three vertices of the triangle.



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16. Write true or false, Value of  $\sin^2 3\theta + \cos^2 3\theta = 3$ .



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17. By melting a sphere of radius  $r$  cm, if a right circular cylinder of same base radius made, then the height of the cylinder is  $r$  cm.



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**18.** In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find the length of the arc.



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**19.** Calculate the difference between compound interest and simple interest of Rs 4000 for 2 years at the rate of interest 10% per annum.



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**20.** In a partnership business of two men, capital and profit share of 1st man are Rs 12,000 and Rs 20,000

respectively. If the total profit of this business is Rs 30,000 then calculate the capital of 2nd man.

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21. If the roots of the equation  $x^2 - 6x + 6 = 0$  are a and b then find the value of  $2(a^2 + b^2)$ .

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22. If  $b \propto a^3$  and a increases in 10% then find what percent b will be increased?

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**23.** In  $\triangle ABC$ ,  $\angle A$  is right angle and  $AD \perp BC$ . If  $AB:AC = 3:4$  and  $AD = 8\text{cm}$  then calculate the length of  $BD$ .



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**24.** Two chords  $AB$  and  $AC$  of a circle are mutually perpendicular to each other. If  $AB = 4\text{ cm}$  and  $AC = 3\text{ cm}$ , find the length of the radius of the circle.



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25. Two tangents to a circle at A and B intersect at a point P. If  $\angle APB = 68^\circ$  then find  $\angle PAB$ .

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26. Prove that  $\cos^2 A - \sin^2 A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$ .

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27. If  $r \cos \theta = 3$  and  $r \sin \theta = \sqrt{3}$  then find the value of  $r$  and  $\theta$ .

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**28.** The numerical values of volume and total surface is same of a hemisphere. Find it's radius

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**29.** Length of diagonal of a cube is  $6\sqrt{3}$  cm. Calculate the volume of the cube.

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**30.** If  $u_i = \frac{x_i - 35}{10}$ ,  $\sum f_i u_i = 30$  and  $\sum f_i = 60$ , then determine the value of  $\bar{x}$ .

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**31.** The simple interest and compound interest of some amount of money in 2 years are Rs,840 and Rs.869.40. Find the amount of money and annual rate of interest.



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**32.** In a business A invests Rs 12,00. After some days B joins the business and invests Rs 16,00 in it. 9 months after B joins, A and B get same profit. Find for how many days A's money was invested in this business.



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33. Solve:  $\frac{x}{x+1} + \frac{x+1}{x} = 2\frac{1}{12}$  ( $x \neq 0, -1$ )



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34. If the difference between a proper fraction and its reciprocal is  $\frac{9}{20}$ , find the proper fraction.



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35. If  $x = \frac{2\sqrt{15}}{\sqrt{5} + \sqrt{3}}$ , find the value of

$$\frac{x + \sqrt{3}}{x - \sqrt{3}} + \frac{x + \sqrt{5}}{x - \sqrt{5}}.$$



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**36.** Three variable  $x, y, z$  such that  $y+z-x$  is a constant and if  $(z+x-y)(x+y-z) \propto yz$ , then show that  $(x + y + z) \propto yz$ .



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**37.** Find the area of a quadrant of a circle whose circumference is 22 cm.



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**38.** If  $a, b, c, d$  are in continued proportion then show that  $(b - c)^2 + (c - a)^2 + (b - d)^2 = (a - d)^2$ .



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**39.** Answer any one question : Prove that angles in the same segment of a circle are equal.

A. u

B.

C.

D.

**Answer:**



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**40.** Prove that opposite angles of a cyclic quadrilateral are supplementary



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**41.** Prove that two equal chords are equidistant from the centre of the circle.



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**42.** Prove that cyclic trapezium is isoscles trapezium and the length of its diagonals are same.

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**43.** Draw a traingle ABC whose  $BC = 6\text{cm}$ ,  $CA = 5.5\text{ cm}$  and  $AB = 4.5\text{ cm}$ . Draw the circum circle of  $\triangle ABC$ .

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**44.** Draw a circle with radius  $2.6\text{ cm}$  in length. Draw two tangents to the circle from an external point which is  $5.7\text{ cm}$  away from the centre of the circle.



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45. Sum of two angles is  $135^\circ$  and their difference is  $\frac{\pi^c}{12}$ . Find the sexagimal and circular values of these two angles.



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46. Find the value of:

$$\frac{\tan 60^\circ - \tan 30^\circ}{1 + \tan 60^\circ \tan 30^\circ} + \cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$$



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47. Show that,  $\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ} - 2 = 0$



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48. A passenger of an aeroplane observes that Howrah station is at one side of the plane and Saheed minar is just on the opposite side. The angles of depression of Howrah station and Saheed minar from the passenger of aeroplane are  $60^\circ$  and  $30^\circ$  respectively. If the aeroplane is at a height of  $545\sqrt{3}$  metres at that time, then find the distance between Howrah Station and Saheed minar.



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**49.** From the two points on the same straight line with the foot of a tower the angles of elevation of the top of the tower are complementary. If the distance of the two points from the foot of the tower are 9 metre and 16 metre and the two points lie on the same side of the tower, then find the height of the tower.



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**50.** External diameter of a hemispherical wooden pot is 10 cm and its thickness is 1 cm. Calculate the cost

of colouring the pot at the rate of Rs 10 per square cm.



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51. The length of two sides adjacent to right angles of a right angled triangle are 4 cm and 3 cm. Find the curved surface area and volume of the solid formed by completely revolving the triangle once by taking the longer side adjacent to right angle as axis.



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52. If the length of radius of a sphere is increased by 50% , then find how much percent will be increased of its curved surface area.



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53. Find the mean of obtained marks of the students from the following cumulative frequency of obtained marks.

| Class limit     | Less than 10 | Less than 20 | Less than 30 | Less than 40 | Less than 50 |
|-----------------|--------------|--------------|--------------|--------------|--------------|
| No. of students | 05           | 09           | 17           | 29           | 45           |



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54. Find the median of the following data

| Value           | Less than 10 | Less than 20 | Less than 30 | Less than 40 | Less than 50 | Less than 60 | Less than 70 | Less than 80 | Less than 90 |
|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| No. of students | 12           | 22           | 40           | 60           | 72           | 87           | 102          | 111          | 120          |

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55. Find the mode of the following data

| Value     | Less than 10 | Less than 20 | Less than 30 | Less than 40 | Less than 50 | Less than 60 | Less than 70 | Less than 80 |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| frequency | 4            | 16           | 40           | 76           | 96           | 112          | 120          | 125          |

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