



# MATHS

## BOOKS - UNITED BOOK HOUSE

### VIDYASAGAR VIDYAPITH MIDNAPORE

#### Exercise

1. IF the roots of the equation

$$3x^2 + 8x + 2 = 0 \text{ are } \alpha, \beta \text{ then } \left( \frac{1}{\alpha} + \frac{1}{\beta} \right) =$$

A.  $-\frac{3}{8}$

B.  $\frac{2}{3}$

C.  $-4$

D.  $4$

**Answer:**



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2. A principal becomes twice its amount in 20 years at a certain rate of simple interest. At

the same rate of simple interest, that principal becomes thrice of its amount in

A. 30 years

B. 35 years

C. 40 years

D. 45 years

**Answer:**



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3. If  $A + B = 90^\circ$  and  $\sin A = \frac{1}{3}$ , then  $\sec$

B =

A. 3

B.  $\frac{1}{3}$

C.  $\frac{3}{2}\sqrt{2}$

D. 1

**Answer:**



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4. AOB is a diameter of a circle with centre O, C is any point on the circle. If AC = 6cm and BC = 8cm then AB =

A. 14 cm

B. 10 cm

C. 5 cm

D. 2cm

**Answer:**



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5. If the area of a side face of a cube is 256 sq.m. then its volume is

A.  $64cm^3$

B.  $216cm^3$

C.  $256cm^3$

D.  $4096cm^3$

**Answer:**



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6. If the median of arranging the ascending order of data 8,9,12,17,x+2,x+4,30,31,34,39 is 24 then x=

A. 20

B. 21

C. 22

D. 24

**Answer:**



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### 7. Fill in the blanks

The compound interest of Rs \_\_\_\_\_ for 2 years at the rate of interest 5% p.a. is Rs 441.



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### 8. Fill in the blanks

Conjugate surds of  $(\sqrt{5} - 1)$  is \_\_\_\_\_.



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### 9. Fill in the blanks

If  $x = 2a \sec \theta$ ,  $y = 2b \tan \theta$ , then  $\frac{x^2}{a^2} - \frac{y^2}{b^2}$   
= \_\_\_\_\_



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### 10. Fill in the blanks

Two circles touch each other externally. The common tangent from that point is called \_\_\_\_\_ common tangent.



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### 11. Fill in the blanks

The curved surface area of a right circular cone is  $\sqrt{6}$  times of its base area. The ratio of its height and radius is \_\_\_\_



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### 12. Fill in the blanks

If the mode of the data 12,5,x,10,13,5,13,12,x is 5 then  $x=$ \_\_\_\_



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### 13. Write True or False

In a business the ratio of the capital of A and B is 5:4. if the profit share of A is Rs 800 then the profit share of B is Rs 640.



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### 14. Write True or False

If  $2a = 5b = 8c$  then  $a:c = 4:1$ .



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**15. Write True or False**

If  $\sin A + \sin B = 2$ ,

$(0 \leq A \leq 90^\circ, 0 \leq B \leq 90^\circ)$  then

$\operatorname{cosec} A + \operatorname{cosec} B = 2$



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**16. Write True or False**

The volume of the largest solid cone that can be cut out from a solid hemisphere of  $r$  units

radius is  $\frac{1}{3}\pi r^3$  cu. Unit.



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**17.** Write True or False

If mean of the numbers 7,9,x,12,y,17 is 11 then

$$x+y = 30.$$



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**18.** In 1 year if the ratio of principal and amount is 8:9 , then calculate the rate of interest per annum.



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19. What should be added to each of 12,22,42,72 to make the sums proportional?



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20. In a business , A,B,C invest Rs 500 , Rs 450 and Rs 700 respectively. If the total profit at the end of year is Rs 1155 then what is the profit share of C.



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21. If  $x^2 + y^2 \propto xy$  then show that  $x + y \propto x - y$ .



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22. Length of two chords of a circle with centre at O are 6 cm and 8 cm. If the length from centre to the smaller chord is 4 cm then find the distance from centre of the greater chord.



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23. In  $\triangle ABC$ ,  $AB=AC$ . If we draw a circle with diameter  $AB$ , the circle intersect  $BC$  at  $D$ , then  $BD:CD=?$



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24. The lengths of radii of two circles are 8 cm and 3 cm and the distance between two centres is 13 cm. What is the length of the direct common tangent of two circle?





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25. If  $\cos^2 \theta - \sin^2 \theta = \frac{1}{2}$  then  
 $\cos^4 \theta - \sin^4 \theta = ?$



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26. If  $\sec 5\theta = \operatorname{cosec}(\theta + 36^\circ)$  and  $5\theta$  is a positive acute angle then find the value of  $\operatorname{cosec} 5\theta$ .



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**27.** If the length of diagonal of a cube is 6 cm then find the total surface area of it.



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**28.** The length of radius of a right circular cylinder is decreased by 50% and height is increased by 50%. How much percent of the volume will be changed?



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29. If  $u_i = \frac{x_i - 25}{10}$   $\sum f_i u_i = 20$  and

$\sum f_i = 100$ , find  $\bar{x}$ .



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30. At present the sum of the number of students in all the secondary institutions in a district is 3993. If the number of students increased in a year was 10% of that in the previous year, then find the sum of the number of students in all the secondary institutions in the districts 3 years before?



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**31.** Pradipbabu and Aminabiib started a business jointly by investing Rs 24,000 and Rs 30,000 respectively at the beginning of the year. After 5 months pradipbabu invested Rs 4000 more. At the end of the year, if the total profit was Rs 27,716 then find the profit sphere of each of them.



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32. Solve :  $\frac{x + 3}{x - 3} + \frac{x - 3}{x + 3} = 2\frac{1}{2}, x \neq \pm 3.$



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33. The speed of a boat in still water is 8 km/hr. if the boat can go 15 kms down stream and 22 kms up stream in 5 hours, then calculate the speed of the stream.



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**34.** If  $x = \frac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}}$  and  $xy = 1$ , find the value of  $\frac{x^2 + 3xy + y^2}{x^2 - 3xy + y^2}$



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**35.** If 5 men can cultivate on 10 bighas of land in 9 days, calculate by theory of variation how long will be taken by 25 men for cultivating 30 bighas of land.



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**36.** 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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**37.** If  $\frac{x^2 - yz}{a} = \frac{y^2 - zx}{b} = \frac{z^2 - xy}{c}$ , show that  $(a+b+c)(x+y+z) = (ax+by+cz)$ .



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**38.** Prove that the front angle formed at the centre of a circle by an arc, is double of the angle formed by the same arc at any point on the circle.



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**39.** State and Prove Pythagoras theorem.



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**40.** ABCD is a cyclic quadrilateral. Extended AB and DC intersect at P. Prove that  $PA \cdot PB = PC \cdot PD$ .



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**41.** Two chords AB and AC of the larger of two concentric circles touch the other circle at points P and Q respectively. Prove that

$$PQ = \frac{1}{2}BC.$$



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**42.** Draw a square whose length of each side is  $\sqrt{24}$  cm. Calculate its diagonal.



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**43.** Draw a right angled triangle length of hypotenuse and one of another side are 9 cm and 5.5 cm respectively. Now draw the incircle of this triangle.



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**44.** The length of radius of a circle is 28 cm. Determine the circular value of angle subtended by an arc of 5.5 cm. Length at the centre of this circle.



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**45.** If  $5 \sin^2 \theta + 4 \cos^2 \theta = \frac{9}{2}$ , find the value of  $\tan \theta$ .



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**46.** Find the value of

$$\cot 12^\circ \cot 38^\circ \cot 52^\circ \cot 78^\circ \cot 60^\circ.$$



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**47.** A man standing on a railway overbridge of  $5\sqrt{3}$  m height observed the engine of the train from one side of the bridge at an angle of depression of  $30^\circ$ . But just after 2 seconds, he observed the engine at an angle of

depression of  $45^\circ$  from the other side of the bridge. Find the speed of the train.



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**48.** If the angle of depression of two consecutive kilometer stones on a road from an aeroplane are  $60^\circ$  and  $30^\circ$  respectively, then find the height of the aeroplane when two km stones stand on the same side of the aeroplane.



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**49.** Three spheres made of copper having the radii of 3 cm, 4 cm and 5 cm are melted and a large sphere is made. Calculate the length of diameter of the large sphere.



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**50.** Answer any two questions : Determine the volume of a solid right circular cone which can be made from a solid wooden cube of 4.2 dcm edge length by wasting minimum quantity of wood .



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**51.** Height of a right circular cylinder is twice of its radius. If the height would be 6 times of its radius, then the volume of the cylinder would be greater by 539 cubic dcm. Calculate the height of the cylinder.



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52. Draw the o give (both greater than type and less than type) from the given frequency distribution table and from it find the median.

Class	50-55	55-60	60-65	65-70	70-75	75-80	80-85
frequency	2	8	12	24	34	16	4



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53. Calculate the mean of the following data by step deviation method.

Class limit	0-30	30-60	60-90	90-120	120-150
frequency	12	15	20	25	8



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54. Find the mode of the following frequency distribution table:

Class	45-54	55-64	65-74	75-84	85-94	95-104
frequency	8	13	19	32	12	6



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