



MATHS

BOOKS - AGRAWAL PUBLICATION

Sample paper 13

Exercise

1. An integer is chosen at random between 1 to 100. Find the probability that the chosen number is divisible by 10.



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2. Two different dice are rolled together. Find the probability of getting a sum of 10 of the numbers on the two dice.



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3. Find the area of the largest triangle that can be inscribed in a semi-circle of radius r units.



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4. Find the total surface area of a quadrant of a wooden sphere of radius 3.5 cm.



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5. If $\sin \theta - \cos \theta = 0$, then find the value of $\sin^4 \theta + \cos^4 \theta$.



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6. Find the length of the altitude AL of an isosceles triangle ABC , where $AB = AC = 5$ cm and $BC = 8$ cm.



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7. State ASA criterion of similarity of triangles.



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8. The mid-point of the line segment joining the points $(-2, 4)$ and $(6, 10)$ is



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9. Find the value of 'a' if $\text{HCF}(a, 18) = 2$ and $\text{LCM}(a, 18) = 36$.



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10. Write one rational and one irrational number lying between 0.25 and 0.32.



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11. If n is a positive odd integer, then show that $n^2 - 1$ is divisible by 8.



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12. Check whether 15^n can end with digit zero for any natural number n .



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13. Show that the roots of the quadratic equation:

$$(b - c)x^2 + (c - a)x + (a - b) = 0 \quad \text{are}$$

equal if $c+a=2b$.



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14. If $P(5,7)$, $Q(x,-2)$ and $R(-3,y)$ are collinear points such that $PR=2PQ$, calculate the values of x and y .



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15. Prove that the diagonals of a rectangle with vertices $(0,0)$, $(a,0)$, (a,b) and $(0,b)$ bisect each other and are equal.



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16. Draw a line segment AB of length 7 cm .

Locate a point R on AB such that $7AR = 5RB$



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17. The sum of circumferences of two circles is 132 cm. If the radius of one circle is 14 cm, find the radius of the other circle.



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18. In a car park, there are 125 cars, $3p$ motorbikes, $2q$ lorrie and 20 buses. One of the vehicles leaves the car park at random. Given that the probability that the vehicle is a motorbike is $\frac{3}{40}$ and probability that the vehicle is a bus is $\frac{1}{10}$, from a pair of linear equations in p and q .



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19. Find the HCF and the LCM of 72 and 120 ,
using prime factorisation method.



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20. Express the length of a side of the n^{th}
frame in terms of x and n .



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21. Find the value of x .



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22. A piece of wire is 99 cm long. It is cut bent into a frame in the sequence. Find the length of a side of the largest frame than can be formed.



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23. If the roots of the equation $x^2 + 2cx + ab + 0$ are real and unequal,

prove that the equation

$$x^2 - 2(a + b)x + a^2 + b^2 + 2c^2 = 0$$
 has no

real roots.



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24. Let $A(4,2)$, $B(6,5)$ and $C(1,4)$ be the vertices of $\triangle ABC$. The median AD from A meets BC in D . Find the coordinates of the point P on AD such that, $AP:PD = 2:1$.



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25. if $\tan \theta = \frac{12}{13}$, evaluate $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$



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26.

if

$\sec \theta + \tan \theta = m$, prove $\widehat{\frac{m^2 + 1}{m^2 - 1}} = \sin \theta$.



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27. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled

with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is just completely submerged in water, then the rise of water level in the cylindrical vessel is



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28. From the first floor of Qutab Minor, which is at a height of 25 m from the level ground, a man observes the top of a building at an angle of elevation of 30° and the angle of

depression of the base of the building to be 60° . Calculate the height of the building.



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29. Prove that the line segments joining the mid-pointd of the sides of a triangle form four triangled, each of which is similar to the original triangle.



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30. A piece of cloth costs Rs. 35. If the piece were 4m longer and each metre costs Rs. 1 less, the cost would remain unchanged. How long is the piece?



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