Mathematics

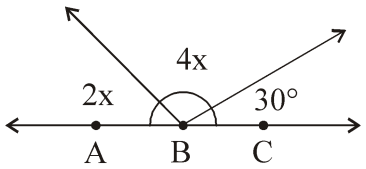
1. If one's digit and ten's digit of a number are a and b respectively, then the number will be

(1) 10 b + a (2) 10 a + b (3) a + b (4) ab

Ans. (1)

Sol. 10b + a

2. If ABC is a straight line then value of x, in the given diagram will be



(1) 15° (2) 20° (3) 25° (4) 30°

Ans. (3)

Sol. $2x + 4x + 30^\circ = 180^\circ$

$6x + 30^\circ = 180^\circ$

$x = 25^\circ$

3. The sum of all interior angles of a Heptagon is

(1) 360° (2) 540° (3) 720° (4) 900°

Ans. (4)

Sol. Sum of interior angle of a n sided polygon is $(n-2)\,180^\circ$ (here n = 7)

$= (7-2) \times 180^\circ = 900^\circ$

4. If in a ΔABC, AB = AC and $\angle A = 70^\circ$ then $\angle B$ is equal to

(1) 50° (2) 55° (3) 60° (4) 65°

Ans. (2)

Sol. $\because$ AB = AC, So triangle is isosceles.

Let equal angles are x, then $x + x + 70^\circ = 180^\circ$.

$x = 55^\circ$

5. If the perimeter of an equilateral triangle is 24 cm, then its area will be

(1) $16\sqrt{3}$ sq. cm (2) $32\sqrt{3}$ sq. cm (3) $48\sqrt{3}$ sq. cm (4) $64\sqrt{3}$ sq. cm

Ans. (1)

Sol. Perimeter of equilateral triangle = 24

Slide of equilateral triangle = 8

Area $= \frac{\sqrt{3}}{4} \times 8 \times 8 = 16\sqrt{3}$ sq. cm.

6. If the volume of a cuboid is 3000 cm^3 and area of its base is 150cm^2, then the height of the cuboid is

(1) 10 cm (2) 15 cm (3) 20 cm (4) 25 cm

Ans. (3)

Sol. $l \times b \times h = 3000$

$l \times b = 100$

$h = \frac{3000}{l \times b} = \frac{3000}{150} = 20\text{cm}$

7. If $\sin\theta = \frac{4}{5}$ then the value of $\frac{4\tan\theta - 5\cos\theta}{\sec\theta + 4\cot\theta}$ will be

(1) $\frac{2}{3}$ (2) $\frac{1}{3}$ (3) $\frac{3}{4}$ (4) $\frac{1}{2}$

Ans. (4)

Sol. $\sin\theta = \frac{4}{5}$

$\cos\theta = \frac{3}{5}$

$\tan\theta = \frac{4}{5}$

So, $\frac{4\tan\theta - 5\cos\theta}{\sec\theta + 4\cot\theta} = \frac{1}{2}$

8. How much time the minute hand of a clock will take to describe an angle of $\frac{2\pi}{3}$ radians ?

(1) 15 min. (2) 20 min. (3) 10 min. (4) 25 min.

Ans. (2)

Sol. Minute hand makes 6° in one minute.

$\frac{2\pi}{3} = \frac{2 \times 180^\circ}{3} = 120^\circ$

So in $120^\circ = \frac{120^\circ}{6^\circ} = 20\,\text{minute}$

9. If Least Common Multiple (LCM) of a and 510 is 23460 and Highest Common Factor (HCF) of a and 510 is 2 then value of a is

(1) 92 (2) 910 (3) 52 (4) 500

Ans. (1)

Sol. Product of number = LCM × HCF

$a \times 510 = 23460 \times 2$

$a = 92$

10. Discriminant of quadratic equation $2\sqrt{2}x^2 + 4x + \sqrt{2} = 0$ will be

(1) 0 (2) 1 (3) 2 (4) 3

Ans. (1)

Sol. $D = b^2 - 4ac$

$16 - 4 \times 2\sqrt{2} \times \sqrt{2} = 0$

11. How many multiples of 3 are there in between 20 and 200 ?

(1) 50 (2) 55 (3) 60 (4) 65

Ans. (3)

Sol. Multiple of 3, between 20 and 200 are

21, 24, 27, ... , 198

Here a = 21

d = 3

$a_n = 198$

n = no. of multiple of '3'

then $a_n = a + (n-1)d$

$\Rightarrow 198 = 21 + (n-1)\,3$

$\Rightarrow \frac{198-21}{3} = n-1$

$\Rightarrow 59 + 1 = n$

$\Rightarrow n = 60$

12. The value of $(\cos 0° + \sin 45° + \sin 30°)(\sin 90° \cos 45° + \cos 60°)$ will be

(1) $\frac{4}{7}$ (2) $\frac{3}{2}$ (3) $\frac{5}{7}$ (4) $\frac{7}{4}$

Ans. (4)

Sol. Given $(\cos 0° + \sin 45° + \sin 30°)(\sin 90° - \cos 45° + \cos 60°)$

$$= \left(1+\frac{1}{\sqrt{2}}+\frac{1}{2}\right)\left(1-\frac{1}{\sqrt{2}}+\frac{1}{2}\right)$$

$$= \left(1+\frac{1}{2}\right)^2 - \left(\frac{1}{\sqrt{2}}\right)^2$$

$$= \frac{9}{4} - \frac{1}{2}$$

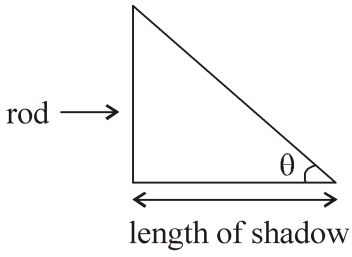
$$= \frac{9-2}{4} = \frac{7}{4}$$

13. If the ratio of the length of a vertical rod and the length of its shadow is 1 : 1 then angle of elevation of sum is

(1) 30° (2) 45° (3) 60° (4) 90°

Ans. (2)

Sol. Here $\tan\theta = 1 \quad \Rightarrow \theta = 45°$



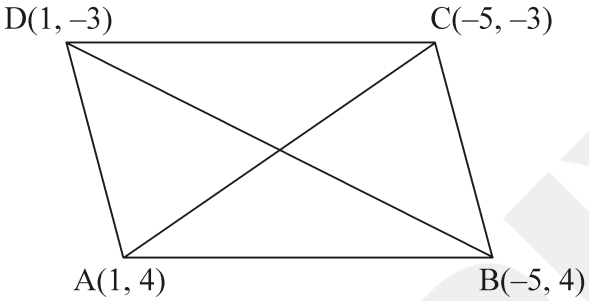
14. Quadrilateral formed by the vertices (1, 4), (–5, 4), (–5, –3) and (1, –3) will be

(1) Square (2) Rectangle

(3) Rhombus (4) None of these

Ans. (2)

Sol. Let A(1, 4), B(–5, 4), C(–5, –3) and D(1, –3)



$AB = \sqrt{(1-(-5))^2+(4-4)^2} = \sqrt{36} = 6$ unit

$BC = \sqrt{(-5-(-5))^2+(4-(-3))^2} = \sqrt{49} = 7$ unit

$CD = \sqrt{(-5-1)^2+(-3-(-3))^2} = \sqrt{36} = 6$ unit

$AD = \sqrt{(1-1)^2+(4-(-3))^2} = \sqrt{49} = 7$ unit

diagonal

$AC = \sqrt{(1-(-5))^2+(4-(-3))^2} = \sqrt{(36)+49} = \sqrt{85}$ unit

$BD = \sqrt{(-5-1)^2+(4-(-3))^2} = \sqrt{36+49} = \sqrt{85}$ unit

Here opposite sides are equal and diagonals are equal then above is a rectangle.

15. The point of concurrence of three interior angle bisectors of a triangles is called

(1) Centre of gravity (2) Circumcentre

(3) Orthocentre (4) Incentre

Ans. (4)

Sol. The point of concurrence of three interior angle bisectors of a triangles is called Incentre

16. The areas of two similar triangles are 36 cm^2 and 81 cm^2 respectively. If the median of smaller triangles is 12 cm then the corresponding median of the larger triangle is

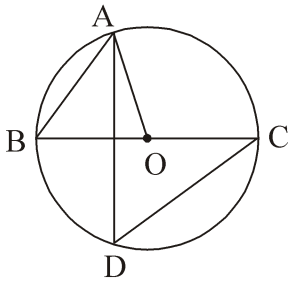
(1) 12 cm (2) 18 cm (3) 24 cm (4) 10 cm

Ans. (2)

Sol. Ratio of area of two similar triangle is equal to ratio of sauare of their respective medians.

$$\frac{36}{81}=\left(\frac{12}{x}\right)^2 \Rightarrow x^2=\frac{144\times 9}{4} \Rightarrow x=\frac{12\times 3}{2}=18 \text{ cm}$$

17. In the given figure, BC is the diameter of a circle and $\angle BAO = 60°$ then $\angle ADC$ is equal to



(1) 30° (2) 45° (3) 60° (4) 90°

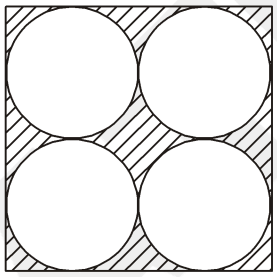
Ans. (3)

Sol. AO = BO (both are radius)

so $\angle OAB = \angle OBA = 60°$

Now we know that angle in same segment are equal So $\angle ABC = \angle ADC = 60°$

18. Find the area of shaded portion in the figure given below, where ABCD is a square of side 28 cm.



(1) 784 cm^2 (2) 616 cm^2 (3) 668 cm^2 (4) 168 cm^2

Ans. (4)

Sol. side of square is 28 cm so radius of circle is 7 cm.

area of square = $(28)^2$ = 784 cm^2

area of four circle = $4 \times \pi \times 7^2 = 616$ cm^2

Area of shaded region = 784 – 616 = 168 cm^2

19. The mean of first eight prime numbers is

(1) 9.625 (2) 8.375 (3) 9.375 (4) 8.534

Ans. (1)

Sol. $\text{Mean} = \frac{2+3+5+7+11+13+17+19}{8} = \frac{77}{8} = 9.625$

20. A die is thrown once. The probability of getting an even number on the die is

(1) $\frac{1}{6}$ (2) $\frac{1}{3}$ (3) $\frac{1}{2}$ (4) $\frac{2}{3}$

Ans. (3)

Sol. Even numbers are 2, 4, 6

$\text{probability} = \frac{3}{6} = \frac{1}{2}$