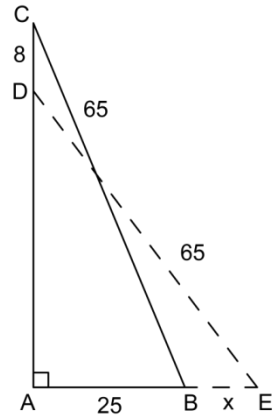
1. A ladder 65 m long is leaning against the wall. Its lower end is 25 m away from the wall. How much further away will it be if the upper end is moved down 8 m ?

1. 60 m 2. 52 m 3. 14 m 4. 10 m

Ans: 3

Explanation



AC = 60; AD = 52; DC = 8

BC = ED = 65

AE = $\sqrt{DE^2 - AD^2}$

AE = $\sqrt{65^2 - 52^2}$

AE = $\sqrt{117x13}$

AE = $\sqrt{1521} = 39$

BE = AE-AB=39-25 = 14

2. Which of the following square roots can be found exactly ?

1. $\sqrt{0.4}$ 2. $\sqrt{0.9}$ 3. $\sqrt{0.09}$ 4. $\sqrt{0.02}$

Ans: 3

Explanation

Option 3: 0.3 x 0.3 = 0.09 ∴ $\sqrt{0.09} = \pm 0.3$

3. Divide (x-y)/(x+y) by (y-x) /(y+x)

1. -1 2.1 3. $(x-y)^2 / (x+y)^2$ 4. $-(x-y)^2 / (x+y)^2$

Ans: 1

Explanation

The given sum is $\frac{x-y}{x+y} \times \frac{x+y}{y-x} = -1$

4. Simplify (1 + 1/x) / (y/x)

1. $\frac{x+1}{y}$ 2. $\frac{x+1}{x}$ 3. $\frac{x^2+1}{y}$ 4. $\frac{x^2+1}{x}$

Ans: 1

Explanation

The given sum is $\frac{x+1}{x} \times \frac{x}{y} = \frac{x+1}{y}$

5. Factor 176 into prime factors.

1. (1)(4)(11) 2. (2)(2)(2)(2)(11) 3. (1)(2)(11) 4. (1)(2)(2)(11)

Ans: 2

Explanation

Given number 176 = 16 × 11 = $2^4 \times 11 \rightarrow$(2)(2)(2)(2)(11)

6. The polygon in which the sum of the interior angles is equal to the sum to the sum of the exterior angles is called a

1. quadrilateral 2. pentagon 3. hexagon 4. heptagon

Ans: 1

Explanation. The polygon in which the sum of the interior angles (360^o) is equal to the sum of the exterior angles (360^o) is called a quadrilateral, e.g., square, rectangle, rhombus, parallelogram and cyclic quadrilateral, kite, etc.

7. Arrange the following fractions in increasing order:-2/5, -1/2, 1/5.

1. -2/5,-1/2, 1/5 2. -1/2,-2/5, 1/5

3. 1/5,-2/5,-1/2 4. 1/5,-1/2,-2/5

Ans:2

Explanation

Given fractions are -0.4, -0.5,and 0.2

∴ Increasing order: -0.5, -0.4, 0.2 → -1/2, -2/5, 1/5

8. The sum of all interior angles of a pentagon is

1. 900° 2. 180° 3. 360° 4. 540°

Ans: 4

Explanation

(i.e., 5 × 108 = 540)

9. The inner and outer circumferences of a circular ring are 22 cm and 44 cm respectively. The thickness (in cm) of the ring is

1. 3.5 2. 3 3. 11 4. 22

Ans : 1

Explanation

Let d and D be inner, outer diameters and t thickness (D-d)/2

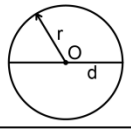
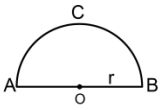
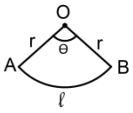
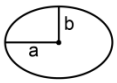
$\pi D = 44 \therefore D = \frac{44}{\pi}$

$\pi d = 22; \therefore d = \frac{22}{\pi}$

$t = \frac{1}{2}(D - d) = \frac{1}{2}\left(\frac{44}{\pi} - \frac{22}{\pi}\right)$

$= \frac{44-22}{2 \times \frac{22}{7}} = 3.5$

Table - Area, Perimeter and Circumference of a circle,semicircle and sector.

Name	Figure	Perimeter, C in linear units	Area, A in square units
1. Circle		$C = 2\pi r$ or $C = \pi d$ where, $d = 2r$	$A = \pi r^2$ $= \frac{\pi}{4} d^2$
2. Semi-Circle		$C = \pi r + 2r$	$A = \frac{1}{2}\pi r^2$
3. Sector of a Circle		$C = \ell + 2r$ $= \frac{\theta}{180^\circ}\pi r + 2r$	$A = \frac{\theta}{360^\circ}\pi r^2$
4. Segment of a circle *		$C = \ell + x$ $C = \frac{\theta}{180^\circ}\pi r + 2r \sin\frac{\theta}{2}$ where, $\ell = \frac{\theta}{180^\circ}\pi r$ $x = 2r \sin\frac{\theta}{2}$ $h = r(1 - \cos\frac{\theta}{2})$	Shaded area, $A = \frac{\theta}{360^\circ}\pi r^2 - \frac{1}{2} r^2 \sin\theta$
5. Annulus		$C = 2\pi (R + r)$	$A = \pi (R^2 - r^2)$
6. Ellipse		$C = \pi [3(a+b) - \sqrt{(a+3b)(b+3a)}]$ or $C = 2\pi \sqrt{\frac{(a^2+b^2)}{2}}$	$A = \pi ab$ a = semimajor axis b = semiminor axis

* To find the volume of liquid, V present inside a cylinder of length, L lying horizontally and upto height, h is V = AL.

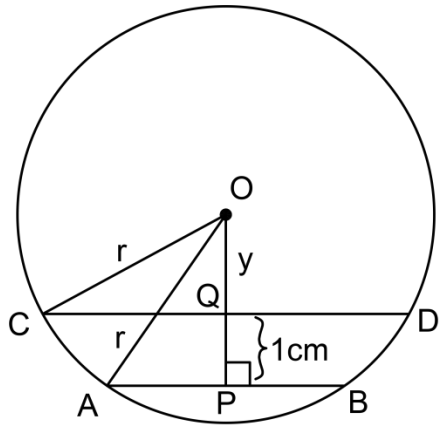
10. Two parallel chords in a circle are 6 cm and 8 cm long and 1 cm a part. The radius of the circle is:

1. 8 cm 2. 7 cm 3. 6 cm 4. 5 cm

Ans: 4

Explanation

For the larger chord, let y = perpendicular distance from centre to longer chord and r = radius



AB = 6 cm
CD = 8 cm

Given CD = QD = 4 and AP = PB = 3; QP =1
Let OQ = y
Therefore, $r^2 = 4^2 + OQ^2$
For the smaller chord, $3^2 + (1+OQ)^2 = r^2$
Equating r^2
$16 + y^2 = 9 + 1 + 2y + y^2$
$6 = 2y \rightarrow \quad y = 3$
$r^2 = 4^2 + 3^2$
r = 5cm

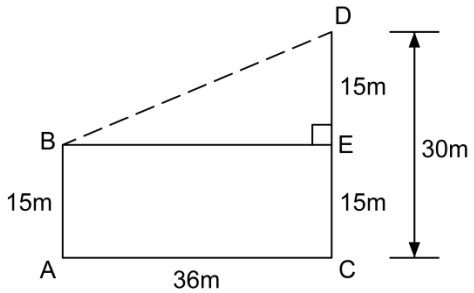
11. Two poles, 15 m and 30 m high, are 36 m apart. The distance between their tops is

1. 45m 2. 40m 3. 39m 4. 35m

Ans: 3

Explanation

To find distance AB



$x = \sqrt{(36^2 + 15^2)} = 39m$

12. Which is the closest approximation to the product: 0.3333 x 0.25 x 0.499 x 0.125 x 24.0?

1.1/8 2. 3/4 3. 3/8 4. 2/5

Ans: 1

Explanation: The given sum: $\approx \frac{1}{3} \times \frac{1}{4} \times \frac{1}{2} \times \frac{1}{8} \times 24 = \frac{1}{8} = 0.125$

13. n! = n(n-1) (n-2) ....1 (2) (1) what is 10!2!/ (8!3!) ?

1.30 2. 100 3. 90 4. 60

Ans: 1

Explanation: The given sum: $\frac{10!\,2!}{8!\,3!} = \frac{10 \times 9 \times 8! \times 2!}{8! \times 3 \times 2!} = \frac{10 \times 9}{3} = 30$

14. A circle with an area equal to an integer might have which of the following as the square of its radius ?

1. π 2. $\frac{1}{\pi}$ 3. 2π 4. π/2

Ans: 2. (Note: r $= \frac{1}{\sqrt{\pi}}$ or r = $\sqrt{\frac{a}{\pi}}$ where a is a positive integer)

15. Which is the least of the following numbers ?

1. $1/\sqrt{3}$ 2. $\sqrt{3}/3$ 3. 1/3 4. $\frac{1}{3\sqrt{3}}$

Ans: 4

Explanation

The given numbers are: $\frac{1}{\sqrt{3}}, \frac{\sqrt{3}}{\sqrt{3}x\sqrt{3}}, \frac{1}{\sqrt{3}\times\sqrt{3}}, \frac{1}{\sqrt{3}\times\sqrt{3}\times\sqrt{3}} = \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}\times\sqrt{3}}, \frac{1}{\sqrt{3}\times\sqrt{3}\times\sqrt{3}}$

The least number is $\frac{1}{\sqrt{3}\times\sqrt{3}\times\sqrt{3}}$

16. If $(0.0001)^p = (0.1)^r$, then p =

1. $\frac{r}{4}$ 2. r^2-1 3. r^2+1 4.r -3

Ans: 1

Explanation: The given sum: $10^{-4p} = 10^{-r}$

$\therefore p = \frac{r}{4}$

17. An increase of 10 degrees on the Centigrade scale produces a corresponding increase on the Fahrenheit scale of

1. 10° 2.18° 3. 22° 4. 14°

Ans: 2

Explanation

0°→ 100°C ≡ 32°F → 212°F

Change of 100°C = change of 180°F

1° inc of centigrade = 1. 8° increase in F

18. How many fifths are there in three-eighths ?

1. $1\frac{1}{4}$ 2. $1\frac{2}{3}$ 3. $1\frac{1}{6}$ 4. $1\frac{7}{8}$

Ans: 4

Explanation

The given sum: $\frac{3}{8} \div \frac{1}{5}$

$\therefore \frac{3}{8} \times \frac{5}{1} = \frac{15}{8}$, $1\frac{7}{8}$

19. A person is standing on a staircase. He walks down 4 steps, up 3 steps, down 6 steps, up 2 steps, up 9 steps, and down 2 steps. Where is he standing in relation to the step on which he started ?

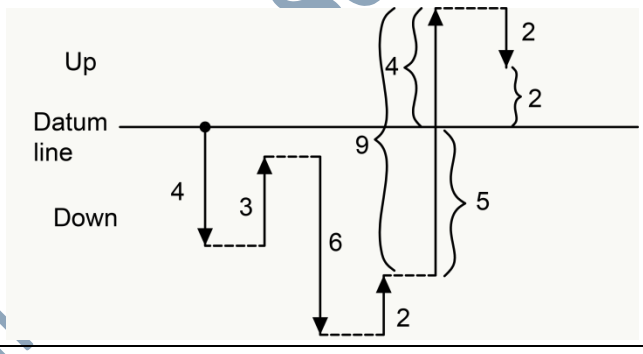
1. 2 steps above 2. 1 step above 3. the same place 4. 1 step below

Ans: 1

Explanation:

Assume to take a step down is -1 and to take a step up to be +1,

the question would translate to -4 + 3 -6 + 2 + 9 - 2 = - 12 + 14 = +2



20. Simplify: 2 + 1/ [2+{1/(2+½)}]

1. 29/12 2. 12/5 3. 70/29 4. 2 1/8

Ans: 1

Explanation: $= 2 + \frac{1}{2+\frac{2}{5}} = 2 + \frac{5}{12} = \frac{29}{12}$

21. What is the area of a square that has a diagonal of length $\sqrt{10}$ units?

1.5 2. 10 3. 20 4. 50

Ans: 1

Explanation

Square area, A = $\frac{d^2}{2}$

$= \frac{\sqrt{10}\times\sqrt{10}}{2} = \frac{10}{2} = 5$

22. How many different three-person committees can be formed from six people?

1. 2 2. 18 3. 20 4. 36

Ans: 3

Explanation

Use the combination formula: $nC_r = \frac{n!}{r!(n-r)!}$

$= \frac{6!}{3!(6-3)!} = \frac{720}{6\,(6)} = \frac{720}{36} = 20$

23. 1/4 of 3/5 is what percent of 3/4 ?

1. 15% 2. 20% 3. 33 1/3% 4. 80%

Ans: 2

Explanation

Let the number of percentage be x.

The given sum: $\frac{1}{4}\times\frac{3}{5} = \frac{3}{20} = \frac{15}{100} = \frac{3}{4}.\frac{X}{100} \rightarrow$ x =20.

i.e., 20% of ¾ =$\frac{20}{100}$ x $\frac{3}{4} = \frac{15}{100}$

24. If x = 3 and $(x-y)^2 = 4$, then y could be

1. -5 2. -1 3. 9 4. 5

Ans: 4

Explanation

Given sum $\rightarrow (3 - y)^2=4$

3 - y = ± 2

∴ y = 3-2 =1 (or) 3+2 = 5

25. All of the following are prime numbers except

1. 13 2. 17 3. 51 4. 79

Ans: 3

Explanation

∵ 51 = 3 × 17

26. 0.250/0.333 divided by 0.125/0.167 is most nearly

1. 10 2. 5 3. 1 4. 0.667

Ans:3

Explanation

$\frac{0.25}{0.333}\times\frac{0.167}{0.125}=\frac{0.25}{0.125}\times\frac{0.167}{0.333}\approx 2\times\frac{1}{2}\approx 1$

27. $(4+\sqrt{5})\,(4-\sqrt{5})$ is equal to

1. -1 2. 0 3. 11 4. 21

Ans: 3

Explanation

The given sum is of the form: $(a+b)(a-b)=a^2-b^2$.

$\therefore(4+\sqrt{5})\,(4-\sqrt{5})\rightarrow 16-5=11$

28. An oil tank is 5/8 full. When 6 litres of oil are removed, the tank is 1/4 full. What is the total capacity of the tank in litres ?

1. 14 2. 16 3. 18 4. 20

Ans:2

Explanation: Let the tank volume = x

Given condition: $\frac{x\times 5}{8}-6=\frac{1}{4}x$

$\therefore\frac{5x}{8}-\frac{x}{4}=6$

i.e., $\frac{5x-2x}{8}=6;\quad \therefore x=\frac{48}{3}=16$

29. If the length of a square is doubled, then;

1. The perimeter and area are both doubled
2. The perimeter and the area are each multiplied by 4
3. The area is multiplied by 4 and the perimeter is doubled
4. The perimeter is multiplied by 4 and the area is doubled

Ans: 3

Explanation

(i) Side x → 2x

(ii) P = 4x → 8x, ∴ P increases to 2 times

(iii) $A=x^2\rightarrow(2x)^2=4x^2$, ∴A increases to 4 times

From the above, area increases by 4 times and perimeter increases 2 times.

∴ Option 3 is the right answer.

30. Of the following, which cannot be the ratio of the lengths of the sides of a triangle?

1. 3:4:5 2. 2:3:5 3. 3:3:4 4. 1:1:1

Ans: 2

Explanation

Let the sides of the triangle be a, b and c. In a triangle, sum of any 2 sides shall be greater than the third side, i.e., a + b > c, b + c > a and c + a > b.

The above condition is met by all options except, option 2.

31. If two sides of a triangle are of length 8 and 14, the third side may be of length :

1. 25 2. 22 3. 6 4. 5

Ans: 1

Explanation

For any triangle of sides a, b and c, the following conditions are to be satisfied:

a + b > c, b + c > a, c + a > b

32. Is a discount series of 40%, 40% and 25% possible ?

1. Possible
2. Not Possible
3. May or may not be
4. Possible, subject to some other conditions.

Ans: 1

Explanation

Let 100 be value on which successive discounts are given:

1st	2nd	3rd	Sequence of discounts
40%	40%	25%	Sequence of rate of discount
40	24 (i.e., 40% of 60)	9 (i.e., 25% of 36)	Discounted amount (sequentially)
60	36	27	Balance amount after successive discounts.

Total discount =100-27 = 63 = 63%.

Hence, successive discounts as per the given sum is possible.

33. The length of each side of an equilateral triangle is 2 cm the length of its altitude (in cm) is

1. $\sqrt{3}$ 2. $2\sqrt{3}$ 3. ½ 4. 1

Ans: 1

Explanation

$\therefore h = \frac{a\sqrt{3}}{2}$

$\therefore h = \frac{2 \times \sqrt{3}}{2} = \sqrt{3}$.

34. The diagonal of a square is $4\sqrt{2}$ cm, its perimeter (in cm) is

1. $16\sqrt{2}$ 2. $8\sqrt{2}$ 3.16 4. 12

Ans: 3

Explanation

If side is a of a square, the diagonal, d = $a\sqrt{2} = 4\sqrt{2}$ or $a = \frac{d}{\sqrt{2}}$

Given d= $a\sqrt{2} = 4\sqrt{2}$

∴ Side, a = 4, Perimeter, P= 4a = 16.

35. The diameter of a circle is increased by 200%, its area increases by

1. 800 %
2. 400 %
3. 300 %
4. 200 %

Ans: 3

Explanation

Let d be the circle diameter and area A = $\pi d^2/4$.

Given: d→2d. ∴ A →$\pi.(2d)^2/4 = 4\pi d^2/4 = 4A$ and therefore increase is 3 times.

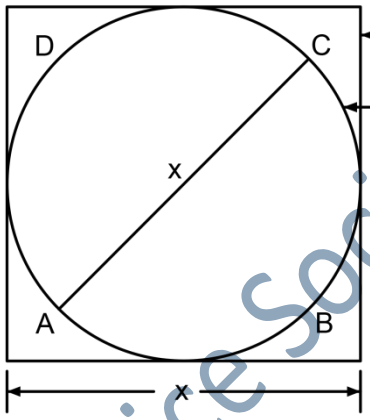
∴Area increase by 300%

36. The area of the circle inscribed in a square of side x

1. πx^2
2. $\pi x^2/2$
3. $\pi x^2/4$
4. None

Ans: 3

Explanation



Square, side x

Circle, diameter x

1. Area of Square, $A_{sq} = x^2$
2. Area of Circle, $A_c = \frac{\pi}{4} x^2$

$A_{sq} : A_c = x^2 : \frac{\pi}{4} x^2$

$= 1 : \frac{\pi}{4}$

= 1 : 0.785

= 0.5 : 0.393

(Note: The side of the square x= diameter of circle, x)

∴ Area of circle = $\frac{\pi}{4} x^2$

37. The perimeter of a rhombus is 100 cm and one diagonal is 30 cm the length of other diagonal is

1. 30 cm
2. 40 cm
3. 70 cm
4. 32 cm

Ans:2

Explanation

Perimeter of rhombus, P =4a = 100, ∴ Side, a = 25

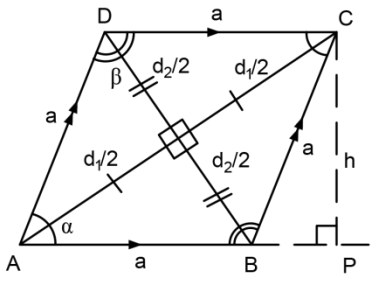
In terms of diagonals, side of rhombus a is also given by:

$a = \sqrt{\left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2}$; ∴ $a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2 \rightarrow 4a^2 = d_1^2 + d_2^2$ i.e., $4x25^2 = 30^2 + d_2^2$

i.e., $2500 - 900 = d_2^2$

∴$1600 = d_2^2$, ∴ $d_2 = 40$.

Box. Details of rhombus.



$\alpha + \beta = 180°$

$d_1^2 + d_2^2 = 4a^2$

$h = \frac{d_1 d_2}{2a}$

$a = \sqrt{\frac{d_1^2}{2} + \frac{d_2^2}{2}}$

Area, $A = ah = a^2 \sin\alpha = \frac{1}{2} d_1 d_2$

Perimeter = 4a

38. The diagonals of a rhombus are 24 cm and 10 cm. Its perimeter (in cm) is

1. 68 2. 60 3. 52 4. None

Ans: 3

Explanation

∴ In terms of diagonals, side of rhombus, $a = \sqrt{\left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2}$

$= \sqrt{12^2 + 5^2} = 13$

∴ P = 4a = 52

39. The area of a square inscribed in a circle of radius r is

1. r^2 2. $2r^2$ 3. πr^2 4. None of the above.

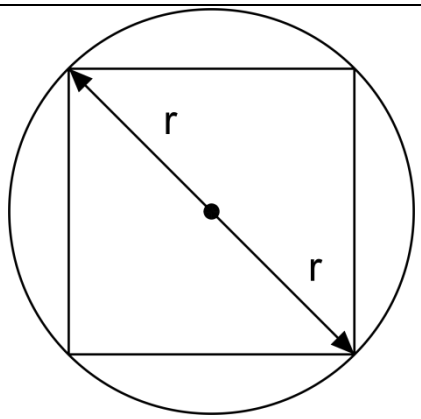
Ans:2

Explanation

From the figure given below,

Diameter of circle, d = 2r is same as the diagonal of square

∴ Area of square with diagonal, $d = \frac{d^2}{2} = \frac{(2r)^2}{2} = 2r^2$ (circle area = $\pi r^2 = 3.14\ r^2$)



40. If the radius of a sphere be increased by 100%. Its volume will be increased by

1. 100 % 2. 200 % 3. 800 % 4.700 %

Ans:4

Explanation

Sphere volume, $V = \frac{4}{3}\pi r^3$ where r is its radius.

Given : $r \rightarrow 2r$, $\therefore V \rightarrow \frac{4}{3}\pi.8r^3$

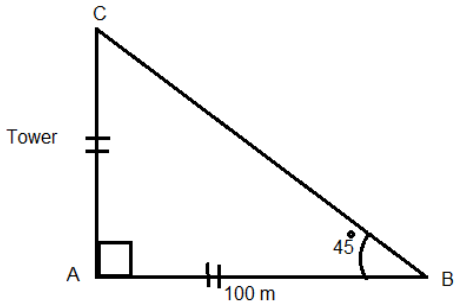
∴Volume increases to 8 times, i.e., Volume increases by 7 times =700%

41. The angle of elevation of the top of a tower at a point 100 metre from its foot on the horizontal plane is found to be 45°. The height of the tower is

1. 50 m 2. 75 m 3. 100 m 4. 125 m

Ans: 3

Explanation



42. The angle between the two diagonals of a cube is

1. 45° 2. 60° 3. 90° 4. None

Ans:4 (Not defined)

43. 5¼ ÷3½ ?

1. 3/2 2. 1 5/6 3. 2 1/3 4. 3½

Ans: 1

Explanation

The given sum → $\frac{21}{4} \times \frac{2}{7} = \frac{3}{2}$

44. Find the value of $\frac{1}{2}$x $\frac{(\sqrt{2}-1)}{(\sqrt{2}+1)}$.

1. 0.500 2. 0.0916 3. 0.857 4. 0.860

Ans: 3

Explanation

The given sum → $\frac{1}{2} \cdot \frac{\sqrt{2}-1}{\sqrt{2}+1}$ x $\frac{\sqrt{2}-1}{\sqrt{2}-1} = \frac{1}{2}x\frac{(\sqrt{2}-1)^2}{2-1} = \frac{1}{2}(0.414)^2 = \frac{0.1714}{2} = 0.0857$

Or

$= \frac{1}{2} = \frac{2-2\sqrt{2}+1}{1} = \frac{0.172}{2} = 0.0856$

45. If $\sqrt{1936}$= 44, then the value of $\sqrt{19.36} + \sqrt{0.1936} + \sqrt{0.001936} + \sqrt{0.00001936}$up to two places of decimals is

1. 4.87 2. 4.86 3. 4.89 4. 4.88

Ans:3

Explanation

Given$\sqrt{19 \cdot 36} = 4 \cdot 4$

$\therefore \sqrt{0 \cdot 1936} = 0.44$, $\sqrt{0.001936} = 0.044$ and $\sqrt{0.00001936} = 0.0044$

∴The given sum → 4.4 + 0.44 + 0.044 + 0.0044 = 4.8884 ≈ 4.89

46. If 2*3 = $\sqrt{13}$ and 3*4 = 5, then the value of 5*12 is

1.√17 2.√29 3. 12 4. 13

Ans: 4

Explanation:

Given: 2*3 = $\sqrt{13} = \sqrt{2^2 + 3^2}$ and 3*4 = $\sqrt{9 + 16} = 5$.

Therefore 5* 12 = $\sqrt{5^2 + 12^2} = \sqrt{169}$=13

47. The value of sin 79° cos 11° + cos 79° sin 11° is equal to

1. 1 2. 1/√2 3. 1/2 4. 0

Ans: 1

Explanation

It is known that: cos θ = sin (90° – θ°) and sin θ°= cos (90° – θ°)

∴ cos11° = sin 79° and sin11° = cos 79°

∴Given sum → sin 79°. sin 79° + cos 79° . cos 79° =1 {∵ $(\sin\theta)^2 + (\cos\theta)^2 = 1$}

48. If the price of milk be increased by 20%, find by how much percent a householder must reduce his consumption of milk so as not to increase his expenditure ?

1. 40% 2. 25% 3. 20% 4. $16\frac{2}{3}$ %

Ans: 4

Explanation

For fixed sum of money, the product of price, x and quantity of purchase, y is same.

i.e., $x_1y_1 = x_2y_2 \rightarrow \therefore \frac{x_1}{x_2} = \frac{y_2}{y_1}$

Given: $x_1y_1 = 1.2\ x_1 \times y_2$

$y_2 = \frac{1}{1.2} = 0.8333$

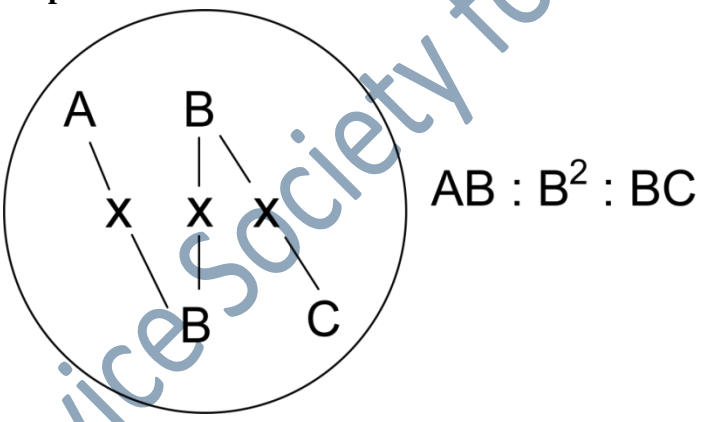
∴ New consumption is 83.33% of original quantity of consumption and hence the quantity to be reduced is $16\frac{2}{3}$ %

49. If A:B = 5:9 and B:C = 3:8, then A:B:C is

1. 5:9:8 2. 5:9:24 3. 15:9:8 4. 5:3:8

Ans: 2

Explanation:



Write the numbers as given below:

5:9

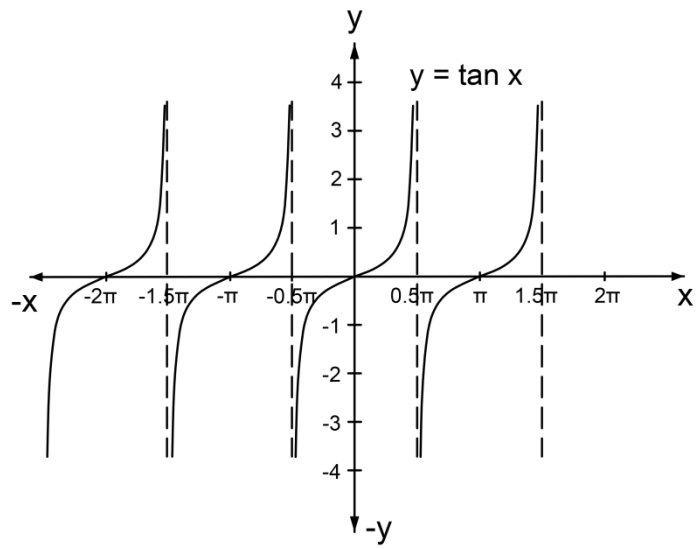
3:8

∴ A:B:C = 15: 27 : 72 → 5: 9 : 24

50. The graph of y = tan θ passes through

1. (0, 1) 2. (1, 0) 3. $(\pi/6, 0)$ 4. $(-\pi/2, \pi/2)$

Ans:4.



Explanation

i. One cycle occurs between $-\pi/2$and $\pi/2$.

ii. There are vertical asymptotes at each end of the cycle. The asymptote that occurs at $-\pi/2$ or $\pi/2$repeats every $\boldsymbol{\pi}$ units.

iii. period: π

iv. amplitude: not defined.