# 75+ Advance Maths Ques. PDF Asked in SSC CPO 2019/18/17

1. If a + b + c = 19, ab + bc + ca = 120, then what is the value of $a^3 + b^3 + c^3 - 3abc$?
A. 31
B. 23
C. 19
D. 18
Ans. C
Sol.
$$a^3+b^3+c^3-3abc=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$
$$a+b+c=19$$
Squaring both sides
$$a^2+b^2+c^2+2(ab+bc+ca)=361$$
$$a^2+b^2+c^2=361-240$$
$$a^2+b^2+c^2=121$$
$$a^3+b^3+c^3=19(121-120)$$
$$a^3+b^3+c^3-3abc=19$$

2. If $x^6 - 512y^6 = (x^2 + Ay^2)(x^4 - Bx^2y^2 + Cy^4)$, then what is the value of (A + B - C)?
A. - 72
B. 72
C. - 80
D. 48
Ans. C
Sol.
$$x^6-512y^6=(x^2+Ay^2)(x^4-Bx^2y^2+Cy^4)$$
$$(x^2)^3+(-8y^2)^3=(x^2+Ay^2)(x^4-Bx^2y^2+Cy^4)$$
$$a^3+b^3=(a+b)(a^2+ab+b^2)$$
$$(x^2)^3+(-8y^2)^3=(x^2-8y^2)(x^4-(-8)x^2y^2+64y^2)$$
On comparing-
A = -8, B = -8, C = 64
Required
A + B – C = -8 – 8 – 64
= -80.

3. Solve the following:
(a + b + c) (ab + bc + ca) – abc = ?
A. (a + b)(b + c)(c - a)
B. (a - b)(b - c)(c - a)
C. (a + b)(b - c)(c + a)
D. (a + b)(b + c)(c + a)
Ans. D
Sol.
(a + b + c)(ab + bc + ca) - abc
$= (a^2b + abc + a^2c) + (ab^2 + b^2c + abc) + (abc + bc^2 + ac^2) - abc$
$= ca^2 + a^2b + b^2c + ab^2 + bc^2 + c^2a + 2abc$
$= a^2(b + c) + (b^2 + 2bc + c^2)a + b^2c + bc^2$
$=(b + c)a^2 + (b + c)^2a + bc(b + c)$
$= (b + c)[a^2 + (b + c)a + bc]$
= (b + c) (a+ b) (a + c)
=(a + b)(b + c)(c + a)

4. If $(2x - 5)^3 + (x + 2)^3 + (3x - 9)^3 = (2x - 5)(3x - 9)(3x + 6)$, then find the value of x?
A. 7
B. 5
C. 2
D. 18
Ans. C
Sol.
We know that, $a^3 + b^3 + c^3 = 3abc$
when a + b + c = 0
So, $(2x - 5)^3 + (x + 2)^3 + (3x - 9)^3 = 3(2x - 5)(3x - 9)(x + 2)$
Hence,
⇒ (2x – 5) + (3x – 9) + (x + 2) = 0
⇒ 6x = 12
⇒ x = 2.

5.If $(x-6)^3+(x-4)^3+(x-5)^3=(3x-15)(x-4)(x-6)$,
then find the value of $x$?
A. 3
B. 5
C. 7
D. 18
Ans. B
Sol.
$$a^3+b^3+c^3=3abc$$
When $a+b+c=0$
$$(x-6)^3+(x-4)^3+(x-5)^3=(3x-15)(x-4)(x-6)$$
Then, $x-6+x-4+x-5=0$
$$3x-15=0$$
$$x=5$$

6. If a + b — c = 7, ab — bc — ca = 21, then $a^3 + b^3 - c^3 + 3abc$ =
A. 117
B. 98
C. 124

D. −98
Ans. D
Sol.

$a + b - c = 7$

$ab - bc - ca = 21$

$a^3 + b^3 - c^3 + 3abc = (a + b - c)(a^2 + b^2 + c^2 - ab + bc +$

$= 7[a^2 + b^2 + c^2 - (ab - bc - ca)]$

$= 7[a^2 + b^2 + c^2 - 21]$

$= 7[\{(a + b - c)^2 - 2(ab - bc - ca)\} - 21]$

$= 7[49 - 2 \times 21 - 21]$

$= 7[-14]$

$= -98.$

7. If $x^2 + \frac{1}{x^2} = 11$, then $x - \frac{1}{x}$ is equal to:

A. 2
B. 3
C. 5
D. 4
Ans. B
Sol.

$$x^2 + \frac{1}{x^2} = 11 \ldots\ldots\ldots (1)(Given)$$

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

Using (1), (2) yield

$$\left(x - \frac{1}{x}\right)^2 = 9 \text{ or } x - \frac{1}{x} = 3$$

8. What is the simplified value of $3 + \sqrt{3} + \frac{1}{3 - \sqrt{3}} + \frac{1}{3 + \sqrt{3}}$?

A. $2 + \sqrt{3}$
B. $2 - \sqrt{3}$
C. $4 - \sqrt{3}$
D. $4 + \sqrt{3}$
Ans. D

Sol. $3 + \sqrt{3} + \frac{1}{3 - \sqrt{3}} + \frac{1}{3 + \sqrt{3}}$

$3 + \sqrt{3} + \frac{3 + \sqrt{3} + 3 - \sqrt{3}}{6}$

$3 + \sqrt{3} + 1$

$4 + \sqrt{3}$

9. What is the simplified value of

$\left(x^{32} + \frac{1}{x^{32}}\right)\left(x^8 + \frac{1}{x^8}\right)\left(x - \frac{1}{x}\right)\left(x^{16} + \frac{1}{x^{16}}\right)\left(x + \frac{1}{x}\right)\left(x^4 + \frac{1}{x^4}\right)$

A. $\left(x^{64} + \frac{1}{x^{64}}\right)$

B. $\frac{\left(x^{64} - \frac{1}{x^{64}}\right)}{\left(x^2 + \frac{1}{x^2}\right)}$

C. $\frac{\left(x^{64} - \frac{1}{x^{64}}\right)}{\left(x + \frac{1}{x}\right)}$

D. $\frac{\left(x^{32} - \frac{1}{x^{32}}\right)}{\left(x + \frac{1}{x}\right)}$

Ans. B
Sol.

$\left(x^{32} + \frac{1}{x^{32}}\right)\left(x^8 + \frac{1}{x^8}\right)\left(x - \frac{1}{x}\right)\left(x^{16} + \frac{1}{x^{16}}\right)\left(x + \frac{1}{x}\right)\left(x^4 + \frac{1}{x^4}\right)$

Multiplying and dividing the above equation by- $\left(x^2 + \frac{1}{x^2}\right)$

We get,

$$\frac{\left(x - \frac{1}{x}\right)\left(x + \frac{1}{x}\right)\left(x^2 + \frac{1}{x^2}\right)\left(x^4 + \frac{1}{x^4}\right)\left(x^8 + \frac{1}{x^8}\right)\left(x^{16} + \frac{1}{x^{16}}\right)\left(x^{32} + \frac{1}{x^{32}}\right)}{\left(x^2 + \frac{1}{x^2}\right)}$$

$$\frac{\left(x^2 - \frac{1}{x^2}\right)\left(x^2 + \frac{1}{x^2}\right)\left(x^4 + \frac{1}{x^4}\right)\left(x^8 + \frac{1}{x^8}\right)\left(x^{16} + \frac{1}{x^{16}}\right)\left(x^{32} + \frac{1}{x^{32}}\right)}{\left(x^2 + \frac{1}{x^2}\right)}$$

so on, this equation will reduce to-

$$\frac{\left(x^{64} - \frac{1}{x^{64}}\right)}{\left(x^2 + \frac{1}{x^2}\right)}$$

10. If $x^2 + \frac{1}{x^2} = \frac{7}{4}$ for x>0, then what is the value of $x^3 + \frac{1}{x^3}$ ?

A. (3√3)/5
B. (3√15)/5
C. (3√15)/8
D. (3√5)/8
Ans. C

Sol. $x^2 + \frac{1}{x^2} = \frac{7}{4}$

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 = \frac{7}{4} + 2$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^2 = \frac{15}{4}$$

Taking square-root of both sides, we get

$$\left(x+\frac{1}{x}\right)=\frac{\sqrt{15}}{2}$$

Now, taking cube of both sides, we get

$$x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right)=\frac{15\sqrt{15}}{8}$$

$$\Rightarrow x^3+\frac{1}{x^3}=\frac{15\sqrt{15}}{8}-\frac{3\sqrt{15}}{2}$$

$$\Rightarrow x^3+\frac{1}{x^3}=\frac{3\sqrt{15}}{8}$$

11. If $3x^2-9x+3=0$, then what is the value of $\left(x+\frac{1}{x}\right)^3$ ?

A. 9
B. 729
C. 81
D. 27
Ans. D
Sol. $3x^2-9x+3=0$
3x(x+1/x)= 9x

$$\left(x+\frac{1}{x}\right)=3$$

Cube on both the sides

$$\left(x+\frac{1}{x}\right)^3=27$$

12. If $x^2+\frac{1}{x^2}=\frac{7}{4}$ for $x>0$ then what is the value of $x^4+\frac{1}{x^4}$ ?

A. 1
B. 17/16
C. 15/16
D. 51/16
Ans. B
Sol. $x^2+\frac{1}{x^2}=\frac{7}{4}$
Square on both the sides

$$x^4+\frac{1}{x^4}+2=\frac{49}{16}$$

$$x^4+\frac{1}{x^4}=\frac{17}{16}$$

13. If $x+y=4$, then what is the value of $x^3+y^3+12xy$ ?
A. 16
B. 32
C. 64
D. 256
Ans. C
Sol. X+y=4
Cube on the both the side
$X^3+y^3+3xy(x+y)=64$
$X^3+y^3+12xy=64$

14. if $x^4+\frac{1}{x^4}=98$ and x>1, then what is the value of $x-\frac{1}{x}$ ?
A. 2
B. 2√2
C. √5
D. √3
Ans. B
Sol. $x^4+\frac{1}{x^4}=98$

$$\Rightarrow x^4+\frac{1}{x^4}+2=100$$

$$\Rightarrow \left(x^2+\frac{1}{x^2}\right)^2=10^2$$

Taking square-root of both sides, we get

$$\left(x^2+\frac{1}{x^2}\right)=10$$

Again, $x^2+1/x^2-2=10-2$
⇒x – 1/x = 2√2

15. If N = (√6 - √5)/(√6 + √5), then what is the value of N + (1/N)?
A. 10
B. 11
C. 12
D. 22
Ans. D
Sol. $N=\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}+\sqrt{5}}$
Multiply both the numerator and denominator by √6 -√5
We get

$$N=\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}+\sqrt{5}}\times\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}}=\frac{6+5-2\sqrt{30}}{1}$$

N=11-2√30

$$\frac{1}{N}=\frac{1}{11-2\sqrt{30}}$$

Multiply both the numerator and denominator by 11+2√30

Then $\frac{1}{N}=11+2\sqrt{30}$

So

$$N + \frac{1}{N} = 11 - 2\sqrt{30} + 11 + 2\sqrt{30} = 22$$

16. If $x^2 + \frac{1}{x^2} = \frac{7}{4}$ for x > 0, then what is the value of $x + \frac{1}{x}$?

A. 2
B. √15/2
C. √5
D. √3
Ans. B

Sol. $x^2 + \frac{1}{x^2} = \frac{7}{4}$

Add 2 on the both the sides

$$x^2 + \frac{1}{x^2} + 2 = \frac{7}{4} + 2$$

$$\left(x + \frac{1}{x}\right)^2 = \frac{15}{4}$$

$$x + \frac{1}{x} = \frac{\sqrt{15}}{2}$$

17. If $x^2$-8x+1=0, then what is the value of $x^2 + \frac{1}{x^2}$ ?

A. 18
B. 34
C. 40
D. 62
Ans. D

Sol. $x^2 - 8x + 1 = 0$
dividing both sides by x, we get
⇒x − 8 + 1/x = 0
⇒(x + 1/x) = 8
Taking square of both sides, we get

$$x^2 + \frac{1}{x^2} + 2 = 64$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 62$$

18. If $a^3 + b^3$ =5824 and a + b = 28,then $(a - b)^2$ + ab is equal to :

A. 208
B. 152
C. 180
D. 236
Ans. A

Sol.
$a^3 + b^3 = 5824$
$(a+b)(a^2 + b^2 - ab) = 5824$
$(a^2 + b^2 - ab) = 5824/28 = 208$
$(a^2 + b^2 - 2ab + ab) = 208$
$(a - b)^2 + ab = 208$

19.If $x + \frac{1}{x} = 8$, then $x^2 + \frac{1}{x^2}$ is equal to:

A. 62
B. 68
C. 64
D. 66
Ans. A

Sol. $x + \frac{1}{x} = 8$

Then, $x^2 + \frac{1}{x^2} = (8)^2 - 2$
= 64-2 = 62

20. If x + y + z =10, xy + yz + zx = 25 and xyz = 100, then what is the value of $(x^3 + y^3 + z^3)$?

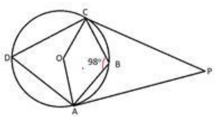
A. 450
B. 540
C. 550
D. 570
Ans. C

Sol.
Since x + y + z = 10
Squaring both sides we get $x^2 + y^2 + z^2 + 2(xy + yz + zx) = 100$
$x^2 + y^2 + z^2 + 2 \times 25 = 100$
$x^2 + y^2 + z^2 = 50$
We know that $x^3 + y^3 + z^3 - 3xyz = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$
$x^3 + y^3 + z^3 - 3 \times 100 = (10)(50 - 25)$
$x^3 + y^3 + z^3 = 250 + 300 = 550$

21. ABCD is a cyclic quadrilateral. The tangents to the circle at the points A and C on it, interest at P. If ∠ABC = 98°, then what is the measure of ∠APC?

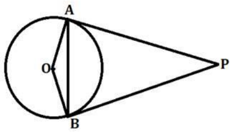
A. 14°
B. 22°
C. 16°
D. 26°
Ans. C

Sol.



∠CDA = 180 – 98
∠CDA = 82°
∠AOC = 2∠D
∠AOC = 164°
∠COA + ∠APC = 180
∠APC = 180 – 164
∠APC = 16°

22. PA and PB are two tangents drawn from a point P outside of the circle of center O. Point A and B are on the circle. If ∠OAB = 35°, then ∠APB is equal to:
A. 70°
B. 25°
C. 35°
D. 20°
Ans. A
Sol.




Since OA = OB
Then, ∠OAB = ∠OBA
∠AOB = 180 – 2∠OAB

$$= 180 - 70 = 110^{\circ}$$

∠APB = 180 – 110 = 70°.

23. The angles of a triangle are 2x - 3, x + 12, x - 1 respectively. Find the largest angle
A. $42^{\circ}$
B. $83^{\circ}$
C. $94^{\circ}$
D. $55^{\circ}$
Ans. B
Sol.
A.T.Q.

$$2x - 3 + x + 12 + x - 1 = 180^{\circ}$$

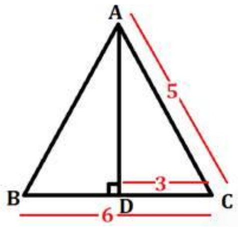
$$4x + 8 = 180^{\circ}$$

$$4x = 172^{\circ}$$

$$x = 43^{\circ}$$

Required Angle $2x - 3 = 86 - 3 = 83^{\circ}$.

24. The base of an isosceles triangle is 6 cm and its perimeter is 16 cm. Find its area:
A. 11 $cm^2$
B. 10 $cm^2$
C. 12 $cm^2$
D. 9 $cm^2$
Ans. C
Sol.




Let equal sides be $= a$
A.T.Q.

$$a + a + 6 = 16$$

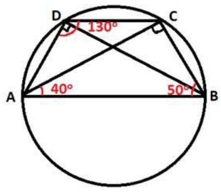
$$2a = 10$$

$$a = 5$$

$$AD = \sqrt{5^2 - 3^2} = 4$$

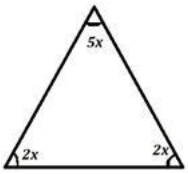
$$\text{Area} = \frac{1}{2} \times 6 \times 4 = 12\ \text{cm}^2.$$

25. ABCD is a cyclic quadrilateral in which AB is the diagonal of a circle. Angle ADC = 130˚, then find the angle BAC?
A. 60°
B. 50°
C. 150°
D. 40°
Ans. D
Sol.



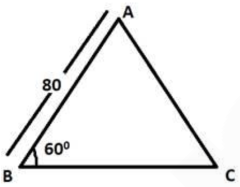

∠ ADC = 130°
Since ABCD is a cyclic quadrilateral.
Then, ∠ ADC + ∠ ABC = 180°
∠ ABC = 180° - 130°
∠ ABC = 50°
∠ ABC + ∠ ACB + ∠ BAC = 180°
50° + 90° + ∠ BAC = 180°
∠ BAC = 180° - 140°
∠ BAC = 40°.

26. The ratio of base angle and vertical angle of an isosceles triangle (whose base angles are equal) is 2:5. Find the vertical angle.
A. 80˚
B. 140˚
C. 100˚
D. 40˚
Ans. C
Sol.



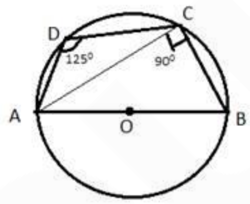

$$2x + 2x + 5x = 180°$$
$$9x = 180°$$
$$x = 20°$$
Required $5x = 100°$.

27. Side AB of a triangle ABC is 80 cm long, whose perimeter is 170 cm. If angle ABC = 60°, the shortest side of triangle ABC measures ________cm.
A. 17
B. 15
C. 25
D. 21
Ans. A
Sol.



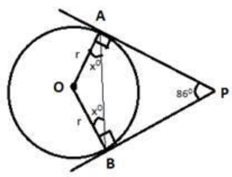

$$AB = 80cm$$
$$AB + BC + CA = 170 \text{ (given)}$$
$$BC + CA = 90cm$$
From cosine rule
$$\cos 60^0 = \frac{AB^2 + BC^2 - CA^2}{2.AB.BC}$$
$$\frac{1}{2} = \frac{(80)^2 + BC^2 - AC^2}{2 \times 80 \times BC}$$
$$80BC = 6400 + (BC - AC)(BC + AC)$$
$$= 6400 + [BC - (90 - BC)] \times 90$$
$$= 6400 + [BC + BC - 90] \times 90$$
$$80BC = 6400 + 180BC - 8100$$
$$100BC = 1700$$
$$BC = 17.$$

28. ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and angle ADC = 125° . Then angle BAC is equal to:
A. 20°
B. 30°
C. 60°
D. 35°
Ans. D
Sol.




ABCD is cyclic quadrilateral.
So, ∠ADC + ∠ABC = $180^0$
$125^0$ + ∠ABC = $180^0$
∠ABC = $55^0$
We know that angle made in semicircle by it's diameter is always $90^0$.
So, ∠ACB = $90^0$
In triangle ABC,
∠BAC + ∠ABC + ∠ACB = $180^0$
∠BAC + $55^0$ + $90^0$ = $180^0$
∠BAC = $35^0$

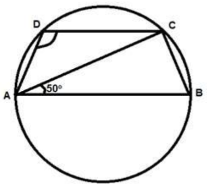
29. PA and PB are two tangents to a circle with centre o, from a point P outside the circle. A and B are points on the circle. If ∠APB = 86° , then ∠OAB is equal to:
A. 43°
B. 45°
C. 50°
D. 20°
Ans. A
Sol.




In quadrilateral OAPB,
∠AOB + ∠OAP + ∠APB +∠OBP =$360^0$
∠AOB + $90^0$ + $86^0$ +$90^0$ =$360^0$

∠AOB $=94^0$
In triangle AOB,
OA=OB = r
So, ∠OBA =∠OAB = $x^0$
Now,
∠AOB + $x^0$ + $x^0$ = $180^0$
$94^0 + 2x = 180^0$
$X=43^0$

30. ABCD is a cyclic quadrilateral such that AB is the diameter of the circle circumscribing it and angle BAC = 50°. Then angle ADC is equal to:
A. 60°
B. 150°
C. 130°
D. 140°
Ans. D
Sol.




∠ACB=$90^o$ because triangle inscribed in a semicircle is always a right angle triangle
∠BAC=$50^o$ (Given)
From the property of Δ
∠ABC+∠ACB+∠BAC=$180^o$
Then ∠ABC=$180^o - 90^o - 50^o = 40^o$
From the property of cyclic quadrilateral
∠ABC + ∠ADC=$180^o$
∠ADC=$180^o - 40^o = 140^o$

31. Triangle PQR is a right-angled at Q. if PQ = 6 cm, PR=10 cm then QR is equal to:
A. 5 cm
B. 8 cm
C. 7 cm
D. 9 cm
Ans. B
Sol.
$QR = \sqrt{PR^2 - PQ^2} = \sqrt{100 - 36} = \sqrt{64} = 8\ cm$

32.ABCD is a trapezium, such that AB = CD and AD||BC, AD = 10 cm and BC = 18 cm. If the area of ABCD is 70 cm, then what is the value of CD?
A. 5
B. $\sqrt{29}$
C. $\sqrt{41}$
D. 6
Ans. A
Sol. Area of ABCD=70cm
AD=10
BC=18
Then
$$area\ of\ trapezium = \frac{1}{2}(AD + BC) \times CD$$
2× 70=28× CD
CD=5cm

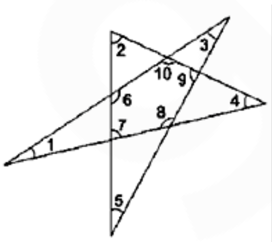
33. In ΔPQR, a line parallel to side QR cuts the side PQ and PR at points M and N respectively and point M divide PQ in the ratio of 1 : 2. If area of ΔPQR is 360 $cm^2$, then what is the area (in $cm^2$) of quadrilateral MNRQ?
A. 160
B. 320
C. 120
D. 96
Ans. B
Sol. We know that,
$$\frac{\boldsymbol{area\ of\ \Delta PMN}}{\boldsymbol{area\ of\ \Delta PQR}} = \frac{\boldsymbol{(PM)^2}}{\boldsymbol{(PQ)^2}}$$
$$\Rightarrow \frac{\boldsymbol{area\ of\ \Delta PMN}}{\boldsymbol{360}} = \frac{\boldsymbol{(1)^2}}{\boldsymbol{(1+2)^2}}$$
⇒area of triangle PMN = 40 $cm^2$
∴Area of quadrilateral MNRQ = Area of (triangle PQR – triangle PMN)
= 360 – 40
= 320 $cm^2$

34. In an isosceles triangle DEF, ∠D = 110 °. If I is the incentre of the triangle, then what is the value (in degrees) of ∠EIF?
A. 110
B. 130
C. 145
D. 155
Ans. C
Sol. We know that, if I is the incentre of a triangle DEF, then
∠EIF = 90 ° + ∠D/2
= 90 ° + 110/2
= 145 °

35. The radius of a wheel is 3.5 cm. What is the distance (in cm) travelled by the wheel in 20 revolutions?
A. 220
B. 440
C. 880
D. 1320
Ans. B
Sol. Given: Radius of the wheel = 3.5 cm
Distance travelled by the wheel in 1 revolution = 2 π r
= 2 × (22/7) × 3.5
= 22 cm
∴Distance travelled by the wheel in 20 revolution = 20 × 22
= 440 cm

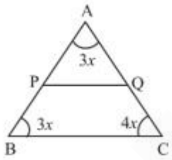
36. $\Delta PQR$ is a right angled at Q. If PQ = 8 cm and PR = (QR + 2) cm. What is the value (in
cm) of PR?
A. 17
B. 15
C. 19
D. 18
Ans. A
Sol. Triangle PQR is a right angled triangle
PQ=8cm
PR=QR+2
We know the Pythagoras theorem
Then $PR^2=PQ^2+QR^2$
$QR^2+4+4QR=PQ^2+QR^2$
4QR= 64-4=60
QR=15
Then PR=QR+2=15+2=17cm

37. In the given figure what is the value of $\angle 1+\angle 2+\angle 3+\angle 4+\angle 5+\angle 6+\angle 7+\angle 8+\angle 9+\angle 10$




A. 600
B. 720
C. 900
D. 1080
Ans. B
Sol. .

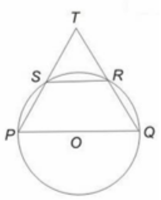
38. In $\Delta ABC$, $\angle A:\angle B:\angle C=3:3:4$ A line parallel to BC is drawn which touches AB and AC at P and Q respectively. What is the value of $\angle AQP-\angle APQ$?
A. 12
B. 18
C. 24
D. 36
Ans. B

Sol.



$\angle A:\angle B:\angle C=3:3:4$
Let A= 3x, B=3x and C=4x
We know that sum of all angles of a triangle =180 °
Then 3x+3x+4x=180
X=18
Then angle A= 54 =B=54 and C=72
PQ is parallel to BC then ∠ APQ= ∠ ABC=54 (corresponding angle are equal)
Angle AQP= ACB=72(corresponding angle are equal)
So ∠ AQP- ∠ APQ= 72-54= 18 °

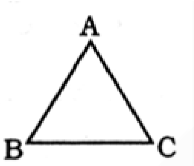
39. Two identical circles each of radius 2 cm intersect each other such that the circumference of each one passes through the centre of the other. What is the area (in $cm^2$) of the intersecting region?
A. $\frac{8\pi}{3}-2\sqrt{3}$
B. $\frac{8\pi}{3}-\sqrt{3}$
C. $\frac{4\pi}{3}-\sqrt{3}$
D. $\frac{4\pi}{3}-2\sqrt{3}$
Ans. B
Sol. .

40. In the given figure, OQ = QR = RT and O is the center of the circle. What is the ∠PTR?




A. 30
B. 60
C. 45
D. 90
Ans. B
Sol. Given:
OQ = QR = OR (∵ OQ = OR radius of the circle)
∴ ∠OQR = 60 °
Similarly, OP = OS = PS
And ∠OPS = 60 °
Now, in triangle PQT
∠QPT + ∠PQT + ∠PTR = 180 °
⇒ 60 + 60 + ∠PTR = 180 °
⇒ ∠PTR = 60 °

41. In ΔABC, ∠A + ∠B = 145° and ∠C+ 2∠B = 180°. State which one of the following relations is true?
A. CA = AB
B. CA < AB
C. BC < AB
D. CA > AB
Ans. D

Sol. 


∠A + ∠B = 145°
∠C = 180° - 145° = 35°
∠C + 2∠B = 180°
2∠B = 180° - 35° = 145°
∠B = 145°/2 = 72.5°
Since ∠B > ∠C
So, AC > AB

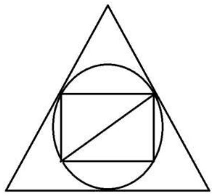
42. The ratio of the volumes of two right circular cylinders A and B is $\frac{x}{y}$ and the ratio of their heights is a : b What is the ratio of the radius of A and B?
A. $\sqrt{\frac{xb}{ya}}$
B. $\frac{xb}{ya}$
C. $\sqrt{\frac{xa}{yb}}$
D. $\frac{yb}{xa}$
Ans. A
Sol.
$$\frac{\text{Volume of cylinder A}}{\text{Volume of cylinder B}} = \frac{\pi r_A^2 h_A}{\pi r_B^2 h_B}$$
$$\frac{\pi r_A^2 \times a}{\pi r_B^2 \times b} = \frac{x}{y}$$
$$\frac{r_A}{r_B} = \sqrt{\frac{xb}{ya}}.$$

43. The length and breadth of a cuboidal store are in the ratio 2 : 1 and its height is 3.5 meters. If the area of its four walls (including doors) is 210m², then its volume is ________.
A. 700 $m^3$
B. 679 $m^3$
C. 567 $m^3$
D. 1050 $m^3$
Ans. A
Sol.
Area of four walls = 2(l + b)h
2(2$x$ + $x$) × 3.5 = 210
3$x$ = 30
$x$ = 10
Then,
Length = 20m, breadth =10m and height =3.5m
Volume of cubes = l × b × h
= 20 × 10 × 3.5
= 700 $m^3$.

44. A circle is inscribed in an equilateral triangle of side 24 cm. What is the area (in cm2) of the square inscribed in the circle?
A. 48
B. 72
C. 96
D. 54
Ans. C
Sol.
Side of an equilateral triangle = 24 cm

Inradius of an equilateral triangle = $\frac{side\ of\ equilateral\ triangle}{2\sqrt{3}}$ = $\frac{24}{2\sqrt{3}} = \frac{12}{\sqrt{3}}$ cm

Inradius of an equilateral triangle = Radius of inscribed circle = $\frac{12}{\sqrt{3}}$ cm



Diameter of inscribed circle = Diagonal of inscribed square = $2 \times \frac{12}{\sqrt{3}}$ cm = $\frac{24}{\sqrt{3}}$ cm

Diagonal of square = $\sqrt{2} \times side\ of\ square$

$\sqrt{2} \times side\ of\ square = \frac{24}{\sqrt{3}}$ cm

Side of square = $\frac{24}{\sqrt{6}}$ cm

Area of square = $\left(\frac{24}{\sqrt{6}}\right)^2 = \frac{24\times24}{6} = 96\ cm^2$

45. A box has enough color to paint an area of 11.28 $m^2$. How many boxes of dimension of 30 cm × 25 cm × 12 cm can be painted?

A. 12
B. 32
C. 40
D. 24

Ans. C

Sol.

T.S.A. of a box $= 2(lb + bh + hl)$

$= 2(30 \times 25 + 25 \times 12 + 12 \times 30)$

$= 2(75 + 300 + 360)$

$= 2820\ cm^2$.

Number of boxes X 2820 = 112800

No. of Boxes = 40.

46. Area of a parallelogram is 338 $m^2$. If its height is two times of its base, then its base is:

A. 14
B. 28
C. 13
D. 26

Ans. C

Sol.

Area of parallelogram $=$ height $\times$ base

Let base $= x$

Height $= 2x$

$x \times 2x = 338$

$x^2 = 169$

$x = 13.$

47. If the surface area of a cube is 1944$m^2$, then find the volume of the cube?

A. 1648 $m^3$
B. 4912 $m^3$
C. 2744 $m^3$
D. 5832 $m^3$

Ans. D

Sol.

Let the side of cube $= a$

$6a^2 = 1944$

$a^2 = 324$

$a = 18$ m

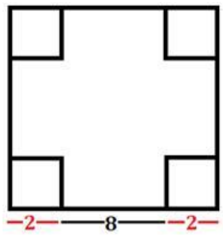
Volume $= a^3 = 18^3 = 5832\ \text{m}^2$.

48. A square of side 2 cm is cut from all four corners of a square of side 12 cm. To make a box of depth 2 cm, resulting flaps are folded. Find the volume of this box.

A. 128 $cm^3$
B. 94 $cm^3$
C. 102 $cm^3$
D. 112 $cm^3$

Ans. A

Sol.




$h = 2\ cm$

After cutting the new side $= 8\ cm$

Volume $= 8 \times 8 \times 2 = 128\ cm^3$.

49. The price of petrol was raised by 15%.
By how much percentage should a motorist reduce the consumption of petrol so that the expenditure on it does not increase?
A. $9\frac{2}{11}$ %
B. $15\frac{3}{13}$ %
C. $13\frac{1}{23}$ %
D. $6\frac{7}{8}$ %
Ans. C
Sol.
We know that
price x consumption = expenditure
Let the price before increment is 100.

| | Before | After |
|---|---|---|
| Price | 100 | 115 |
| Consumption | 115 | 100 |
| Expenditure | 11500 | 11500 |

% decrease in consumption= $\frac{115-100}{115}\times 100$
$= 13\frac{1}{23}$ %

50. If a cuboid has *l* = 24 cm, b = 16 cm, h = 7.5 cm, its lateral surface area is:
A. 720 $cm^2$
B. 2880 $cm^2$
C. 600 $cm^2$
D. 1440 $cm^2$
Ans. C
Sol.
Lateral surface area = 2(lh+bh)
= 2(24x7.5 + 16x7.5)
= 2(180 + 120) = 600 $cm^2$

51. Three cubes with edge 6 cm each are joined end to end to form a cuboid. The total surface area of the cuboid is :
A. 432 $cm^2$
B. 504 $cm^2$
C. 648 $cm^2$
D. 720 $cm^2$
Ans. B
Sol.
When three cube joined end to end l become 18 cm
W=6 cm & h=6 cm
Total surface area of cuboid=2(lw + wh + hl)
= 2×(18×6+6×6+6×18)=504 $cm^2$

52. A solid metallic sphere of radius 8.4 cm is melted and recast into a right circular cylinder of radius 12 cm. What is the height of the cylinder? (Your answer should be correct to one decimal place.)
A. 6.5 cm
B. 5.5 cm
C. 7.0 cm
D. 6.0 cm
Ans. B
Sol.
$\frac{4}{3}\pi r^3 = \pi r^2 h$
$\frac{4}{3}\pi \times 8.4 \times 8.4 \times 8.4 = \pi \times 12\times12\times h$
Solving we get h = 5.48 or 5.5 cm

53. Total surface area of a right circular cylinder is 1848 $cm^2$. The ratio of its total surface area to the curved surface area is 3 : 1. What is the volume of the cylinder(Take $\pi = \frac{22}{7}$)?
A. 4312 $cm^3$
B. 3696 $cm^3$
C. 4002 $cm^3$
D. 4851 $cm^3$
Ans. A
Sol.
According to the question,
$\frac{\text{Total Surface Area}}{\text{Curved Surface Area}} = \frac{3}{1}$
$\frac{1848}{2\pi rh} = \frac{3}{1}$
$6\pi rh = 1848$
$\pi rh = 308$ --------------(1)
Now curved surface area = 1848
$2\pi r(r+h) = 1848$
$\pi r(r+h) = 924$

$\pi r^2 + 308 = 924$

$r^2 = \frac{616\times7}{22}$

r = 14

Put value of r in (1)

$\pi \times 14 \times h = 308$

$h = \frac{22\times7}{22}$

h =7

Now, Volume = $\pi r^2 h$ = $\frac{22}{7} \times 14 \times 14 \times 7$ = 4312 $cm^3$

54. The radius of the base of a solid right circular cone is 8 cm and its height is 15 cm. The total surface area of the cone is:

A. 200 п

B. 120 п

C. 136 п

D. 128 п

Ans. A

Sol.

Calculating slant height, $l = \sqrt{r^2 + h^2} = \sqrt{225 + 64}$ = 17

Total surface area = $\pi rl + \pi r^2$

= $\pi \times 8(17+8)$

= 200 $\pi$ $cm^2$

55. The length, width and height of a box are 506 cm, 345 cm and 230 cm respectively. Find the maximum length of a scale, which can measure the all three sides of the box?

A. 23 cm

B. 15 cm

C. 30 cm

D. 46 cm

Ans. A

Sol.

Maximum side length = HCF (506, 345, 230)

Required Length = 23 cm.

56. 5 cubes, each of edge 4 cm, are joined end to end. What is the total surface area of the resulting cuboid?

A. 352 $cm^2$

B. 486 $cm^2$

C. 720 $cm^2$

D. 526 $cm^2$

Ans. A

Sol.

when 5 cubes put side by side, they form a cuboid with the length equal to the sum of length of 5 cubes and height and width remain same as cube.

$l = 4 \times 5 = 20\ cm, h = 4cm, b = 4cm$

Surface area of cuboid,

$s = 2(lb + bh + hb) \rightarrow 2(20 \times 4 + 4 \times 4 + 4 \times 20)$

$s = 2 \times (80 + 16 + 80) \rightarrow 352\ cm^2$

57. If $\cos^2 \theta - \sin^2 \theta = \tan^2 \emptyset$, then which of the following is true?

A. $\cos \theta \cos \emptyset = 1$

B. $\cos \theta \cos \emptyset = \sqrt{2}$

C. $\cos^2 \emptyset - \sin^2 \emptyset = \cot^2 \theta$

D. $\cos^2 \emptyset - \sin^2 \emptyset = \tan^2 \theta$

Ans. D

Sol.

$\cos^2\theta - \sin^2\theta = \tan^2\emptyset$

$\cos^2 \theta - \sin^2 \theta = \sec^2\varphi - 1$

$$\frac{\cos^2\theta - \sin^2\theta}{1} = \frac{1-\cos^2\varphi}{\cos^2\varphi}$$

$$\frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta + \sin^2\theta} = \frac{\sin^2\varphi}{\cos^2\varphi}$$

Apply componendo and dividendo

$$-\frac{2\cos^2\theta}{2\sin^2\theta} = \frac{\sin^2\varphi + \cos^2\varphi}{\sin^2\varphi - \cos^2\varphi}$$

$\cos^2\varphi - \sin^2\varphi = \tan^2 \theta$.

58. If $x = a \cos\theta + b \sin\theta$ and $y = a \sin\theta - b \cos\theta$, the value of $x^2 + y^2$ is:

A. $a^2 - b^2$

B. a – b

C. $a^2 + b^2$

D. a + b

Ans. C

Sol.

$x = a \cos\theta + b \sin\theta$

$x^2 = a^2 \cos^2\theta + b^2 \sin^2\theta + 2ab\sin\theta\cos\theta$ ..........(1)

And

$y^2 = a^2 \sin^2\theta + b^2 \cos^2\theta - 2ab\sin\theta\cos\theta$ ...........(2)

By adding equation (1) and (2)

$x^2 + y^2 = (a^2 + b^2)\sin^2\theta + (a^2 + b^2)\cos^2\theta$

$x^2 + y^2 = (a^2 + b^2)(\sin^2\theta + \cos^2\theta)$

$x^2 + y^2 = a^2 + b^2$ ∵

$\sin^2\theta + \cos^2\theta = 1$

59. (cosec A – sin A)$^2$ + (secA – cosA)$^2$ – (cotA – tanA)$^2$ is equal to :
A. 2
B. 0
C. 1
D. -1
Ans. C
Sol.

$cosec^2 A + \sin^2 A - 2cosecA \sin A + \sec^2 A + \cos^2 A - 2\cos A \sec A - \cot^2 A - \tan^2 A + 2\cot A \tan A$

$= \sin^2 A + \cos^2 A + cosec^2 A - \cot^2 A + \sec^2 A - \tan^2 A - 2 - 2 + 2$

$= 1 + 1 + 1 - 4 + 2$

$= 1.$

60. What is the value of $\frac{\sin 30^\circ + \cos 30^\circ}{\cos 30^\circ - \sin 30^\circ}$?
A. 2 – √3
B. 2 + √3
C. 1
D. – (2 – √3)
Ans. B
Sol. .

61. If sin A = x – cos A and sec A = y – cosec A, then the value of y(x$^2$ – 1) is equal to:
A. 3x
B. 2x
C. 2xy
D. 0
Ans. B
Sol. x= sinA+cosA
x$^2$ = sin$^2$A+cos$^2$A+2sinAcosA
=1+2sinAcosA
y= secA+cosecA
Then y(x$^2$ – 1)
(secA+cosecA)(1+2sinAcosA-1)

$= \frac{sinA + cosA}{sinAcosA}(1 + 2sinAcosA - 1) = 2(sinA + cosA)$

62. If 3 cot θ = 4 cos θ, then what is the value of cos 2θ?
A. 2/16
B. - 1/8
C. 7/16
D. 9/16
Ans. B
Sol. 3 cot θ = 4 cos θ
⇒3 cos θ/sin θ = 4 cos θ
⇒Sin θ = ¾ and cos θ = √7/4 ⇒cos θ = √ (1 – sin$^2$θ)
And, 2 cos θ = cos$^2$θ – sin$^2$θ
2 cos θ = 7/16 – 9/16 ⇒ (-2)/16 ⇒**(-1)/8**
Hence, the correct option is **B**

63. If cosec θ - sin θ= l and sec θ - cos θ= m, then the value of $l^2m^2(l^2+m^2+3)$is
A. - 1
B. 0
C. 1
D. 2
Ans. C
Sol. $(l^2 . m^2)(l^2 + m^2 + 3)$

$\Rightarrow (cosec\,\theta - \sin\theta)^2(\sec\theta - \cos\theta)^2$

$\{(cosec\,\theta - \sin\theta)^2 + (\sec\theta - \cos\theta)^2 + 3\}$

$= \left(\frac{1}{\sin\theta} - \sin\theta\right)^2\left(\frac{1}{\cos\theta} - \cos\theta\right)^2$

$\left\{\left(\frac{1}{\sin\theta} - \sin\theta\right)^2 + \left(\frac{1}{\cos\theta} - \cos\theta\right)^2 + 3\right\}$

$= \left(\frac{1-\sin^2\theta}{\sin\theta}\right)^2\left(\frac{1-\cos^2\theta}{\cos\theta}\right)^2$

$\left\{\left(\frac{1-\sin^2\theta}{\sin\theta}\right)^2 + \left(\frac{1-\cos^2\theta}{\cos\theta}\right)^2 + 3\right\}$

$= \left(\frac{\cos^2\theta}{\sin\theta}\right)^2\left(\frac{\sin^2\theta}{\cos\theta}\right)^2$

$\left\{\left(\frac{\cos^2\theta}{\sin\theta}\right)^2\left(\frac{\sin^2\theta}{\cos\theta}\right)^2 + 3\right\}$

$= \frac{\cos^4\theta}{\sin^2\theta} \times \frac{\sin^4\theta}{\cos^2\theta}$

$\left\{\frac{\cos^4\theta}{\sin^2\theta} \times \frac{\sin^4\theta}{\cos^2\theta} + 3\right\}$

$= \cos^2\theta \times \sin^2\theta$

$\left\{\frac{\cos^6\theta + \sin^6\theta + 3\cos^2\theta.\sin^2\theta}{\cos^2\theta\,.\,\sin^2\theta}\right\}$

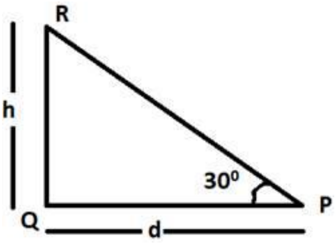
$= \cos^6\theta + \sin^6\theta + 3\cos^2\theta\,.\sin^2\theta$

$= (\cos^2\boldsymbol{\theta} + \sin^2\boldsymbol{\theta})^3$

=1

64. From a point P on a level ground, the angle of the elevation of the top of a tower is 30°. If the tower is 270 m high, the distance of point P form the foot of the tower is:
A. 467.65m
B. 476.65m
C. 376.65m

D. 367.65m
Ans. A
Sol.




A.T.Q.

$\angle QPR = 30^{\circ}$

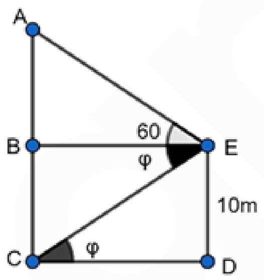
$\tan 30^{0} = h/d = \frac{270}{d}$

$d = \frac{270}{\tan 30^{0}} = 270\sqrt{3}$

$= 270 \times 1.732 = 467.64$

$= 467.65\ (approx.)$

65. From the top of a 10 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of the foot of the tower is φ and tan φ =2/3. What is the approximate height of the tower of in metres?
A. 34 m
B. 35 m
C. 36 m
D. 33 m
Ans. C
Sol.




Suppose AC=h.
ΔCDE,

$tan\,\varphi = \frac{DE}{CD}, CD = \frac{3\times 10}{2} \rightarrow 15m$ and

BE=CD
ΔABE,

$\tan 60 = \frac{AB}{BE}, AB = 15 \times \sqrt{3} = 15 \times 1.732 \rightarrow 25.98m$

Height of the tower, $h = AB + BC \rightarrow 10 + 25.98 \rightarrow 36m$

66. The value of $\sin^2 30°. \cos^2 45° + 2\tan^2 30° - \sec^2 60°$ is equal to:

A. $-\frac{13}{12}$

B. $-\frac{77}{24}$

C. $-\frac{25}{12}$

D. $-\frac{1}{12}$

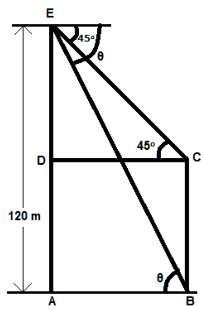
Ans. B
Sol.

$\sin^2 30°.\cos^2 45° + 2\tan^2 30° - \sec^2 60^0$

$= \left(\frac{1}{2}\right)^2 . \left(\frac{1}{\sqrt{2}}\right)^2 + 2\left(\frac{1}{\sqrt{3}}\right)^2 - (2)^2$

$= \frac{1}{8} + \frac{2}{3} - 4 = -\frac{77}{24}$

67. From the top of a 120 m high tower, the angle of depression of the top of a pole is 45° and the angle of depression of the foot of the pole is θ, such that $\tan\theta = \frac{3}{2}$. What is the height of the pole?
A. 80 m
B. 75 m
C. 60 m
D. 40 m
Ans. D
Sol.




We are given,
Height of the tower, AE=120m and $tan\theta = \frac{3}{2}$

Because ∠ABE and the angle of depression of the foot of the pole θ are alternate angles, so ∠ABE$= \theta$,
And ∠DCE and the angle of depression of the top of the pole 45° are also alternate angles, so ∠DCE$= 45^o$,
In $\Delta EAB$

$$tan\theta = \frac{AE}{AB} = \frac{3}{2}$$

$$\therefore\ AB = \frac{2}{3} \times 120 = 80m$$

In rectangle ABCD,
AB=DC=80m and BC=AD
In $\Delta EDC,$

$$tan45^o = \frac{ED}{DC} = 1$$

$$\therefore ED = DC$$

$$ED = 80m$$

Now height of the pole, BC
∵ BC=AD,
AD=AE-ED=120-80=40m

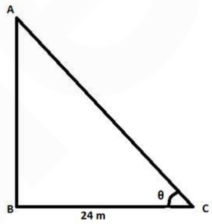
68. A sum of ₹ 12,800 is invested partly at 15% per annum and the remaining at 12% per annum simple interest. If the total interest at the end of 3 years is ₹5,085, then how much money was invested at 15% per annum?
A. ₹ 5,200
B. ₹ 7,500
C. ₹ 5,800
D. ₹ 5,300
Ans. D
Sol.
Effective rate of interest on the full sum

$= \frac{Interest \times 100}{Principal \times time}$

$= \frac{5085 \times 100}{12800 \times 3}$ = 1695/128 %
Now by applying allegation,
12 15
1695/128
225/128 159/128
75 53
Therefore the amount put at 15% interest = 12800 x 53/(53+128) = Rs 5300

69. If tan 3x = cot ($30^0$ + 2x), then what is the value of x?
A. $18^0$
B. $12^0$
C. $10^0$
D. $15^0$
Ans. B
Sol.
tan 3x = cot (30+2x)
Since tan = cot, the sum of their angles must be equal to 90°.
3x + 2x + 30° = 90°
5x = 60°
x = 12°

70.The length of shadow of a vertical pole on the ground is 24 m. If the angle of elevation of the sun at that time is θ, such that $\sin\theta = \frac{5}{13}$, then what is the height of the pole?
A. 8 m
B. 10 m
C. 18 m
D. 12 m
Ans. B
Sol.




In $\Delta ABC,$

$$sin\theta = \frac{AB}{AC} = \frac{5}{13}$$

$$BC = \sqrt{AC^2 - AB^2}$$

$$= \sqrt{13^2 - 5^2}$$

$$= \sqrt{169 - 25}$$

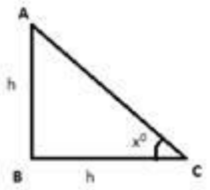
$$= \sqrt{144}$$

$= 12$units
12 units represent 24 m
1 unit will represent 2 m
Therefore, Height of the pole=AB=5 units,

$$5 \times 2 = 10\ m$$

71. If the height of a pole and the distance between the pole and a man standing nearby are equal, what would be

the angle of elevation to the top of the pole?
A. 60°
B. 90°
C. 30°
D. 45°
Ans. D
Sol.




the height of a pole and the distance between the pole and a man standing nearby are equal.
AB=BC=h cm
From fig.

$$tan x^0 = \frac{AB}{BC} = \frac{h}{h} = 1$$
$$x^0 = 45^0$$

72. 45789 number is divisible by which one-digit number?
A. Only 3
B. Only 3 and 9
C. Only 9
D. Only 3 and 7
Ans. A
Sol.
If the sum of any number is divisible by 9 then it will be divisible by 3 also.
And, if the sum is divisible only 3 then it will not divisible by 9.

$4 + 5 + 7 + 8 + 9 = 33$ (It is divisible b
45789 is not divisible by 9 and 7.
Hence, it is divisible only by 3.

73. The value of $\frac{1}{\sqrt{7-4\sqrt{3}}}$ is closest to:
A. 1.2
B. 4.1
C. 4.2
D. 3.7
Ans. D
Sol.
The expression in the question can be written as follows:

$$= \frac{1}{\sqrt{2^2 + (\sqrt{3})^2 - 2 \times 2\sqrt{3}}}$$
$$= \frac{1}{2-\sqrt{3}}$$

Rationalizing
We get,
$2 + \sqrt{3}$ = 2+1.73
= 3.73

74. Which one among the following is the smallest?
A. $\sqrt{101} - \sqrt{99}$
B. $\sqrt{201} - \sqrt{199}$
C. $\sqrt{301} - \sqrt{299}$
D. $\sqrt{401} - \sqrt{399}$
Ans. D
Sol.
If we observe that the difference between the numbers is 2 .
As 101 – 99 = 2
201 – 199 = 2
Similarly for the other numbers.
As the number increases the difference of roots decreases.
Or larger the numbers , smaller is the difference between their roots.
So $\sqrt{401} - \sqrt{309}$ has the smallest difference.

75. The value of $\frac{(\sqrt{0.6912} + \sqrt{0.5292})}{\sqrt{0.6912} - \sqrt{0.5292}}$ is:
A. 15
B. 1.5
C. 0.9
D. 9
Ans. A
Sol.
Here

$$\frac{(\sqrt{0.6912} + \sqrt{0.5292})}{\sqrt{0.6912} - \sqrt{0.5292}}$$
$$= \frac{(\sqrt{6912} + \sqrt{5292})}{\sqrt{6912} - \sqrt{5292}}$$

This number is divisible by 3 and 4 both so the numbers are divisible by 12 also.
Hence dividing the both numbers by 12.

$$\frac{\left(\sqrt{\frac{6912}{12}}+\sqrt{\frac{5292}{12}}\right)}{\sqrt{\frac{6912}{12}}-\sqrt{\frac{5292}{12}}}$$

$$\frac{\sqrt{576}+\sqrt{441}}{\sqrt{576}-\sqrt{441}}=\frac{24+21}{24-21}$$

$= 15$

76. Find the value of 7 - {4 × 3 - (-10) × 8 ÷ (-4)}.
A. -1
B. 0
C. 53
D. 15
Ans. D
Sol.

$7 - \{4 \times 3 - (-10) \times 8 \div (-4)\}$

$= 7 - \left\{4 \times 3 + 10 \times \frac{8}{-4}\right\}$

$= 7 - \{12 - 20\}$

$= 7 + 8$

$= 15$

77. Find the value of 10 – {17 – 12 ÷ (5 + 9 × 2 – 17)}:
A. ¯5
B. 5
C. 7
D. ¯7
Ans. A
Sol.

$10 - \{17 - 12 \div (5 + 9 \times 2 - 17)\}$

$= 10 - \{17 - 12 \div (5 + 18 - 17)\}$

$= 10 - \{17 - 12 \div 6\}$

$= 10 - \{17 - 2\}$

$= 10 - 15 = -5$

78. What is the value of 13 ÷ {4 of 2 – 3 + 4 × (6 – 4)}?
A. $-2\frac{1}{13}$
B. 0
C. 1.3
D. 1
Ans. D
Sol.

$13 \div \{4 \text{ of } 2 - 3 + 4 \times (6 - 4)\}$

$= 13 \div \{4\ of\ 2 - 3 + 4 \times 2\}$

$= 13 \div \{4 \times 2 - 3 + 8\}$

$= 13 \div \{8 - 3 + 8\}$

$= 13 \div 13$

$= 1$

79. (-4) × (-8) ÷ (-2) + 3 × 5 is equal to:
A. -1
B. 1
C. 31
D. -31
Ans. A
Sol.
(-4) × (-8) ÷ (-2) + 3 × 5
=(-4) x 4 +3 x 5
= -16 + 15 = -1

80. Find the value of $\frac{\operatorname{cosec} 31^\circ}{\sec 59^\circ}$:
A. 3
B. 2
C. 1
D. 0
Ans. C
Sol.

$$\frac{\operatorname{cosec} 31^\circ}{\sec 59^\circ}=\frac{\operatorname{cosec}(90^\circ - 59^\circ)}{\sec 59^\circ}$$

$$=\frac{\sec 59^\circ}{\sec 59^\circ}$$

$= 1.$

81. Find the value of $1+\frac{\tan^2 A}{1+\sec A}$?
A. cosec A
B. cos A
C. sec A
D. sin A
Ans. C
Sol.

$$1+\frac{\tan^2 A}{1+\sec A}$$

Let A = 60°

$$1+\frac{\tan^2 60^\circ}{1+\sec 60^\circ}$$

$$= 1 + \frac{3}{1+2}$$
$$= 1 + 1 = 2 = \sec 60^\circ$$
$$= \sec A.$$

82. If $4\tan\theta = 3$, then find the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta}$

A. $\frac{1}{9}$

B. $\frac{1}{9}$

C. 3

D. 9

Ans. B

Sol.

$4\tan\theta = 3$

$\tan\theta = \frac{3}{4}$

$\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta}$

$= \frac{\cos\theta\,(5\tan\theta - 3)}{\cos\theta\,(5\tan\theta + 3)}$

$= \frac{5 \times \frac{3}{4} - 3}{5 \times \frac{3}{4} + 3}$

$= \frac{15 - 12}{15 + 12}$

$= \frac{3}{27}$

$= \frac{1}{9}$