Solution

S1. Ans.(b)
Sol.

$$\sqrt{\frac{0.064 \times 6.25}{0.081 \times 4.84}} = \frac{8 \times 25}{9 \times 22} = \frac{100}{99}$$

S2. Ans.(c)
Sol. Put x = – 4 in the option
$x^2 - 7x - 44 = 16 + 28 - 44$
$= 0$

S3. Ans.()
Sol.

S4. Ans.(a)
Sol. $a = b \times c$
$6 = 2 \times 3$
H.C.F. $(3, 2 \times 6)$ = H.C.F. (3, 6) [True]
L.C.M. (6, 6) = L.C.M. (3, 12) [False]
Only (i) satisfies

S5. Ans.(a)
Sol.

$$\frac{(0.35)^2 + 0.70 + 1}{2.25} + 0.19$$
$$= \frac{0.1225 + 0.70 + 1}{2.25} + 0.19$$
$$= \frac{1.8225}{2.25} + 0.19$$
$= 0.81 + 0.19 = 1$

S6. Ans.(b)
Sol. $x = 2^{40}$
$\log x = \log (2)^{40}$
$\log x = 40 \log 2$
$\log x = 40 \times 0.301$
$\log x = 12.04$
$\log 13 \cong 12.04$
So, No. of terms = 13

S7. Ans.(a)

Sol. $(a^2 - 5a + 3)\, x^2 + (3 - 1)\, x + 2 = 0$

When one Root is twice the other then in

$Ax^2 - Bx + C = 0$

$2B^2 = 9AC$

$A = a^2 - 5a + 3,\ B = 3a - 1,\ C = 2$

$2\,(3x - 1)^2 - (a^2 - 5a + 3) \times 2$

$2(9a^2 + 1 - 6a) = (9a^2 - 45a + 27) \times 2$

$18a^2 + 2 - 12a = 18a^2 - 90a + 54$

$78a = 52$

$a = \frac{52}{78} = \frac{2}{3}$

S8. Ans.(a)

Sol.

Remainder

$\frac{4^1}{9} = 4$

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

$\frac{4^3}{9} = 1$

$\frac{(4444)^{4444}}{9} = \frac{(4)^{4444}}{9} = \frac{[4^3]^{1481}}{9} \times 4^1$

$= \underset{\text{Remainder}}{\underset{\downarrow}{\left[\frac{4^3}{9}\right]^{1481}}} \times \underset{\text{remainder}}{\underset{\downarrow}{\frac{4^1}{9}}}$

$= 1 \times 4$

$= 4 \rightarrow$ Remainder

S9. Ans.(a)

Sol.

$x = \frac{\sqrt{a+b} - \sqrt{a-b}}{\sqrt{a+b} + \sqrt{a-b}}$

$x = \frac{\sqrt{a+b} - \sqrt{a-b}}{\sqrt{a+b} + \sqrt{a-b}} \times \frac{\sqrt{a+b} - \sqrt{a-b}}{\sqrt{a+b} - \sqrt{a-b}}$

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

$= \frac{a + b + a - b - 2\sqrt{a^2 - b^2}}{2b}$

$= \frac{2a - 2\sqrt{a^2 - b^2}}{2b}$

$= \frac{a}{b} - \frac{\sqrt{a^2-b^2}}{b}$

$bx^2 = b\left[\frac{a}{b} - \frac{\sqrt{a^2-b^2}}{b}\right]^2$

$= b\left[\frac{a^2}{b^2} + \frac{a^2-b^2}{b^2} - \frac{2a\sqrt{a^2-b^2}}{b^2}\right]$

$= \frac{a^2}{b} + \frac{a^2}{b} - b - \frac{2a\sqrt{a^2-b^2}}{b}$

$-2ax = -2a\left[\frac{a}{b} - \frac{\sqrt{a^2-b^2}}{b}\right]$

$= \frac{-2a^2}{b} + \frac{2a\sqrt{a^2-b^2}}{b}$

$bx^2 - 2ax + b = \frac{a^2}{b} + \frac{a^2}{b} - b - \frac{2a\sqrt{a^2-b^2}}{b} - \frac{2a^2}{b} + \frac{2a\sqrt{a^2-b^2}}{b} + b$

$= 0$

S10. Ans.(c)

Sol.

$\frac{(443+547)^2 + (443-547)^2}{443 \times 443 + 547 \times 547}$

$a = 443, b = 547$

$\frac{(a+b)^2 + (a-b)^2}{a^2+b^2} = \frac{a^2+b^2+2ab+a^2+b^2-2ab}{a^2+b^2}$

$= \frac{2a^2+2b^2}{a^2+b^2}$

$= \frac{2(a^2+b^2)}{a^2+b^2} = 2$

S11. Ans.()

Sol.

S12. Ans.(b)

Sol. A : B = 3 : 4

$A \rightarrow 3\ B \rightarrow 4$

$\frac{3A^2+4B}{3A-4B^2} = \frac{3\times 9+16}{9-64}$

$= -\frac{43}{55}$

S13. Ans.()

Sol.

S14. Ans.()

Sol.

S15. Ans.(c)

Sol.

$$\sqrt{\frac{x}{y}} = \frac{24}{5} + \sqrt{\frac{y}{x}}$$

$$\sqrt{\frac{x}{y}} - \sqrt{\frac{y}{x}} = \frac{24}{5}$$

$$\frac{(x-y)}{\sqrt{xy}} = \frac{24}{5}$$

$$\frac{x^2 + y^2 - 2xy}{xy} = \frac{576}{25}$$

$$-2xy + x^2 + y^2 = \frac{576}{25}xy \quad \ldots (i)$$

$x + y = 26$

squaring both sides

$x^2 + y^2 + 2x = 676$

$x^2 + y^2 = 676 - 2xy \ldots (ii)$

from (i) and (ii)

$$676 - 2xy - 2xy = \frac{576}{25}xy$$

$(676 - 4xy)\ 25 = 576\ xy$

$676 \times 25 - 100xy = 576xy$

$676xy = 676 \times 25$

$xy = 25$

S16. Ans.()

Sol.

S17. Ans.()

Sol.

S18. Ans.(b)

Sol. $a^3 = 335 + b^3$

$a^3 - b^3 = 335 \ldots (i)$

$a = S + b$

$a - b = S \quad \ldots (ii)$

Cubing both sides

$a^3 - b^3 - 3ab\ (a - b) = 125 \ldots (iii)$

from (i), (ii) and (iii)

$335 - 3ab \times 5 = 125$

$335 - 125 = 3ab \times 5$

$210 = 3ab \times 5$

$ab = 14$

$(a + b)^2 = (a - b)^2 + 4ab$

$= (5)^2 + 4 \times 14$

$= 25 + 56$

$(a + b)^2 = 81$

$a + b = 9$

S19. Ans.(c)

Sol. $9^x\ 3^y = 2187$

$3^{2x}\ 3^y = 2178$

$3^{2x+y} = 3^7$

$2x + y = 7$ ... (i)

$2^{3x+2y} = 2^{2xy}$

$3x + 2y = 2xy$ … (ii)

From (i) and (ii)

$3x + 2(7 - 2x) = 2x\ (7 - 2x)$

$3x + 14 - 4x = 14x - 4x^2$

$4x^2 - 15x + 14 = 0$

$4x^2 - 8x - 7x + 14 = 0$

$4x\ (x - 2) - 7\ (x - 2) = 0$

$x = 2, x = 7/4$

If $x = 2$

$y = 7 - 2 \times 2$

$= 7 - 4$

$= 3$

$x + y = 5$

S20. Ans.(b)

Sol. $a_1x + b_1y + c_1 = 0$ … (i)

and

$a_2x + b_2y + c_2 = 0$ … (ii)

Line (i) and line (ii) intersect each other if

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$a_1 = k, a_2 = 2, b_1 = 3, b_2 = 1$

$\frac{k}{2} \neq \frac{3}{1}$

$k \neq 6$

S21. Ans.(b)

Sol. 25

→ 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97

S22. Ans.(a)

Sol. Ratio of weights of Broken Diamond = 1 : 2 : 3 : 4

$x + 2x + 3x + 4x = 10x$

Net weight = 10x

Price = $100\ x^2$

Price = $x^2 + 4x^2 + 9x^2 + 16x^2$

$= 30x^2$

Net loss = $100x^2 - 30x^2$

$= 70x^2$

$70x^2 = 70000$

Price of original diamond = $100x^2$ = Rs. 1,00,000

S23. Ans.(c)

Sol. Time taken by A to cover 100 m

$= \frac{100}{5} \times 3$

= 60 sec

Time taken by B to cover (100 m – 4m) = 60 sec + 12 sec

96 meter ⇒ 72 sec

96 meter is covered by B in 72 sec

Speed of B $= \frac{96}{72}\text{m/sec} = \frac{4}{3}\text{m/sec}$

S24. Ans.(d)

Sol. 3w = 2M

$1w = \frac{2}{3}M$

$21w = \frac{2}{3} \times 21M = 14\ M$

$15 \times 21 \times 8 = D \times 6 \times 14$

D = 30 days

S25. Ans.(d)

Sol.

$\frac{27 - x}{35 - x} = \frac{2}{3}$

$81 - 3x = 70 - 2x$

x = 11

S26. Ans.(c)

Sol.

$P = \frac{x}{\left(1 + \frac{r}{100}\right)} + \frac{x}{\left(1 + \frac{r}{100}\right)^2}$

$$8400 = \frac{x}{\frac{11}{10}} + \frac{x}{\frac{121}{100}}$$

$$8400 = \frac{10x}{11} + \frac{100x}{121}$$

$$8400 = \frac{210x}{121}$$

4840 = x

x = 4840

S27. Ans.(c)

Sol. Let x years be her age at the time of marriage.

$$x + 6 = \frac{5}{4}x$$

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

$$6 = \frac{x}{4}$$

x = 24

Her present age = 24 + 6 = 30 years

Her son's age = 30/10 = 3 years.

S28. Ans.(b)

Sol.

A + B → 12 5

60

B → 30 2

A + B = 5

A + 2 = 5

A = 3

No. of days taken by A

$= \frac{60}{3} = 20$ days

S29. Ans.(a)

Sol. Using options

Put x = –1 & x = 1

In $5^{1+x} + 5^{1-x} = 26$

⇒ x = –1

$5^{1-1} + 5^{1+1}$

$= 5^0 + 25$

= 26

⇒ x = 1

$5^2 = 5^0$

= 25 + 1 = 26

S30. Ans.(a)

Sol. 5M × 10 = 12W × 15

$M = \frac{18}{5}W$

$5M + 6W = 5 \times \frac{10}{5}W + 6W = 24W$

12W × 15 days = 24W × days

$Days = \frac{15}{2}$

= 7 ½ days

S31.Ans()

Sol.

S32. Ans.(b)

Sol. $No.of\ girls = 49 \times \frac{4}{7} = 28$

$No.of\ boys = 49 \times \frac{3}{7} = 21$

Girls left after 4 girls leaves = 28 – 4 = 24

Ratio of girls to boys = 24 : 21 = 8 : 7

S33. Ans.(a)

Sol. a + b = 5 … (i)

ab = 6

squaring both sides in (i)

$a^2 + b^2 + 2ab = 25$

$a^2 + b^2 + 12 = 25$

$a^2 + b^2 = 13$

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

= (5) (13 – 6)

= 5 × 7

= 35

S34. Ans.(c)

Sol. Discount % = 25%

$= \frac{25}{100} = \frac{1}{4}$

Marked price = 4

Discount = 1

Mobile costs him = 4 – 1 = 3

3 ratio → 4875

1 ratio → 1625

Original selling price = 1625 × 4 = 6500 Rs.

S35. Ans.(b)

Sol. Speed of train = 30 km/hr

Speed of man = 3 km/hr

Relative speed = 27 km/hr

$= 27 \times \frac{5}{18}$ m/sec

$= \frac{15}{2}$ m/sec

Time taken by train to pass the man

$= \frac{225}{\frac{15}{2}}$

$= \frac{225}{15} \times 2$

= 30 seconds.

S36. Ans.(b)

Sol.

$\frac{7}{9} = 0.77$

$\frac{11}{14} = 0.78$

$\frac{3}{4} = 0.75$

$\frac{10}{13} = 0.76$

$\frac{11}{14} > \frac{7}{9} > \frac{10}{13} > \frac{3}{4}$

S37. Ans.(c)

Sol. Rate = 4%

$= \frac{4}{100} = \frac{1}{25}$

Let principle be = $(25)^2 = 625$

S. I. for 1st year $= \frac{625}{25} = 25$

S.I. for 2nd year = 25

C.I. for 2nd year = 1

C.I. for 2 years = 51 Rs.

S.I. for 2 years = 50 Rs.

Difference between C.I. & S.I. for two years

= 51 – 80 = Rs. 1

1 ratio = Rs. 10

625 ratio = Rs. 625 × 10

= Rs. 6250

S38. Ans.(c)

Sol. a% of a + b% of b = 2% of ab

$\frac{a^2}{100}+\frac{b^2}{100}=\frac{2ab}{100}$

$a^2 + b^2 - 2ab = 0$

$(a - b)^2 = 0$

$a = b$

a is 100% of b

S39. Ans.(c)

Sol. Male $= \frac{5}{9}x$

Female $= \frac{4}{9}x$

Unmarried females $= \frac{4x}{9}-\frac{5x}{9}\times\frac{30}{100}$

$=\frac{4x}{9}-\frac{x}{6}$

$=\frac{8x-3x}{18}$

$=\frac{5x}{18}$

% of unmarried females $=\frac{\frac{5x}{18}\times 100}{\frac{5x}{9}+\frac{4x}{9}}=\frac{500}{18}=27\frac{7}{9}$

$=\frac{4x}{9}-\frac{x}{6}$

$=\frac{8x-3x}{18}$

$=\frac{5x}{18}$

% of unmarred females $=\frac{\frac{5x}{18}\times 100}{\frac{5x}{9}+\frac{4x}{9}}=\frac{500}{18}=27\frac{7}{9}$

S40. Ans.(b)

Sol. 7x + 10y = 200

Using option

(a) 25

7x + 10 (25 – x) = 200

7x – 10x = 50x

(b) 26

7x + 10(26 – x) = 200

7x + 260 – 10x = 200

60 = 3x

x = 20 → complete numerical value satisfies.

S41. Ans.(a)

Sol. $x^3 + 8 = x^3 + 2^3$

$= (x + 2)(x^2 - 2x + 4)$

$x^2 + 5x + 6 = x^2 + 2x + 3x + 6$

$= x(x + 2) + 3(x + 2)$

$= (x + 2)(x + 3)$

$x^3 + 4x^2 + 4x = x(x^2 + 4x + 4)$

$= x(x + 2)^2$

L.C.M $= x(x + 2)^2 (x + 3)(x^2 - 2x + 4)$

S42. Ans.(d)

Sol. Product of two numbers = L.C.M. of two numbers × H.C.F. of two number

$p \times q = \text{L.C.M.} \times 1$

$\text{L.C.M.} = pq$

$$\frac{1}{\text{L.C.M}} = \frac{1}{pq}$$

$= (pq)^{-1}$

S43. Ans.(a)

Sol.

$$\sqrt[3]{4\frac{12}{125}} = \sqrt[3]{\frac{512}{125}}$$

$$= \frac{8}{5} = 1\frac{3}{5}$$

S44. Ans.(c)

Sol. Relative speed of Police & thief = 10 km/hr – 8 km/hr = 2 km/hr

$$= \frac{5}{9} \text{ m/sec}$$

Time taken by police to catch thief

$$= \frac{100 \text{ m}}{\frac{5}{9}}$$

$= 180$ sec

$$= \frac{180}{60 \times 60} \text{h}$$

$$= \frac{1}{20} \text{h}$$

Distance travelled by thief before he got caught

$$= 8 \times \frac{1}{20}$$

$$= \frac{2}{5} \text{km}$$

$$= \frac{2}{5} \times 1000 \text{ m}$$

$= 400$ m

S45. Ans.()
Sol.

S46. Ans.(c)
Sol. Both (1) & (2)
Of the two-consecutive integer one will always be odd and one will be even
(3, 4) $\rightarrow 3^2 \Rightarrow 9 \Rightarrow 8n + 1$ (n = 1)
(4, 5) $\rightarrow 5^2 \Rightarrow 25 \Rightarrow 8n + 1$ (n = 3)
(6, 7) $\rightarrow 7^2 \Rightarrow 49 \Rightarrow 8n + 1$ (n = 6)
(8, 9) $\rightarrow 9^2 \Rightarrow 81 \Rightarrow 8n + 1$ (n = 10)
(10, 11) $\rightarrow 11^2 \Rightarrow 121 \Rightarrow 8n + 1$ (n = 15)

Q47.Ans(c)
Sol. $2x + 4y - 6 = 0$
$x + 2y - 3 = 0$ … (i)
$4x + 8y - 8 = 0$
$x + 2y - 2 = 0$ … (ii)
$a_1=1, b_1= 2, c_1= -3$
$a_2=1, b_2= 2, c_2= -2$
$\frac{a_1}{a_2} = 1$
$\frac{b_1}{b_2} = 1$
$\frac{c_1}{c_2} = \frac{3}{2}$
If
(a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \Rightarrow$ Consistent with unique solution
(b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \Rightarrow$ Coincident lines & Consistent infinitely many solutions
(c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2} \Rightarrow$ Parallel lines & Inconsistent no solution
∴ In, Given Equations
$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
$1 = 1 \neq 3/2$, Hence, Inconsistent

S48. Ans.()
Sol.

S49. Ans.(c)
Sol. Ratio of numbers = 1 : 5
Numbers ⇒ x, 5x
$x \times 5x = 320$

$5x^2 = 320$

$x^2 = 64$

$x = 8$

Numbers ⇒ 8, 40

Difference b/w there square = $(40)^2 - (8)^2$

$= 1600 - 64$

$= 1536$

S50. Ans.(d)

Sol.

	Lead	:	Tin
X →	1	:	2
Y →	2	:	3

I → X → 25 kg →

Lead in 25 kg = 25/3

Tin in 25 kg = 50/3

II Y → 125 kg →

Lead in 125 kg = 50

Tin in 125 kg = 75

$$\text{Lead in Mixture} = 50 + \frac{25}{3} = \frac{175}{3}$$

$$\text{Tin in mixture} = \frac{50}{3} + 75$$

$$= \frac{50 + 225}{3}$$

$$= \frac{275}{3}$$

$$\text{Rati of Lead : Tin} = \frac{175}{3} : \frac{275}{3} = 7 : 11$$

S51. Ans.(d)

Sol.

$$\text{Mean} = \frac{\text{Sum of Numbers}}{\text{Total Numbers}}$$

$$15 = \frac{\text{sum of 5 numbers}}{5}$$

Sum of Numbers = 75 … (i)

$$\frac{\text{Sum of 6 Numbers}}{6} = 17$$

Sum of 6 number = 102 … (ii)

From (i) and (ii)

6^{th} no. + 75 = 102

6^{th} number = 102 – 75 = 27

S52. Ans.()
Sol. $\text{Mean}_{300} = 60$
$\frac{\text{Sum}_{300}}{300} = 60$
$\text{Sum}_{300} = 18000$
$\text{Remaining}_{100} + \text{Top}_{100} + \text{Last}_{100} = 18000$
$\text{Remaining}_{100} + 8000 + 5000 = 18000$
$\text{Remaining}_{100} = 5000$
$\text{Mean}_{\text{Remaining100}} = \frac{5000}{100} = 50$

S53. Ans.()
Sol.

S54. Ans.()
Sol.

S55. Ans.()
Sol.

S56. Ans.()
Sol.

S57. Ans.()
Sol.

S58. Ans.()
Sol.

S59. Ans.(c)
Sol. π Radian = 180 degree

S60. Ans.(c)
Sol. $9\tan^2\theta + 4\cot^2\theta$
$\text{Minimum} = 2\sqrt{ab} = 2\sqrt{9 \times 4} = 2 \times 3 \times 2 = 12$

S61. Ans.()
Sol.

S62. Ans.(a)
Sol. If $\cos\theta_1 + \cot\theta_2 + \cos\theta_3 = 3$
Then $\theta_1 = \theta_2 = \theta_3 = 0°$
$= \sin 0° + \sin 0° + \sin 0°$
$= 0$

S63. Ans.(a)

Sol. $\cos\theta + \tan\theta$

Put $\theta = 0°$

$\Rightarrow \cos 0° + \tan 0°$

$= 1 + 0 = 1$

S64. Ans.(a)

Sol.

$$\Rightarrow \sin x \sqrt{\frac{1}{1+\cos x} + \frac{1}{1-\cos x}}$$

$$= \sin x \sqrt{\frac{2}{1-\cos^2 x}}$$

$$= \sin x \sqrt{\frac{2}{\sin^2 x}} = \sin x \times \frac{\sqrt{2}}{\sin x}$$

$= \sqrt{2}$

S65. Ans.(c)

Sol.

$$\frac{\cos^4 A - \sin^4 A}{\cos^2 A - \sin^2 A}$$

$$\Rightarrow \frac{(\cos^2 A - \sin^2 A)(\cos^2 A + \sin^2 A)}{\cos^2 A - \sin^2 A}$$

$= \cos^2 A + \sin^2 A$

$= 1$

S66. Ans.(d)

Sol.

$7\sin^2 x + 3\cos^2 x = 4$

$7(1 - \cos^2 x) + 3\cos^2 x = 4$

$7 - 7\cos^2 x + 3\cos^2 x = 4$

$7 - 4 = 4\cos^2 x$

$4\cos^2 x = 3$

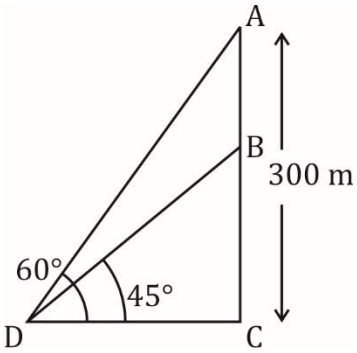
$$\cos x = \frac{\sqrt{3}}{2}$$

$x = 30°$

$$\tan 30° = \frac{1}{\sqrt{3}}$$

S67. Ans.(a)

Sol.



$\tan 60° = \frac{300}{DC}$

$\sqrt{3} = \frac{300}{DC}$

$DC = \frac{300}{\sqrt{3}}$ M

$\tan 45° = \frac{BC}{DC}$

$1 = \frac{BC}{DC}$

BC = DC

$= \frac{300}{\sqrt{3}}$

$= 100\sqrt{3}$ m

S68. Ans.(c)

Sol. $x = a\cos\theta + b\sin\theta$ … (i)

$y = a\sin\theta - b\cos\theta$ ...(ii)

squaring and adding (i) & (ii)

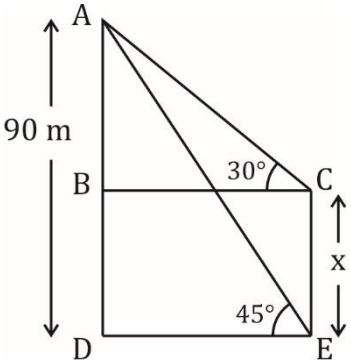
$x^2 + y^2 = a^2\cos^2\theta + b^2\sin^2\theta + 2ab\sin\theta\cos\theta + a^2\sin^2\theta + b^2\cos^2\theta - 2ab\sin\theta\cos\theta$

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

$= a^2 + b^2$

S69. Ans.(b)

Sol.



$\tan 45° = \frac{AD}{DE}$

$1 = \frac{90}{DE}$

DE = 90 … (i)

$\tan 30° = \frac{AB}{BC(DE)}$

$\frac{1}{\sqrt{3}} = \frac{AB}{90}$

$AB = \frac{\sqrt{3} \times \sqrt{3} \times 30}{\sqrt{3}}$

$= 30\sqrt{3}$ m

Height of tree = $90 - 30\sqrt{3}$ m

S70. Ans.(d)

Sol. 3 + 2 ⊁ 6

Sum of two sides must be greater than the other two sides.

S71. Ans.(d)

Sol. 2(a + b) = 10 cm

ℓ + b = 5 cm … (i)

ℓb = 4cm²

b = 4/ℓ cm² ….(ii)

$\ell + \frac{4}{\ell} = 5$

ℓ² + 4 = 5ℓ

ℓ² - 5ℓ + 4 = 0

ℓ² – 4ℓ – ℓ + 4 = 0

ℓ(ℓ – 4) – 1 (ℓ – 4) = 0

ℓ = 1, ℓ = 4

length = 4 cm

S72. Ans.(b)

Sol.

$180 \times \frac{2}{9} = 40°$

S73. Ans.(c)

Sol. Radius of cylinder = 1 cm

Height of cylinder = 14 m = 1400 cm

Surface Area = 2πr² + 2πrh

= 2π (1 + 1400)

$= 2 \times \frac{22}{7} \times 1401 \cong 8800$ cm²

S74. Ans.(b)

Sol.

$\frac{\pi {r_1}^2}{\pi {r_2}^2} = \frac{16}{49}$

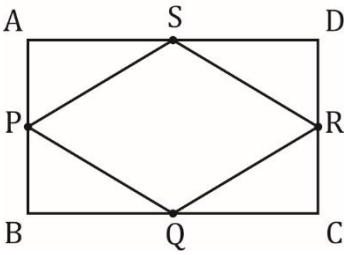
$\frac{\pi {r_1}^2}{14 \times 14} = \frac{16}{49}$

${r_1}^2 = 16 \times 4$

$r_1 = 4 \times 2 = 8$ cm

S75. Ans.(a)

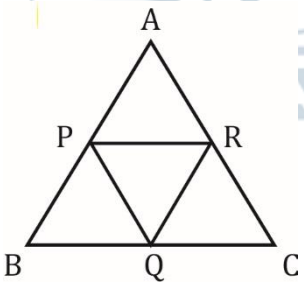
Sol.



PQRS are midpoints then PQRS will be a square

S76. Ans.(c)

Sol.



Area Δ ABC = 5 square units

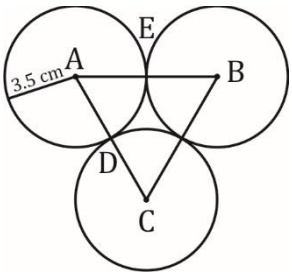
Area of $\Delta PQR = \frac{1}{4} \times$ Area of $\Delta ABC = \frac{5}{4}$ square units

S77. Ans.(d)

Sol. % change $= 200 + 200 + \frac{200 \times 200}{100} = 400 + 400 = 800\%$

S78. Ans.(c)

Sol.



Area enclosed b/w = Area of equilateral triangle – 3 × area of sector ADE

$= \frac{\sqrt{3}}{4} \times 7 \times 7 - 3 \times \pi \times (3.5)^2 \times \frac{60}{360}$

$= \frac{49\sqrt{3}}{4} - 3 \times \frac{49}{4} \times \frac{1}{6} \times \pi$

$= \frac{49}{8}(2\sqrt{3} - \pi)$ square unit

S79. Ans.(b)

Sol. Area of Regular hexagon of side

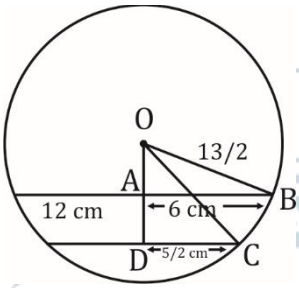
$a = \frac{3\sqrt{3}}{2}a^2$

S80. Ans.()

Sol.

S81. Ans.(c)

Sol.



In △OAB

$OA = \sqrt{\left(\frac{13}{2}\right)^2 - (6)^2}$

$= \sqrt{\frac{169}{2} - 36}$

$= \sqrt{\frac{169-144}{4}} = \sqrt{\frac{25}{4}}$

$= \frac{5}{2} = 2.5$ cm

In △ODC

$OD = \sqrt{\left(\frac{13}{2}\right)^2 - \left(\frac{5}{2}\right)^2}$

$= \sqrt{\frac{169}{4} - \frac{25}{4}}$

$= \sqrt{\frac{144}{4}} = \frac{12}{2} = 6$ cm

Distance b/w 2 chords = 6 – 2.5

= 3.5 cm

S82. Ans.(d)

Sol.

Volume of cone = $\frac{1}{3}\pi r^2 h$

Increased radius = r $\left(\frac{100+P}{100}\right)$

Increased volume = $\frac{1}{3}\pi\left[r\left(\frac{100+P}{100}\right)\right]^2 h$

$= \frac{1}{3}\pi r^2 h\left[1+\frac{P}{100}\right]^2$

$= \frac{1}{3}\pi r^2 h + \frac{1}{3}\pi r^2 h\left[\left(\frac{P}{100}\right)^2 + \frac{2P}{100}\right]$

% Change = $\frac{\frac{1}{3}\pi^2 h+\frac{1}{3}\pi r^2 h\left[\frac{P}{100}\left(\frac{P}{100}+2\right)\right]-\frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi r^2 h}\times 100$

$=\frac{P}{100}\left[\frac{P}{100}+2\right]\times 100$

$= P\left(2+\frac{P}{100}\right)$

S83. Ans.(c)

Sol. Area of Square, a^2 = 121 cm^2

Side of square , a = 11 cm

Perimeter of Square, 4a = 44 cm

Perimeter of circle = 44

$2\pi r = 44$

$2\times\frac{22}{7}\times r = 44$

r = 7 cm

Area of circle = πr^2

$= \frac{22}{7}\times 7\times 7$

= 154 cm^2

S84. Ans.()

Sol.

S85. Ans.(b)

Sol. Surface area of sphere = 4 πr^2

$S_1 = 4\ \pi r_1^2$

$\frac{S_1}{9} = 4\ \pi r_2^2$

$4\ \pi r_1^2 = 36\ \pi r_2^2$

$\frac{r_1^2}{r^2} = \frac{9}{1}$

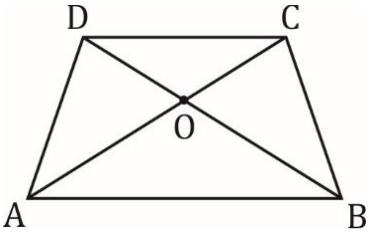
$\frac{r_1}{r\_2} = \frac{3}{1}$

$r_1 = 3, r_2 = 1$

Radius is reduced to $\frac{1}{3^{rd}}$ (one third)

S86. Ans.(a)

Sol.



Diagonals of trapezium intersect each other in the equal ratio

$\frac{AO}{OC} = \frac{BO}{OD} = \frac{AB}{DC}$

S87. Ans.(c)

Sol.

$\pi r_1^2 h_2 = n \times \frac{1}{3}\pi r_2^2 h_2$

$\frac{35}{2} \times \frac{35}{2} \times 32 = n \times \frac{1}{3} \times 2 \times 2 \times 7$

n = 35×10×3

= 1050 persons

S88. Ans.(b)

Sol. 15% change in circumference

= 15% change in Radius

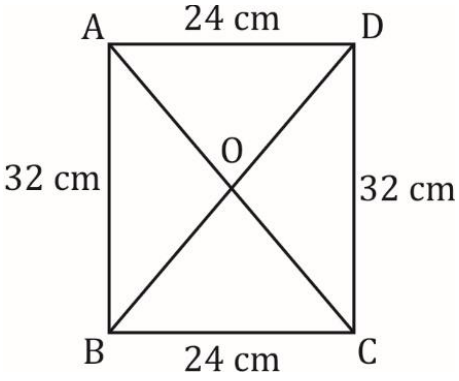
Area of circle increase by = $15 + 15 + \frac{15 \times 15}{100}$

= 30+2.25

= 32.25%

S89. Ans.(b)

Sol.



BD = $\sqrt{(24)^2 + (32)^2} = \sqrt{1600} = 40$ cm

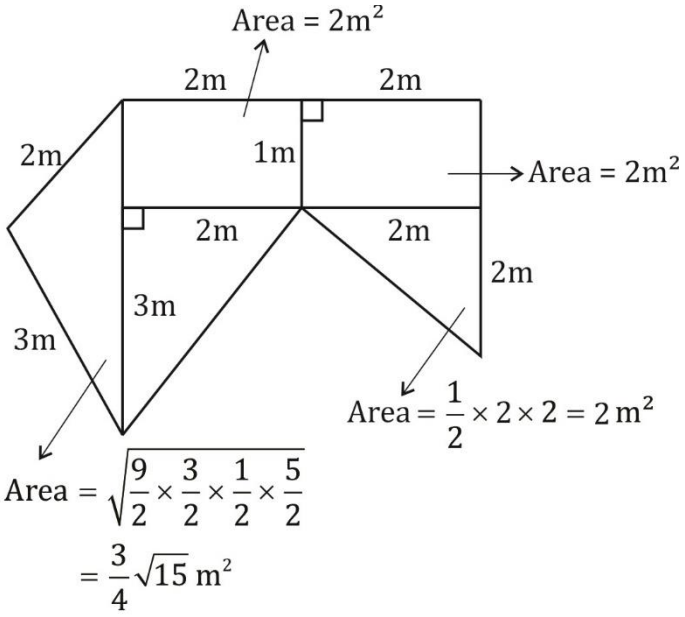
Diagonals of Rectangle are equal & Bisect each other,

∴ OD = $\frac{40}{2}$

= 20 cm

S90. Ans.(c)

Sol.



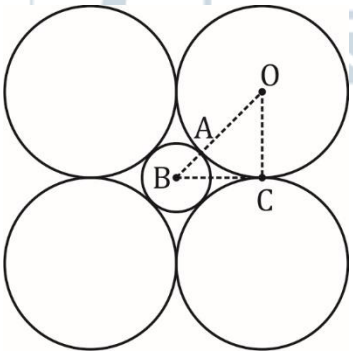
$= \frac{3}{4}\sqrt{15}\ m^2$

Total area = $2+3+2+2+\frac{3}{4}\sqrt{15}$

$= 9+\frac{3}{4}\sqrt{15}$

S91. Ans.(a)

Sol.



In ΔOBC

OC = D/2

OB = OA + AB

$= x + \frac{D}{2}$

$OB^2 = OC^2 + BC^2$

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

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

$x+\frac{D}{2} = \frac{D}{\sqrt{2}}$

$\frac{2x+D}{2} = \frac{D}{\sqrt{2}}$

$2x + D = D\sqrt{2}$

$2x = D(\sqrt{2} - 1)$

$x = \frac{D(\sqrt{2}-1)}{2}$

Radius of shaded circle '

$= \frac{D}{2}(\sqrt{2}-1)$

Diameter = 2 × r

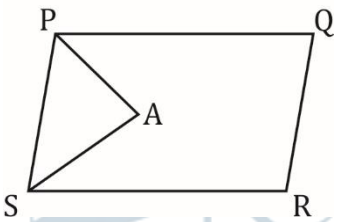
$= D(\sqrt{2}-1)$

S92. Ans.()

Sol.

S93. Ans.(c)

Sol.



∠SPQ + ∠PSR = 180°

2(∠SPA + ∠PSA) = 180°

∠SPA + ∠PSA = 90°

In Δ PSA

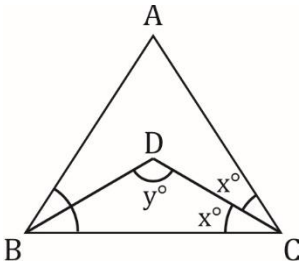
∠P + ∠S + ∠A = 180°

90° + ∠A = 180°

∠ A = 90°

S94. Ans.(c)

Sol.



∠A = 80°, ∠ABC = 60°

∠ACB = 180° – 140° = 40°

$x = \frac{\angle ACB}{2} = \frac{40°}{2} = 20°$

y = 180° – (20° + 30°) = 180° – 50° = 130°

S95. Ans.()
Sol.

S96. Ans.()
Sol.

S97. Ans.()
Sol.

S98. Ans.()
Sol.

S99. Ans.()
Sol.

S100. Ans.()
Sol.