

200 Important Quantitative Aptitude Questions for AAI JE ATC 2023 Exam (Solutions)

S1. Ans.(b)

Sol.

Import of x in 2013-14 — 750

In 2015 - 2016 — 1000

$$\% \text{ Increase} = \frac{1000-750}{750} \times 100 = \frac{250}{750} \times 100$$
$$= 33.3\%$$

S2. Ans.(c)

Sol.

$$\text{Avg of Increase} = \frac{200+50+200+600}{5} = 210$$

S3. Ans.(c)

Sol.

$$\text{Avg. import of x} = \frac{750+950+1000+1000+1200+1800}{6}$$

$$= 1116.66$$

Import of x more than Avg. import = 2 years.

S4. Ans.(b)

Sol. difference = 4 - 2 = 2 years.

S5. Ans.(a)

Sol.

Total import of x = 67000, Avg = 1116.66

$$\text{Required}\% = \frac{1800-1116.66}{1116.66} \times 100 = 61.19\%$$

S6. Ans.(a)

Sol.

| | | | |
|---|---|------|-----------------------|
| A | B | C | |
| 8 | 9 | 8.1 | 12.5% → $\frac{1}{8}$ |
| | | ↓ | |
| | | 1215 | |

$$8.1 \rightarrow 1215 \Rightarrow 1 \text{ unit} = 150 \text{ Rs.}$$

$$\text{A pay of the book} = 150 \times 8 = 1200 \text{ Rs.}$$



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S7. Ans.(d)

Sol.

Given 1981pq divisible

by 9, 11 and 13

By Option elimination method.

$\Rightarrow p=9$ and $q=8$

$\Rightarrow 1981 \underline{9} \underline{8}$ is divisible by 9, 11 and 13

S8. Ans.(b)

Sol.

$$\frac{1}{5} : \frac{7}{4} : \frac{4}{3}$$

Ratio $\rightarrow 12 : 105 : 80$

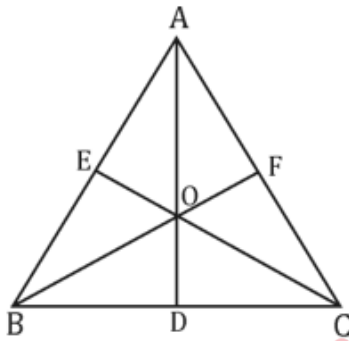
Given $\rightarrow 12 + 80 \Rightarrow 644$

$\Rightarrow 1 \text{ unit} = 7$

Greatest number = $105 \times 7 = 735$

S9. Ans.(d)

Sol.



Area of $\Delta ABC = 51.6 \text{ cm}^2$

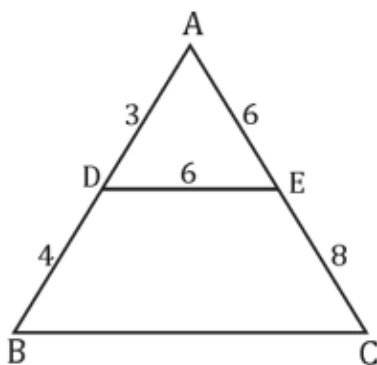
then, Area of $(\Delta DOC) = \frac{51.6}{6}$

$= 8.6 \text{ cm}^2$

Area of $\square(CDOF) = 8.6 + 8.6 = 17.2 \text{ cm}^2$

S10. Ans.(d)

Sol.



We know that

$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$$

$$\Rightarrow \frac{3}{7} = \frac{6}{14} = \frac{6}{BC}$$

$\Rightarrow BC = 14 \text{ cm}$

S11. Ans.(b)

Sol.

$$\text{Total work} = 28 \times 7 = 196$$

$$\text{half work} = 98$$

$$7 \text{ men do half work} = \frac{98}{7} = 14 \text{ days.}$$

S12. Ans.(a)

Sol.

$$\left(x + \frac{1}{x} + 4\right)^3 = 125 \Rightarrow x + \frac{1}{x} = 1$$

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

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

S13. Ans.(c)

Sol.

$$\tan A = \frac{1.2}{0.5} = \frac{12}{5}$$

$$\Rightarrow \sin A = \frac{12}{13}, \cos A = \frac{5}{13}$$

$$\text{Now, } (25 \cos A + 26 \sin A)$$

$$= \left[25 \times \frac{5}{13} + 26 \times \frac{12}{13}\right] = \frac{437}{13}$$

S14. Ans.(d)

Sol.

$$3 \operatorname{cosec}^2 \alpha + 4 \sin^2 \alpha = 7$$

$$\Rightarrow \text{at } \alpha = 60^\circ$$

$$3 \times \frac{4}{3} + 4 \times \frac{3}{4} = 7$$

$$\alpha = 60^\circ$$

S15. Ans.(b)

Sol.

$$\text{SI on A's borrowing} = \frac{4500 \times 4 \times 4}{100} = \text{Rs. } 720$$

$$\text{SI on B's borrowings} = \frac{4500 \times 6 \times 4}{100} = \text{Rs. } 1080$$

$$\text{A's gain} = 1080 - 720 = \text{Rs. } 360$$

S16. Ans.(c)

Sol.

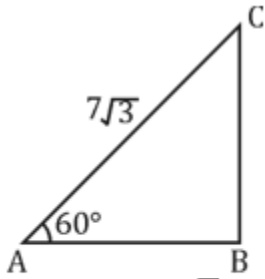
| | | | | |
|------------------|--------|-------------------|---|-------------------|
| A | : | B | : | C |
| (2000×4+3000×8) | : | (19000×4+15000×8) | : | [15000×4+15750×8] |
| = (24000 + 8000) | : | (76000 + 120000) | : | (60000 + 126000) |
| = 32000 | 196000 | 186000 | | |
| = 16 | : 98 | : 93 | | |

$$\text{Total profit} = 232047 \text{ Rs.}$$

$$\text{B's share profit} = 232047 \times \frac{98}{207} = 109858$$

S17. Ans.(a)

Sol.



Given $AC = 7\sqrt{3}$

$$\sin 60^\circ = \frac{BC}{AC}$$

$$\frac{\sqrt{3}}{2} = \frac{BC}{7\sqrt{3}} \Rightarrow BC = \frac{21}{2} \text{ m} = 10.5 \text{ m}$$

S18. Ans.(b)

Sol.

$$\begin{aligned} & 25 - 50 - \frac{50 \times 25}{100} \\ & = -25 - 12.5 = 37.5\% \text{ Loss} \\ & \Rightarrow \text{Loss of } 37.5\% \end{aligned}$$

S19. Ans.(d)

Sol.

From same direction

$$= \frac{(175+x)}{(50-40) \times \frac{5}{18}} = 3 \times 60$$

$$= \frac{(175+x) \times 18}{50} = 180$$

$$175 + x = 500 \Rightarrow x = 325 \text{ m}$$

S20. Ans.(a)

Sol.

$$x^4 - 574x^2 + 1 = 0$$

$$\Rightarrow x^2 + \frac{1}{x^2} - 574 = 0,$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^2 = 576$$

$$\Rightarrow x + \frac{1}{x} = 24$$

S21. Ans.(a)

Sol.

At 8 monthly

$$16.64 + 8 + \frac{16.64 \times 8}{100}$$

$$= (24.64 + 1.3312)\% = 25.9712\%$$

$$\text{Compound interest} = 25.9712\% \times 325$$

$$= \text{Rs.}8440.64$$

S22. Ans.(b)

Sol.

$$SP = 15620 \text{ Rs.}$$

$$37\frac{1}{2}\% = \frac{75}{2}\% \quad CP : SP$$

$$\Rightarrow CP = 8 \times 1420 = \text{Rs.}11360$$

S23. Ans.(b)

Sol.

$$\angle A = 45^\circ$$

$$= \frac{8 \tan A + 11 \operatorname{cosec}^2 A - 2 \cot^2 A}{14 \sin^2 A}$$

$$= \frac{8 \times 1 + 11 \times 2 - 2}{14 \times 1/2} = \frac{28}{7} = 4$$

S24. Ans.(d)

Sol.

$$\text{Sides} \rightarrow 180, 240, 300$$

$$\text{Area of triangle} = \sqrt{360 \times 60 \times 180 \times 120}$$

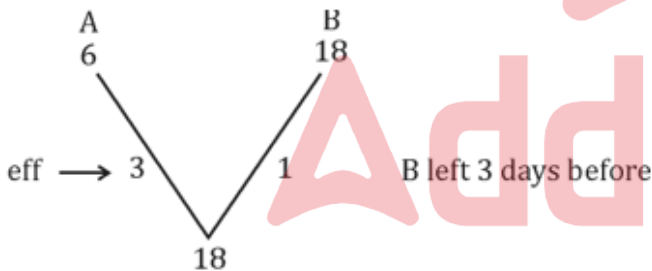
$$= 2 \times 180 \times 60 = 21600$$

$$\text{Side of square} = (\text{Side})^2 = 21600$$

$$\text{Side} = 60\sqrt{6} \text{m}$$

S25. Ans.(c)

Sol.

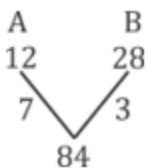


$$\text{Let Total work} = 18 + 3 = 21 \text{ unit}$$

$$\text{They complete the work} = \frac{21}{4} = 5\frac{1}{4} \text{ days}$$

S26. Ans.(b)

Sol.



$$\text{They worked together} = (7 + 3) \times 3 = 30 \text{ unit}$$

$$\text{Remaining} = 84 - 30 = 54$$

$$\text{Remaining work complete by B} = \frac{54}{3} = 18 \text{ days}$$

$$\text{B worked Total} = 18 + 3 = 21 \text{ days}$$

S27. Ans.(c)

Sol.

$$\begin{aligned} (A + 8B) &= 8 \\ (A + 8B)^3 &= 8^3 \Rightarrow A^3 + 512B^3 + 3 \times A \times 8B (A + 8B) = 512 \\ \Rightarrow A^3 + 512B^3 + 48 \times 8 &= 512 \\ \Rightarrow A^3 + 512B^3 &= 512 - 384 \\ \Rightarrow A^3 + 512B^3 &= 128 \end{aligned}$$

S28. Ans.(d)

Sol.

$$\begin{aligned} \tan^2 \theta &= 3(\sec \theta - 1) \\ \Rightarrow -4 + 4 \sec^2 \theta &= 3(\sec \theta - 1) \\ \Rightarrow 4 \sec^2 \theta - 4 \sec \theta + \sec \theta - 1 & \\ \Rightarrow \sec \theta &= -\frac{1}{4}, \sec \theta = 1 \\ \sec \theta &= 1 \text{ when, } \theta = 0^\circ \\ \text{Now } (2 \sin \theta + 4 \cos \theta - \sec \theta) &= (2 \sin 0^\circ + 4 \cos 0^\circ - \sec 0^\circ) \\ &= (0 + 4 - 1) = 3 \end{aligned}$$

S29. Ans.(c)

Sol.

$$\begin{aligned} 600 \times \frac{(100-x)}{100} \times \frac{87.5}{100} &= 420 \\ = \frac{6 \times 87.5}{100} \times (100 - x) &= 420 \\ \Rightarrow x &= 20 \end{aligned}$$

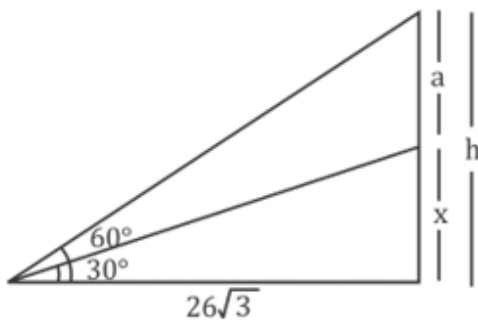
S30. Ans.(a)

Sol.

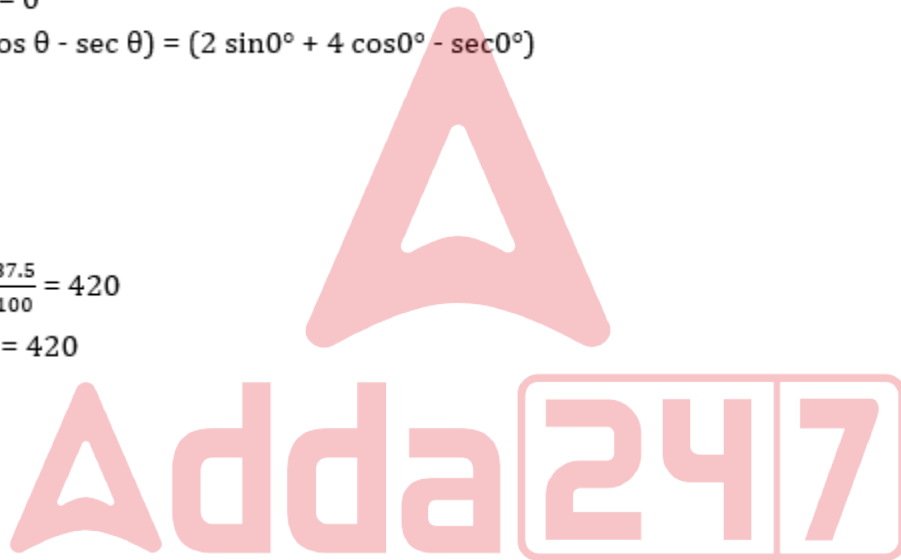
320682 is divisible by 3 Not divisible by 9.

S31. Ans.(b)

Sol.



$$\begin{aligned} \text{We know that } \tan \theta &= \frac{H}{B} \\ \Rightarrow \tan 30^\circ &= \frac{x}{26\sqrt{3}} \end{aligned}$$



$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{x}{26\sqrt{3}} \Rightarrow x = 26$$

$$\text{Now } \tan 60^\circ = \frac{h}{26\sqrt{3}}$$

$$\Rightarrow \frac{a+x}{26\sqrt{3}} = \tan 60^\circ$$

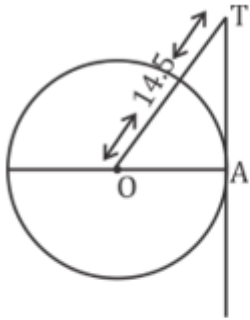
$$\Rightarrow \frac{26+a}{26\sqrt{3}} = \frac{\sqrt{3}}{1}$$

$$\Rightarrow a = 52 \text{ m}$$

The building must be raised 52 m

S32. Ans.(b)

Sol.



Diameter = 20 cm

OA = 10 cm

we know that

$$OT^2 = (OA)^2 + (AT)^2$$

$$\Rightarrow (14.5)^2 = (10)^2 + (AT)^2$$

$$\Rightarrow AT^2 = 210.25 - 100$$

$$AT = 10.5 \text{ cm}$$

S33. Ans.(d)

Sol.

$$\begin{aligned} & \frac{1}{35} + \frac{1}{63} + \frac{1}{99} + \frac{1}{143} + \frac{1}{195} \\ &= \frac{1}{5 \times 7} + \frac{1}{9 \times 7} + \frac{1}{9 \times 11} + \frac{1}{11 \times 13} + \frac{1}{13 \times 15} \\ &= \frac{1}{2} \left[\frac{1}{5} - \frac{1}{7} + \frac{1}{7} - \frac{1}{9} + \frac{1}{9} - \frac{1}{11} + \frac{1}{11} - \frac{1}{13} + \frac{1}{13} - \frac{1}{15} \right] \\ &= \frac{1}{2} \left[\frac{1}{5} - \frac{1}{15} \right] = \frac{1}{15} \end{aligned}$$

S34. Ans.(a)

Sol.

radius \rightarrow 10 11

 10 11

height \rightarrow 25 23

Area of cylinder = $\pi r^2 h$

$$\% \text{ changed} = \frac{2783 - 2500}{2500} \times 100$$

$$= \frac{283}{2500} \times 100 = 11.32\% \text{ increase}$$

S35. Ans.(d)

Sol.

$$\text{Total distance} = 945 + 825 = 1770 \text{ km/h}$$

$$\text{Total Time} = \frac{945}{70} + \frac{825}{50} = 16.5 + 13.5$$

$$= 30$$

$$\text{Avg speed} = \frac{\text{Total distacen}}{\text{Total Time}} = \frac{1770}{30} = 59$$

S36. Ans.(b)

Sol.

$$S \frac{49+68+43+a+b}{5} = 37$$

$$\frac{37+43+49+56+45+c+d}{7} = 69$$

$$\Rightarrow c + d = 253$$

$$\text{Avg. of a, b, c and d} = \frac{a+b+c+d}{4} = \frac{25+253}{4} = 69.5$$

S37. Ans.(c)

Sol.

$$l = 5 \times 5 = 25$$

$$h = 5 \quad b = 5$$

$$\text{T.S.A} = 2(lb + bh + hl)$$

$$= 2(25 \times 5 + 25 + 25 \times 5)$$

$$= 2(125 + 125 + 25) = 550 \text{ m}$$

S38. Ans.(a)

Sol.

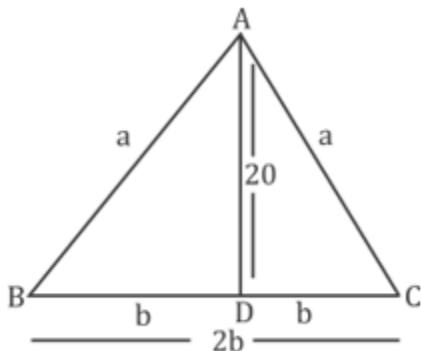
$$\text{LCM} \times \text{HCF} = \text{I}^{\text{st}} \times \text{II}^{\text{nd}}$$

$$10^3 \times 5^2 \times 10^2 = 10^4 \times \text{II}^{\text{nd}}$$

$$\text{II}^{\text{nd}} \text{ number} = 250$$

S39. Ans.(c)

Sol.



Perimeter = 80 cm

$$2a + 2b = 80$$

$$a + b = 40 \text{ _____ (I)}$$

In $\triangle ABD$

$$a^2 - b^2 = AD^2$$

$$(a + b)(a - b) = 400$$

$$40(a - b) = 400$$

$$a - b = 10 \text{ _____ (II)}$$

From eqⁿ (I) and (II)

$$a = 25, b = 15$$

$$BC = 30$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times 30 \times 20 = 300 \text{ cm}$$

S40. Ans.(b)

Sol.

$$S.I = \frac{P \times R \times T}{100} \text{ Let } x = \text{Principal}$$

$$(3x - x) = \frac{x \times R \times 4}{100}$$

$$\Rightarrow 50\%$$

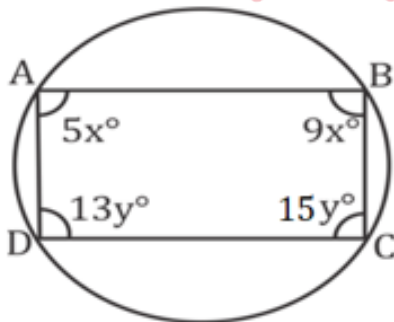
Now for 5 times the amount

$$5x - x = \frac{x \times 50 \times t}{100}$$

$$\Rightarrow t = 8 \text{ years}$$

S41. Ans.(a)

Sol.



Since ABCD is cyclic

$$\text{then } \angle A + \angle C = \angle B + \angle D$$

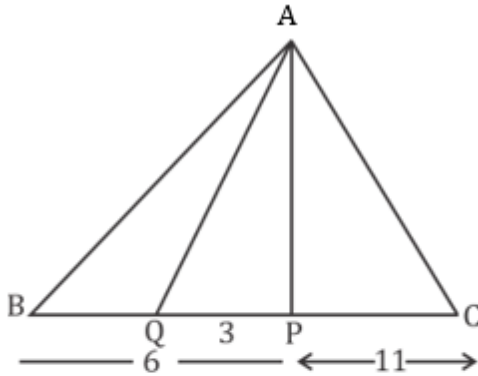
$$\Rightarrow 5x^\circ + 15y^\circ = 9x^\circ + 13y^\circ$$

$$\Rightarrow 4x^\circ = 2y^\circ$$

$$\Rightarrow \frac{x}{y} = \frac{1}{2}$$

S42. Ans.(d)

Sol.



BP = 6 then BQ : QP = 3 : 3

Q is mid-point

$\text{ar}(\Delta ABQ) = \text{ar}(\Delta AQP) = 3$

Area in base ratio

Now $\text{ar}(\Delta ABP) : \text{ar}(\Delta APC)$

= 6 : 11

$\Rightarrow \text{ar}(\Delta ABQ) : \text{ar}(\Delta ABC)$

= 3 : 17

S43. Ans.(b)

Sol.

$$\begin{array}{ccc} 70\% & & 40\% \\ & \diagdown & / \\ & x & \\ & / & \diagdown \\ 40 & : & 35 \\ 8 & : & 7 \\ \Rightarrow x = \frac{8 \times 70 + 7 \times 40}{8+7} = 56\% \end{array}$$

S44. Ans.(a)

Sol.

$$\begin{aligned} \frac{a}{b} &= \frac{4}{3}, & \frac{c}{d} &= \frac{3a}{2b} = \frac{12}{6} = \frac{2}{1} \\ \frac{ac}{bd} &= \frac{a}{b} \times \frac{c}{d} = \frac{4}{3} \times \frac{2}{1} = \frac{8}{3} \\ ac : bd &= 8 : 3 \end{aligned}$$

S45. Ans.(d)

Sol.

$$\begin{aligned} &12\frac{1}{2}\% \text{ Loss} \\ &= \frac{1}{8} - SP \\ &= \frac{1}{8} - Loss \end{aligned}$$

$$CP = SP - Loss = 7$$

$$\text{Loss at CP} = \frac{8-7}{7} \times 100 = 14.285\%$$

S46. Ans.(b)

Sol.

$$\text{C.I for 2 years} = 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

$$21\% \rightarrow 6300 \Rightarrow 100\% = 30000$$

Sum = 30000 Rs.

S47. Ans.(a)

Sol.

Avg of Boys in five states

$$= \frac{12.5 + 11.5 + 10 + 9 + 9}{5} = 10.4$$

\Rightarrow Greater in states (A and C)

S48. Ans.(a)

Sol.

Avg of Boys = 10.4

Only state A is greater

S49. Ans.(a)

Sol.

Total employees = 4200

$$360 \rightarrow 4200$$

$$1 \rightarrow \frac{35}{3}$$

$$\text{In Office D} \Rightarrow 75 \times \frac{35}{3} = 875$$

S50. Ans.(d)

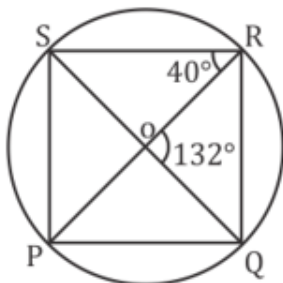
Sol.

$$\text{Number of employees in A} = \frac{35}{3} \times 120 = 1400$$

Hence None of these Answer.

S51. Ans.(c)

Sol.



$$\angle SRP = \angle SQP = 40^\circ \text{ [}\therefore \text{ Angle on same chord]}$$

$$\angle POQ + \angle QOR = 180^\circ \text{ [linear pair]}$$

$$\angle POQ = 180 - 132^\circ = 48^\circ$$

In ΔPOQ

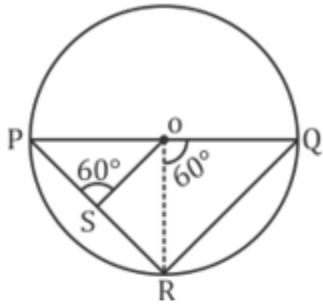
$$\angle P + \angle Q + \angle O = 180$$

$$\angle P + 40 + 48^\circ = 180$$

$$\angle P = 92^\circ$$

S52. Ans.(c)

Sol.



In ΔPRQ ,

$\angle R = 90^\circ$ [angle made in semi-circle]

In ΔOQR

Given, $\angle O = 60^\circ$

$OQ = OR$ [Radius]

So,

$\angle R = \angle Q = 60^\circ$ [Equilateral triangle]

$\angle PRQ = \angle PRO + \angle ORQ$

$90^\circ = \angle PRO + 60^\circ$

$\angle PRO = 30^\circ$

Now,

$\angle PSO = \angle SRO + \angle SOR$

$60^\circ = 30^\circ + \angle SOR$ [Sum of external angle is equal to the sum of two opposite angle]

$\angle SOR = 30^\circ$

$\angle SRO = \angle SOR = 30^\circ$

So, ΔSRO is isoscale triangle.

$SO = SR = 9\text{cm}$

S53. Ans.(d)

Sol.

$$x - \frac{1}{x} = 5$$

cube both side

$$\left(x - \frac{1}{x}\right)^3 = (5)^3$$

$$x^3 - \frac{1}{x^3} = 125 + 3 \times 5$$

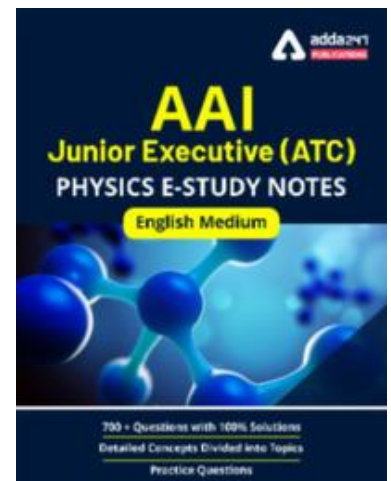
$$x^3 - \frac{1}{x^3} = 140$$

Now,

$$\Rightarrow \frac{x^3 - \frac{1}{x^3} + 5}{x - \frac{1}{x}}$$

$$\Rightarrow \frac{140 + 5}{5} = \frac{145}{5}$$

$$\Rightarrow 29$$

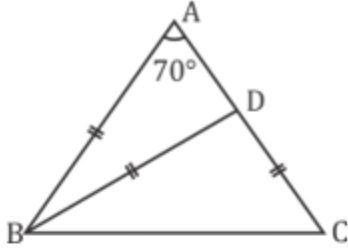


S54. Ans.(b)

Sol. Average Production (Sony) = $\frac{40+60+45}{3} = 48.33\%$

S55. Ans.(d)

Sol.



In ΔABD

$$AB = BD$$

then

$$\angle BAD = \angle BDA = 70^\circ$$

ΔABC

$$\angle A + \angle B + \angle C = 180$$

$$\angle B = 180 - 140 = 40$$

$$\angle BDC = 180 - 70 \text{ [Linear Pair]}$$

$$= 110^\circ$$

and

In ΔBDC

$$BD = DC \text{ [Given]}$$

So,

$$\angle DBC = \angle DCB = 35^\circ$$

$$\angle B = 40^\circ + 35^\circ = 75^\circ$$

S56. Ans.(d)

Sol.

A.T.Q.

$$\frac{25 \text{ men} \times 15 \text{ h} \times 8 \text{ days}}{5 \text{ unit}} = \frac{\text{Days} \times 12 \text{ men} \times 20 \text{ hr}}{10 \text{ unit}}$$

$$\text{Days} = 25$$

S57. Ans.(b)

Sol.

Area of Rectangle = Length \times Breadth

Length : Breadth

Old \rightarrow 4 : 2 = 8

New \rightarrow 5 : 1 = 5

S58. Ans.(a)**Sol.**

$$2 \cos^2 \theta = 3 \sin \theta$$

$$2 - 2 \sin^2 \theta = 3 \sin \theta$$

$$2 \sin^2 \theta + 3 \sin \theta - 2 = 0$$

$$2 \sin^2 \theta + 4 \sin \theta - \sin \theta - 2 = 0$$

$$(\sin \theta + 2) (2 \sin \theta - 1) = 0$$

$$\sin \theta = -2, \quad \sin \theta = \frac{1}{2}$$

Putting the value of $\theta = 30^\circ$

A.T.Q.

$$\Rightarrow 9 \sec^2 \theta - 12 \tan^2 \theta + 8 \cos^2 \theta$$

$$\Rightarrow 9 \times \left(\frac{2}{\sqrt{3}}\right)^2 - 12 \times \left(\frac{1}{\sqrt{3}}\right)^2 + 8 \times \left(\frac{\sqrt{3}}{2}\right)^2$$

$$\Rightarrow 9 \times \frac{4}{3} - 12 \times \frac{1}{3} - 8 \times \frac{3}{4}$$

$$\Rightarrow 12 - 4 - 6 = 2$$

S59. Ans.(c)

Sol. Let the width of the wall = x meter

then,

$$\text{height} = 8x, \text{ Length} = 5 \times 8x = 40x$$

Now,

$$\text{Volume of the school wall} = l \times b \times h$$

$$= x \times 8x \times 40x$$

$$2560 = x^3 \times 320$$

$$x = 2$$

Now,

$$\text{Width} = 2$$

$$\text{Height} = 8 \times 2 = 16$$

$$\text{Length} = 40 \times 2 = 80$$

$$\text{Now, the surface area of wall} = 80 \times 16 = 1280 \text{m}^2$$

The cost of painting the wall

$$\Rightarrow 1280 \times 45 = \text{Rs. } 57,600$$

S60. Ans.(c)**Sol.****Vishal****Radhika**

$$\text{Income (11 : 9) } \times 4$$

$$\text{Expenditure (4 : 3) } \times 9$$

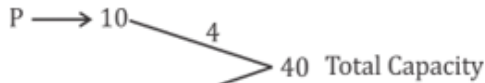
$$44 : 36$$

$$\underline{36 : 27}$$

$$\text{Saving ratio } \boxed{8 : 9}$$

S61. Ans.(a)

Sol.



1st → Q → 30 min → 2.5 units

2nd → P 30 min → 2 units.

1 hour → 4.5 unit

8 hour → 36 unit

8.5 hour → 38.5 unit

P fills 2 units water in tank in 30 min then, tank will be completely be filled in 9th hour approx.

S62. Ans.(d)

Sol. Let the downstream and upstream speed be 'x' km/hr and 'y' km/h respectively.

As per the question,

$$\frac{8}{x} + \frac{4}{y} = \frac{40}{60} \text{ (i)}$$

$$\frac{6}{x} + \frac{8}{y} = \frac{30}{60} \text{ (ii)}$$

Equ. (i) multiply by 2.

$$\frac{16}{x} + \frac{8}{y} = \frac{80}{60} \text{ (iii)}$$

After, solving equation (ii) and (iii)

$$x = 12 \text{ km}$$

When x = 12 put in equation (i)

$$\frac{8}{12} + \frac{4}{y} = \frac{40}{60}$$

$$\frac{4}{y} = 0$$

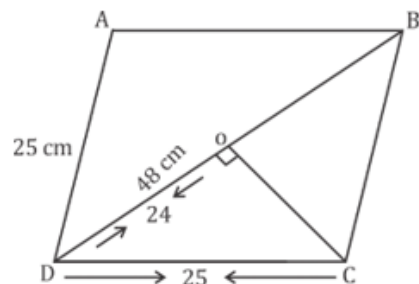
$$4 = 0$$

y's value not possible

So, the data is inadequate.

S63. Ans.(d)

Sol.



$$OC^2 = 25^2 - 24^2$$

$$\Rightarrow 625 - 576$$

$$\Rightarrow 49$$

$$OC = 7 \text{ cm}, \quad AC = 2 \times 7 = 14$$

$$\text{Area of Rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 14 \times 48$$

$$= 336 \text{ cm}^2$$

S64. Ans.(c)

Sol.

$$\text{Sales increased in the month of June} = \frac{(780 - 600)}{600} \times 100$$

$$= \frac{180}{600} \times 100$$

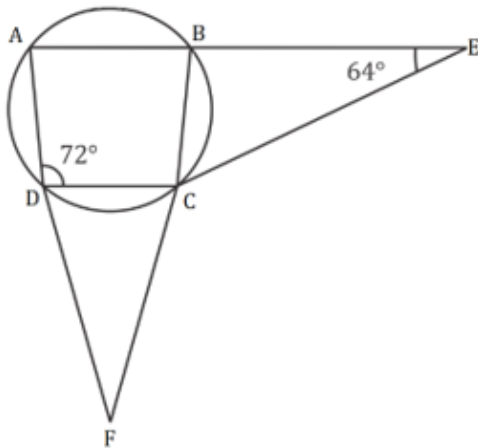
$$= 30\%$$

$$\text{Number of Auto rickshaw sold in July month} = 780 \times \frac{130}{100}$$

$$= 1014$$

S65. Ans.(a)

Sol.



$$\angle D + \angle B = 180 \text{ [}\because \text{ cyclic quadrilateral]}$$

$$\angle B = 180 - 72^\circ = 108^\circ$$

$$\angle ABC + \angle EBC = 180 \text{ [Straight line]}$$

$$\angle EBC = 180 - 108^\circ = 72^\circ$$

In $\triangle BCE$

$$\angle B + \angle C + \angle E = 180^\circ$$

$$72^\circ + \angle C + 64^\circ = 180^\circ$$

$$\angle C = 44^\circ$$

$$\text{Now, } \angle DCB = 180 - 44^\circ = 136^\circ$$

$$\angle ADC + \angle FDC = 180^\circ \text{ [}\because \text{ linear line]}$$

$$\angle FDC = 180 - 72^\circ = 108$$

$$\angle DCB + \angle DCF = 180^\circ \text{ [linear line]}$$

$$\angle DCF = 180^\circ - 136^\circ = 44^\circ$$

In $\triangle DFC$

$$\angle D + \angle C + \angle F = 180$$

$$\angle F = 180 - (44^\circ + 108^\circ)$$

$$= 180 - 152 = 28^\circ$$

S66. Ans.(b)

Sol.

$$\text{Require \%} = \frac{(548+638+720+740+650+800)}{(520+645+722+740+600+780)} \times 100$$

$$\frac{4096}{4007} \times 100 = 102.22\% = 102\%$$

S67. Ans.(a)

Sol.

$$\cot 29^\circ \cot 34^\circ \cot 60^\circ \cot 61^\circ \cot 56^\circ$$

$$\Rightarrow \cot A \times \cot B = 1 \text{ [If } A + B = 90^\circ]$$

$$\text{Now, } \cot 60^\circ = \frac{1}{\sqrt{3}}$$

S68. Ans.(d)

Sol. 27 Oranges → Rs. 90

18 Oranges → Rs. 70

Make the quantity equal

$$(18 \text{ Oranges}) \times 1.5 \rightarrow (Rs. 70) \times 1.5$$

27 Oranges → Rs. 105

Now,

27 Oranges → 90

27 Oranges → 105

54 Oranges → 195

Total cost price = 195 for 54 oranges

48 Oranges → $85 \times 4 = 340$

6 Oranges → $85 \times 0.5 = 42.5$

Total selling price = 382.5

$$\text{Required Result} = \frac{(382.5 - 195)}{195} \times 100$$

$$= \frac{187.5}{195} \times 100$$

$$= 96.15\%$$

S69. Ans.(d)

Sol.

$$\text{Time} = \frac{1}{4} \text{ year} = \frac{5}{4} \times 12 = 15 \text{ months}$$

Rate = 6% p.a.

Interest is compounded 5 monthly,

$$\text{Time} = \frac{15}{5} = 3$$

$$\text{Rate} = \frac{6}{12} \times 5 = \frac{5}{2}$$

A.T.Q

$$\text{Amount} = P \left[1 + \frac{r}{100} \right]^x$$

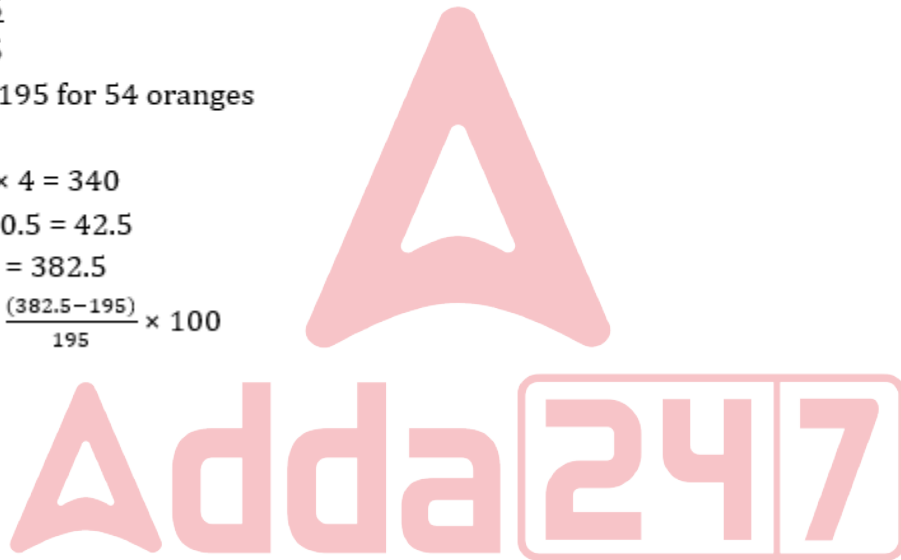
$$= 25,600 \left[1 + \frac{5}{200} \right]^3$$

$$= 25,600 \times \frac{41}{40} \times \frac{41}{40} \times \frac{41}{40}$$

$$\Rightarrow 27568.4$$

$$\Rightarrow 27568.4 - 25,600$$

$$= 1968.4$$



S70. Ans.(a)

Sol.

Abhishek alone can finish the work = 65 days

$$\text{Abhishek's one day work} = \frac{1}{65}$$

Abhishek and Bharat complete the whole work = $13\frac{1}{2}$ days

Abhishek and Bharat work on alternate days, with Bharat beginning so,

We can say Bharat will work only 7 days

$$\text{Abhishek work only} \Rightarrow 13\frac{1}{2} - 7 = 6\frac{1}{2} \text{ days}$$

$$\text{Abhishek's } 6\frac{1}{2} \text{ days work} = \frac{1}{65} \times \frac{13}{2} = \frac{1}{10}$$

$$\text{Remaining work} = 1 - \frac{1}{10} = \frac{9}{10}$$

Bharat complete $\frac{9}{10}$ work in = 7 days

$$\text{Bharat complete whole work} = 7 \times \frac{10}{9} = \frac{70}{9}$$

$$\text{Bharat completes 9 times the same work} = \frac{70}{9} \times 9$$

$$= 70 \text{ days}$$

S71. Ans.(d)

Sol.

$$x + \frac{1}{x} = 7$$

Squaring both side.

$$x^2 + \frac{1}{x^2} = 49 - 2 = 47 \text{ (i)}$$

Multiply Equation (i) & (ii)

$$x^5 + \frac{1}{x} + x + \frac{1}{x^5} = 322 \times 47$$

$$x^5 + \frac{1}{x^5} = 15134 - 7$$

$$x^5 + \frac{1}{x^5} = 15127$$

$$x + \frac{1}{x} = 7$$

Cube both side

$$x^3 + \frac{1}{x^3} = 343 - 3 \times 7 \text{ (ii)}$$

$$= 322$$

S72. Ans.(b)

Sol. A.T.Q

$$x + 25 \times 56 = 13 \times 70 + 13 \times 80$$

$$x + 1400 = 910 + 1040$$

$$x = 1950 - 1400$$

$$x = 550$$

$$\text{The Average} = \frac{25 \times 56 - 550}{24}$$

$$= \frac{850}{24} = 35.42$$

S73. Ans.(c)

Sol. L.C.M of (3, 7, 11) = 231

Let the maximum Number divisible by 231 is 46499,

$$\begin{array}{r} 231 \overline{)46499} \text{ (21)} \\ \underline{462} \\ 299 \\ \underline{231} \\ 68 \end{array}$$

Maximum Number divisible

$$= 46499 - 68$$

$$= 46431$$

$$x = 3, \quad y = 1$$

Now,

$$\Rightarrow (3x^2 - 5y)$$

$$\Rightarrow 3 \times 3^2 - 5 \times 1$$

$$\Rightarrow 3 \times 9 - 5 = 22$$

S74. Ans.(b)

Sol.

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

CP : SP : MP

$$4 : 5$$

$$\underline{\quad 3 : 4 \quad}$$

$$12 : 15 : 20$$

$$CP : SP = 12 : 15$$

S75. Ans.(b)

Sol. 25 of 15 + (35 ÷ 7) × 6 + 90 ÷ 15 of 7

$$\Rightarrow 25 \text{ of } 15 + 5 \times 6 + 6 \text{ of } 7$$

$$\Rightarrow 375 + 30 + 42$$

$$\Rightarrow 447$$

S76. Ans.(c)

Sol.

For minimum distance covered, LCM (252, 280, 308)

$$= 2 \times 2 \times 7 \times 9 \times 10 \times 11 = 27,720$$

S77. Ans.(b)

Sol.

$$444\frac{4}{9}\% = \frac{40}{9}$$

Original number
9 unit

Formed number
40 unit

$$\text{Difference} = (40 - 9) \text{ units} = 31 \text{ units} = 7440$$

$$1 \text{ unit} = 240$$

$$\text{So, original number} = 9 \times 240 = 2160$$

S78. Ans.(c)

Sol.

$$\text{Average production of wheat} = \frac{\text{Sum of production of wheat in given years}}{\text{number of years}}$$

$$\Rightarrow \text{Average production of wheat} = \frac{81+82+86+89+85+93}{6}$$

$$= (516/6) \text{ m tonnes}$$

$$= 86 \text{ m tonnes}$$

Maximum recorded production of food grain over the years = 120 m tonnes

∴ Percentage of average production of wheat to maximum production of food grains over the years = $(86/120) \times 100$

$$\approx 71.7\%$$

S79. Ans.(b)

Sol.

$$\frac{PRT}{100} + P = 6516$$

$$P \left(\frac{8 \times 11}{100 \times 2} + 1 \right) = 6516$$

$$P = \text{Rs. } 4525$$

S80. Ans.(b)

Sol.

$$(6k + l) (k - 6l)$$

$$= 6k^2 + kl - 36kl - 6l^2$$

$$= 6k^2 - 35kl - 6l^2$$

S81. Ans.(c)

Sol.

$$k^6 - 1 \Rightarrow (k^2)^3 - 1^3$$

$$\text{Using } \Rightarrow a^3 - b^3 = (a-b) (a^2 + b^2 + ab)$$

$$\Rightarrow (k^2 - 1) (k^4 + 1 + k^2 \times 1)$$

$$\Rightarrow (k^2 - 1) (k^4 + 1 + k^2) \dots \dots \dots \text{(i)}$$

Again,

$$k^4 + 2k^3 - 2k - 1$$

$$\Rightarrow k^4 - 1 + 2k(k^2 - 1)$$

$$\Rightarrow (k^2)^2 - 1^2 + 2k(k^2 - 1)$$

$$\Rightarrow (k^2 - 1)(k^2 + 1) + 2k(k^2 - 1)$$

$$\Rightarrow (k^2 - 1)(k^2 + 1 + 2k) \dots \dots \dots \text{(ii)}$$

From (i) and (ii)

H.C.F is a common term

$$\text{H.C.F} = (k^2 - 1)$$

S82. Ans.(b)

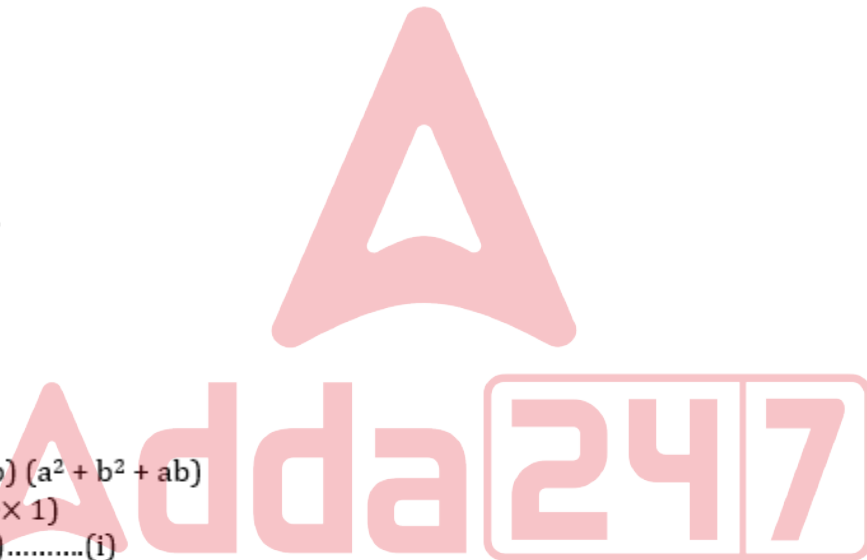
Sol. Let the average of team is x then total scores is 16x

But, according to question,

$$16x - 170 + 184 = 16 \times 168$$

$$16x = 2688 - 14$$

$$16x = 2674$$



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S83. Ans.(a)**Sol.**

Average production of wheat = (Sum of production of wheat in given years)/(number of years)

$$\Rightarrow \text{Average production of wheat} = \frac{81+82+86+89+85+93}{6}$$

$$= (516/6) \text{ m tonnes}$$

$$= 86 \text{ m tones}$$

S84. Ans.(b)**Sol.**

Total marked price of guitar and guitar cover = Rs. 14000 + Rs. 1000 = Rs. 15000

We know, Selling Price = Marked Price \times (1 - (Discount Percentage/100))

$$\Rightarrow \text{Selling price after discount of 24\%} = \text{Rs. } 15000 \times (1 - 24/100) = \text{Rs. } 11400$$

Manish availed this deal and sold the guitar cover to Amit at Rs. 900.

$$\Rightarrow \text{Effective selling price of guitar for Manish} = \text{Rs. } 11400 - \text{Rs. } 900 = \text{Rs. } 10500$$

$$\Rightarrow \text{Manish bought guitar worth Rs. } 14000 \text{ at Rs. } 10500.$$

To find discount percentage,

$$10500 = 14000 \times (1 - \text{Discount Percentage}/100)$$

$$\Rightarrow \text{Discount Percentage} = 100 \times (1 - 0.75) = 25$$

\therefore Effective discount will be 25%.

S85. Ans.(c)**Sol.**

$$\text{Length of AB} = 7 + 7 = 14 \text{ cm}$$

As we can see ΔABC is equilateral triangle

$$\therefore \angle CAB = \angle ABC = \angle ACB = 60^\circ$$

$$\text{So, Area of } \Delta ABC = \frac{\sqrt{3}}{4} \times 14 \times 14 = 49\sqrt{3} \text{ cm}^2$$

$$\text{Required answer} = 49\sqrt{3} - \pi \times 7^2 \times \frac{180}{360}$$

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

S86. Ans.(b)

Sol. $908^{\wedge}6\#8!7$ is divisible by 33

It means it is divisible by both 11 and 3 because $33 = 11 \times 3$

We know, the divisibility rule of 3 is sum of the digits must be divisible by 3.

and the divisibility rule of 11 is difference of sum of alternate digits is equal to 0 or divisible of 11.

$$908^{\wedge}6\#8!7/11 = 7 + 8 + 6 + 8 + 9 - (^{\wedge} + \# + !)$$

$$38 - (^{\wedge} + \# + !)$$

$$\text{If we put } ^{\wedge} + \# + ! = 16$$

then it is divisible by both 3 and 11

S87. Ans.(b)

Sol. Let Sameer be able to complete one piece of work in x days.

\Rightarrow In one day, work done by Sameer alone = $1/x$ ---(1)

\therefore Work done by Shobhit in 1 day = $(2/5x)$ ---(2) (given)

Work done by Shobhit and Sameer in 1 day = $(1/x) + (2/5x) = 7/5x$ ---(3)

\therefore Work done by Shobhit and Sameer in half a day = $7/10x$ ---(4)

From 2 and 4,

Total work completed at the end of 1.5 days = $(2/5x) + (7/10x) = 11/10x$

\therefore Remaining work = $3 - (11/10x) = (30x - 11)/10x$

If Sameer doubles his efficiency in a day,

Work done by Sameer in 1 day = $2/x$

If it takes 4 hours (i.e. $1/6^{\text{th}}$ of a day) for him to finish remaining work,

$(1/6) \times (2/x) = (30x - 11)/10x$

$\Rightarrow x = 43/90$

\therefore Work done by Sameer and Shobhit together in 1 day = $7/5x = (7 \times 90)/(5 \times 43) = 126/43$

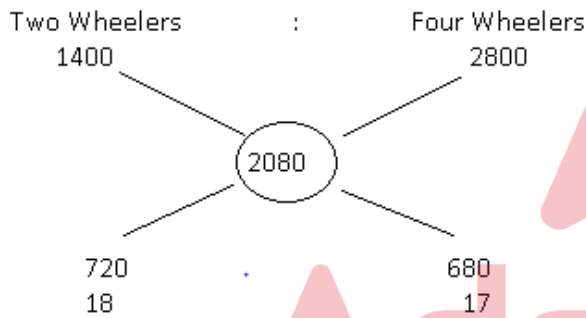
\therefore if it takes n days to finish a single piece of work together,

$N \times 126/43 = 1$

Thus, it takes $43/126^{\text{th}}$ of a day for both of them to complete a single piece of work together.

S88. Ans.(c)

Sol.



Total number of two wheelers vehicles = $\frac{700}{(18+17)} \times 18 = 360$

S89. Ans.(a)

Sol.

$$x - \frac{20}{x} = 1$$

$$x^2 - 20 = x$$

$$x^2 - x - 20 = 0$$

$$x^2 - 5x + 4x - 20 = 0$$

$$x(x - 5) + 4(x - 5) = 0$$

$$(x + 4)(x - 5) = 0$$

$$x = -4, 5$$

$$x \neq -4 \quad [\because x > 0]$$

So,

$$x = 5$$

Now

$$x^2 + \frac{75}{x^2} = (5)^2 + \frac{75}{(5)^2}$$

$$= 25 + \frac{75}{25} = 25 + 3$$

$$= 28$$

S90. Ans.(a)**Sol.**

$$\text{Total profit Tata Pvt. Ltd.} = (350 + 630 + 290 + 420) = 1690$$

$$\text{Total Profit of Jio Mart and Airtel Bharti} = (100 + 110 + 100 + 124 + 180 + 195 + 140 + 150) = 1099$$

$$\text{Required Result} = \frac{1690 - 1099}{1099} \times 100 = 53.77 \text{ (appx.)} = 54\%$$

S91. Ans.(d)**Sol.** Students enrolled in Sharda University in 2018 and 2019 = (375 + 225) = 600

Students enrolled in Amity University in 2016 and 2017 = (160 + 280) = 440

Required Ratio = 600 : 440

$$\boxed{15 : 11}$$

S92. Ans.(a)**Sol.**

Let downstream = x

Upstream = y

$$\frac{7.2}{x} + \frac{3.2}{y} = 2 \quad \text{--- (i)}$$

$$\frac{1.5}{x} + \frac{0.6}{y} = \frac{24}{60} \quad \text{--- (ii)}$$

On solving x = 6 ; y = 4

S93. Ans.(a)**Sol.**

$$\Rightarrow 5\frac{1}{6} + \left[3\frac{1}{6} + \left\{ 17 \times \left(4\frac{4}{5} \div 2\frac{2}{50} \right) \right\} \right]$$

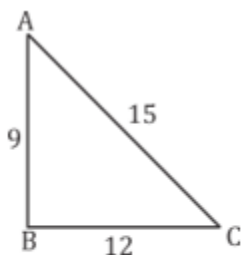
$$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + \left\{ 17 \times \left(\frac{24}{5} \times \frac{50}{102} \right) \right\} \right]$$

$$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + \left\{ 17 \times \frac{40}{17} \right\} \right]$$

$$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + 40 \right]$$

$$\Rightarrow \frac{31}{6} + \left[\frac{259}{6} \right]$$

$$= \frac{31 + 259}{6} = \frac{290}{6} = 48.33$$

S94. Ans.(d)**Sol.**

9, 12 and 15 makes triplet so the give value shows it is a right angle triangle.

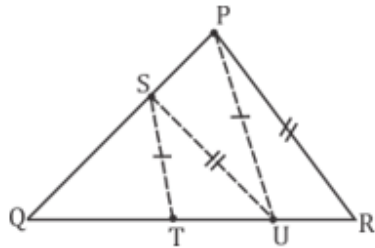
Now,

sin A + cosC + tan C

$$\Rightarrow \frac{12}{15} + \frac{12}{15} + \frac{9}{12} = \frac{141}{60}$$

S95. Ans.(b)

Sol. Let TU be xcm



In ΔPQR $SU \parallel PR$
 $\frac{QS}{PQ} = \frac{QU}{RQ}$ ----- (i)

In ΔPQR
 $\frac{QS}{PQ} = \frac{QT}{QR}$ ----- (ii)

On solving equation (i) and (ii)

$$\frac{QU}{RQ} = \frac{QT}{QR}$$

$$(QU)^2 = QT \times QR$$

$$(4 + x)^2 = 28 + 4x$$

$$16 + x^2 + 8x = 28 + 4x$$

$$x^2 + 4x - 12 = 0$$

$$x^2 + 6x - 2x - 12 = 0$$

$$x(x + 6) - 2(x + 6) = 0$$

$$(x - 2)(x + 6) = 0$$

$$x = 2, -6$$

$$x \neq -6, \text{ So } x = 2$$

Then,

Length of TU = 2cm.

S96. Ans.(c)

Sol.

Let the total work = LCM of (20 and 25) = 100 units

Rajesh efficiency = 5 unit/day

Radhika efficiency = 4 units/day

Rajesh and Radhika work together 6 days, then completed work = $9 \times 6 = 54$ units.

If remaining work completed in 4 days, then efficiency of Rajesh and Ritika together = $\frac{46}{4}$

= 11.5 units/day

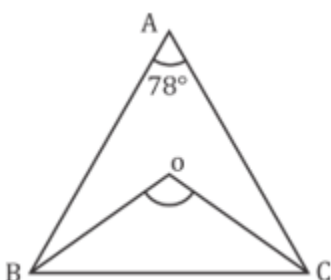
Ritika efficiency alone = $11.5 - 5$

= 6.5 unit/day

50% work completed by Ritika in days = $\frac{50 \text{ units}}{6.5} = 7.69$ days

S97. Ans.(d)

Sol.



$$\begin{aligned}\angle BOC &= 90 + \frac{\angle BAC}{2} \\ &= 90^\circ + \frac{78^\circ}{2} \\ &= 90^\circ + 39^\circ \\ &= 129^\circ\end{aligned}$$

S98. Ans.(b)

Sol.

Rs. 1 Rs. 2 Rs. 5 Rs. 10

9 : 7 : 5 : 3 (Ratio of No. of coins)

9 : 14 : 25 : 30 (Total value of denomination)

(9 + 7 + 5 + 3) units = 144

24 units = 144

1 unit = 6

Total money in Piggy bank = 6 × (9 + 14 + 25 + 30)

= 6 × 78 = Rs. 468

S99. Ans.(b)

Sol.

| | CP | SP |
|-------------------------|---------------|----|
| 1 st Article | (4 5) × 5 | |
| 2 nd Article | (25 21) × 1 | |
| 20 25 | | |
| <u>25 21</u> | | |
| 45 46 | | |
| <u> 1</u> | | |

$$\text{Profit} = \frac{1}{45} \times 100 = 2.2\%$$

S100. Ans.(c)

Sol.

$$\begin{aligned}\text{Average salary of all employees} &= \frac{35 \times 18500 + 2 \times 35000 + 6 \times 24000}{43} \\ &= \frac{647500 + 70000 + 144000}{43} \\ &= \frac{861500}{43} = 20035\end{aligned}$$

S101. Ans.(a)

Sol.

Distance = Relative speed × Time

$$= (68 + 72) \times \frac{6}{60} = 140 \times \frac{6}{60}$$

= 14 km

S102. Ans.(c)

Sol.

$$\begin{aligned}\Rightarrow & \frac{10\sqrt{3} \sin 60^\circ + 15\sqrt{3} \operatorname{cosec} 60^\circ - 3\sqrt{3} \tan 60^\circ}{5\sqrt{3} \operatorname{Cosec} 2 \times 60^\circ} \\ \Rightarrow & \frac{10\sqrt{3} \times \frac{\sqrt{3}}{2} + 15\sqrt{3} \times \frac{2}{\sqrt{3}} - 3\sqrt{3} \times \sqrt{3}}{-5\sqrt{3} (\sec 30^\circ)} \\ \Rightarrow & \frac{5 + 30 - 9}{5\sqrt{3} \times \frac{2}{\sqrt{3}}} = \frac{26}{10} = 2.6\end{aligned}$$

S103. Ans.(d)**Sol.**Let 1st, 2nd and 3rd number be 3x, 2x and x.

A.T.Q

$$(3x)^3 + (2x)^3 + x^3 = 30758$$

$$14x^3 = 30758$$

$$x^3 = 2197$$

$$x = 13$$

$$2^{\text{nd}} \text{ number} = 2x = 2 \times 13 = 26$$

$$3^{\text{rd}} \text{ number} = x = 13$$

$$\text{Average} = \frac{26+13}{2} = 18.5$$

S104. Ans.(d)**Sol.**

$$\text{Successive discount} = -35\% + 35\% - \frac{35 \times 35}{100} = -12.25\%$$

S105. Ans.(c)**Sol.**

$$\text{Passed students} = 23 + 24 + 9 + 4 = 60$$

$$\text{Total students} = 76$$

$$\text{Required result} = \frac{60}{76} \times 100 = 78.94\% \sim 79\%$$

S106. Ans.(c)**Sol.**

$$35\% \text{ of P's office} = \frac{72}{360} \times 1600 \times \frac{35}{100} = 112$$

$$\text{Equally number of employees shifted to Q and T office} = 56$$

$$\text{Number of employees in office Q} = \frac{108}{360} \times 1600 = 480$$

$$\text{Number of employees in office T} = \frac{90}{360} \times 1600 = 400$$

$$\text{Sum of number of employees} = (480 + 400 + 112) = 992$$

S107. Ans.(a)**Sol.** Anurag : Bhargav : Chand

$$650000 : 50000 : 55000$$

$$13 : 10 : 11 \leftarrow \text{Capital ratio}$$

$$12 : 12 - x : 9 - x \leftarrow \text{Time ratio}$$

$$156 : 120 - 10x : 99 - 11x \leftarrow \text{profit ratio}$$

$$\text{Given } 50\% = 156,$$

Then,

$$120 - 10x + 99 - 11x = 156$$

$$219 - 21x = 156$$

$$x = 3$$

Time for Bhargav = 9 months, Time for Chand = 6 months

Anurag invested alone in the business for 3 months.



S108. Ans.(a)

Sol.

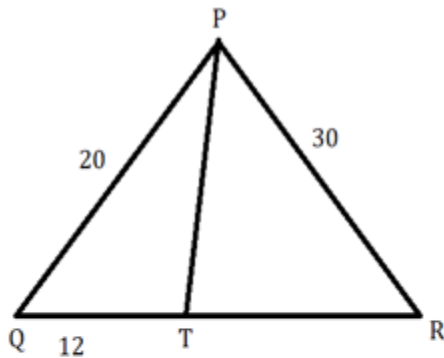
$$[(\sqrt{3} \operatorname{Cosec}\theta)^2 - 2^2] = 0$$

$$\sqrt{3} \operatorname{Cosec}\theta = 2$$

$$\operatorname{Cosec}\theta = \frac{2}{\sqrt{3}}, \theta = 60^\circ$$

S109. Ans.(d)

Sol.



By angle bisector theorem,

$$\frac{PQ}{PR} = \frac{QT}{TR}$$

$$\frac{20}{30} = \frac{12}{TR}$$

$$TR = 18,$$

$$QR = QT + TR$$

$$= 12 + 18 = 30\text{cm}$$

S110. Ans.(a)

Sol.

$$\text{Successive discount} = -25\% - 35\% + \frac{25 \times 35}{100} = -51.25\%$$

$$SP = 9650 \times \frac{(100 - 51.25)}{100} = 4704.375$$

S111. Ans.(b)

Sol.

$$\begin{aligned} &= \frac{\frac{21}{4} + \frac{7}{4} \times \frac{4}{5} + 15 \times \left(\frac{25}{8} \text{ of } \frac{8}{5}\right)}{\frac{5}{8} + \frac{5}{6} \times \frac{3}{4}} \\ &= \frac{\frac{21}{4} + \frac{7}{4} \times \frac{4}{5} + \frac{1}{15} \times \frac{25}{3} \times \frac{8}{5}}{\frac{5}{8} \times \frac{6}{5} \times \frac{3}{4}} = \frac{\frac{21}{4} + \frac{7}{5}}{\frac{6}{4}} = \frac{\frac{815 + 28}{60}}{\frac{6}{4}} = \frac{343}{60} \times \frac{4}{6} = \frac{343}{90} \end{aligned}$$

S112. Ans.(c)

Sol.

$$= \frac{(5.05)^3 - (0.5)^3}{(5.05)^2 + (0.5)^2 + 2.525}$$

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

$$= 5.05 - 0.5 = 4.55$$

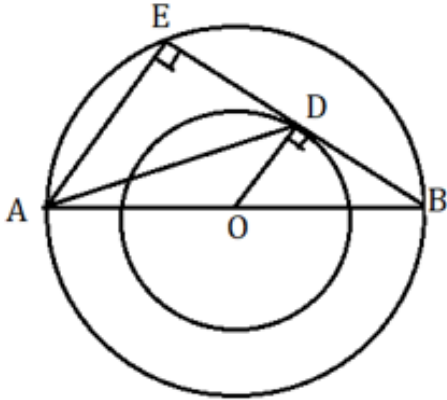
S113. Ans.(d)

Sol.

$$SI = \frac{23000 \times 3 \times 9}{100} + \frac{23000 \times 5 \times 8}{100} + \frac{23000 \times 4 \times 12}{100}$$
$$= 6210 + 9200 + 11040 = 26,450$$

S114. Ans.(a)

Sol.



$$OA = OB = 32\text{cm}$$

$$OD = 24\text{cm}$$

$$AE = 2 \times OD \quad [\because \triangle AEB \sim \triangle ODB]$$

$$AE = 2 \times 24 = 48$$

In $\triangle ODB$,

$$BD^2 = 32^2 - 24^2 = 448$$

$$BD = 8\sqrt{7}\text{ cm}$$

In $\triangle AED$

$$AD^2 = (8\sqrt{7})^2 + 48^2 = 448 + 2304$$

$$= 2752$$

$$AD = 8\sqrt{43}\text{cm}$$

S115. Ans.(a)

Sol.

$$11 \text{ fans} \rightarrow \text{Rs. } 250$$

$$17 \text{ fans} \rightarrow \text{Rs. } 430$$

For required result make number of fans equal.

So,

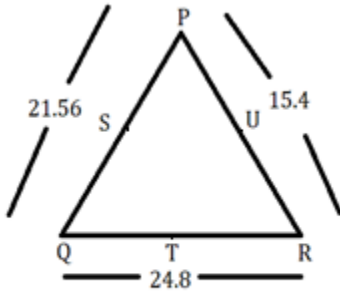
$$(11 \times 17) \text{ fans} \rightarrow 250 \times 17 = 4250$$

$$(11 \times 17) \text{ fans} \rightarrow 430 \times 11 = 4730$$

$$\text{Profit \%} = \left(\frac{4730 - 4250}{4250} \right) \times 100 = 11.29\%$$

S116. Ans.(b)

Sol.



$$\text{Perimeter of } \Delta STU = \frac{21.56 + 15.4 + 24.8}{2} = 30.88$$

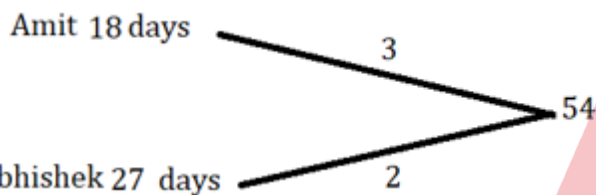
S117. Ans.(b)

Sol. $2019 = 98 - 72 = 26$

Company's maximum gain is in the year of 2019.

S118. Ans.(d)

Sol.



Amount of work completed by Amit in 5 days $= 5 \times 3 = 15$

Now,

Total work $= 54 + 15 = 69$

Number of days required to complete work $= \frac{69}{5} = 13 \frac{4}{5}$ days

S119. Ans.(c)

Sol.

$$\left(2x - \frac{1}{3x}\right) = 6$$

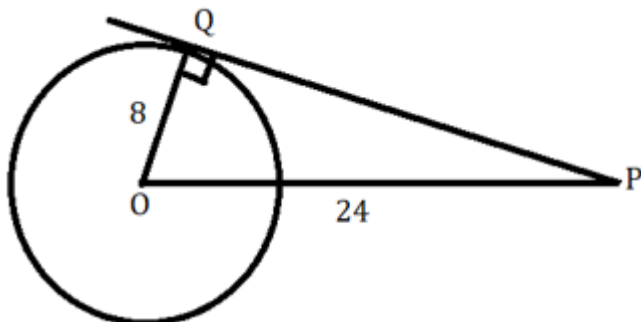
On squaring both sides,

$$= \left(4x^2 + \frac{1}{9x^2}\right) = 36 + \frac{4}{3} = \frac{112}{3}$$

$$= 37 \frac{1}{3}$$

S120. Ans.(c)

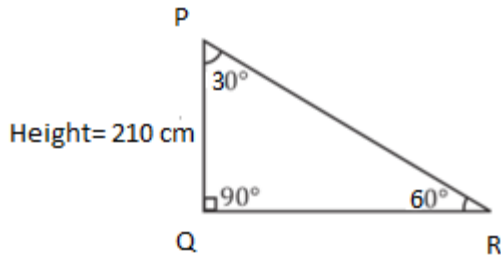
Sol.



$$\begin{aligned}
 &\text{In } \Delta OQP, \\
 &QP^2 = PO^2 - QO^2 \\
 &= 24^2 - 8^2 \\
 &= 576 - 64 \\
 &OP^2 = 512 \\
 &OP = 16\sqrt{2}\text{cm}
 \end{aligned}$$

S121. Ans.(b)

Sol.



Ratio of sides

$$PQ : QR : PR$$

$$\sqrt{3} : 1 : 2$$

$$\sqrt{3} \rightarrow 210$$

$$1 \rightarrow 70\sqrt{3}$$

$$\text{Distance} = 70\sqrt{3}\text{m}$$

S122. Ans.(c)

Sol. LCM of (8, 15, and 18) = 360

Minimum number added to make it perfect cube = $360 + 152 = 512$

Sum of digit of number which is added = $1 + 5 + 2 = 8$

S123. Ans.(b)

Sol.

$$\text{Students obtained grade B} = 2700 \times \frac{18}{100} = 486$$

$$\text{Students obtained grade C} = 2700 \times \frac{16}{100} = 432$$

$$\text{Required result} = 486 - 432 = 54$$

S124. Ans.(d)

Sol.

$$\text{diagonal of cube} = \text{side} \times \sqrt{3}$$

$$9\sqrt{3} = \text{side}\sqrt{3}$$

$$\text{Side} = 9$$

$$\text{Volume of cube} = \text{side}^3$$

$$= 9^3 = 729$$

**MECHANICAL
ENGINEERING
KA MAHAPACK**

By Adda247

BILINGUAL

S125. Ans.(b)**Sol.** LCM of (5, 8, 12 and 15) = 120For the greatest 4 digit number = $120k + 4$ put $k = 83$

$$= 120 \times 83 + 4$$

$$= 9964$$

S126. Ans.(d)**Sol.**

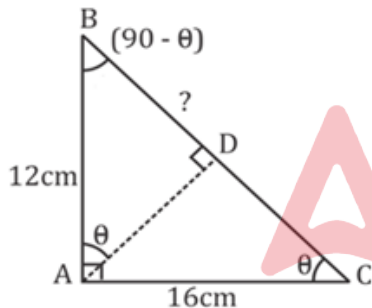
$$30\% = \frac{3}{10} \qquad 137.5\% = \frac{11}{8}$$

Ajay Pushpa Piyush

| | | |
|-----|-----|-------------------|
| 13 | 10 | |
| 143 | 110 | 80 = Income Ratio |

Difference of Income of Ajay and Pushpa = $(143 - 110)$ units $\rightarrow 2838$ 33 units $\rightarrow 2838$ 1 unit $\rightarrow 86$

Then,

Income of Piyush = $86 \times 80 = 6,880$ **S127. Ans.(b)****Sol.**

By Pythagoras,

$$BC^2 = AB^2 + AC^2$$

$$= 12^2 + 16^2$$

$$= 144 + 256 = 400$$

$$BC = 20 \text{ cm}$$

In ΔABC and ΔADB

$$\angle BAC = \angle ADB [\because 90^\circ]$$

$$\angle ACB = \angle BAD = \theta$$

$$\angle ABC = \angle ABD = 90^\circ - \theta$$

$$\Delta ABC \sim \Delta ADB$$

Now,

$$\frac{BC}{AB} = \frac{AB}{BD}$$

$$\frac{20}{12} = \frac{12}{BD}$$

$$BD = 7.2 \text{ cm}$$

S128. Ans.(c)**Sol.**

$$\begin{array}{ccc} & \text{Father} & \text{Daughter} \\ \text{Present ratio} & 6 & : & 5 & = & 1 \end{array}$$

$$\text{After 27 year } 3 : 1 = 2$$

Now,
12 : 10

$$\frac{3 : 1}{9 : 9}$$

9 units \rightarrow 27

1 units \rightarrow 3

Present age of Father = $12 \times 3 = 36$

Present age of Daughter = $10 \times 3 = 30$

Ratio of age of Father and daughter after 10 years

Father : Daughter

$$(36 + 10) : (30 + 10)$$

$$46 : 40$$

$$\boxed{23 : 20}$$

S129. Ans.(c)**Sol.**

$$3\sin^2\theta - \sin\theta - 2 = 0$$

$$\text{Then, } \sin\theta \neq -\frac{2}{3}, \text{ So, } \sin\theta = 1, \theta^0 = 90^0$$

$$1 + 2\sin^2\theta + 3\operatorname{cosec}^2\theta \cdot \cos^2\theta$$

$$\theta = 90^0$$

$$\Rightarrow 1 + 2 \times (1)^2 + 3 \times (1)^2 \times (0)^2$$

$$\Rightarrow 1 + 2 \times 1 + 3 \times 1 \times 0$$

$$\Rightarrow 1 + 2 + 0 = 3$$

S130. Ans.(c)**Sol.**

From 2010 to 2014 Tree planted in DPS School

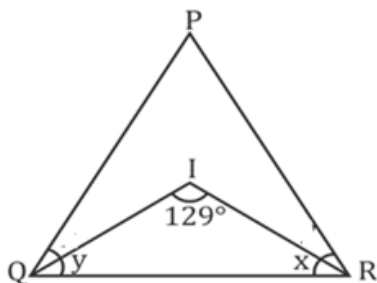
$$= 1750 + 1600 + 1760 + 1800 + 2000 = 8910$$

From 2010 to 2014 Tree planted in Sanik School

$$= 2000 + 1900 + 1840 + 1850 + 1800 = 9390$$

$$\Rightarrow (\text{Planted trees in DPS} - \text{Planted trees in Sanik School})$$

$$\Rightarrow 8910 - 9390 = 480 \text{ less.}$$

S131. Ans.(b)**Sol.**

$$\begin{aligned}\angle QIR &= 90 + \frac{\angle P}{2} \\ 129 &= 90 + \frac{\angle P}{2} \\ 39 &= \frac{\angle P}{2} \\ \angle P &= 78\end{aligned}$$

S132. Ans.(a)

Sol.

Total number of aspirants of IBPS, UPSC and PCS in 2016
 $= (150 + 100 + 120) = 370$

Total number of aspirants of SSC and IBPS in 2019
 $= (135 + 120) = 255$

Required Ratio -

(IBPS + UPSC + PCS) : (SSC + IBPS)

$$370 : 255$$

$$\boxed{74 : 51}$$

S133. Ans.(d)

Sol.

$$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$$

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$$

$$3^2 = x^2 + y^2 + z^2 + 2 \times (-14)$$

$$9 = x^2 + y^2 + z^2 - 28$$

$$x^2 + y^2 + z^2 = 37$$

Now,

$$x^3 + y^3 + z^3 - 3xyz = 3\{37 - (-14)\}$$

$$= 3(51) = 153$$

S134. Ans.(d)

Sol.

$$16 \div 4 \text{ of } 5 \times 25 + 7 \div 49 \text{ of } 2 \times 6 - 1 \div 4 \times 2$$

$$\Rightarrow 16 \div 20 \times 25 + 7 \div 98 \times 6 - 1 \div 4 \times 2$$

$$\Rightarrow \frac{4}{5} \times 25 + \frac{1}{14} \times 6 - \frac{1}{2} = 20 + \frac{3}{7} - \frac{1}{2}$$

$$\Rightarrow \frac{280 + 6 - 7}{14} = \frac{279}{14} = 19 \frac{13}{14}$$

S135. Ans.(d)

Sol. Let the smallest angle of the triangle be $(x - y)^\circ$

Now,

The second largest angle of the triangle = x°

The largest angle of the triangle = $(x + y)^\circ$

A.T.Q

$$(x + y)^\circ - 40^\circ = (x - y)^\circ$$

$$(x + y)^\circ - (x - y)^\circ = 40$$

$$2y = 40^\circ$$

$$y = 20^\circ$$

Now,

$$(x - y)^\circ + x^\circ + (x + y)^\circ = 180$$

$$3x^\circ = 180$$

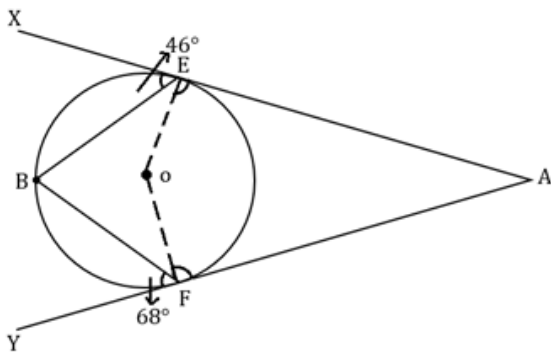
$$x^\circ = 60$$

The largest angle of triangle

$$= (x + y)^\circ = 60^\circ + 20^\circ = 80^\circ$$

S136. Ans.(d)

Sol.



$OE \perp AX$ and $OF \perp AY$ [Any line drawn from center to tangent is always perpendicular]

$$\angle OEX = \angle BEX + \angle OEB$$

$$90 = 46^\circ + \angle OEB$$

$$\angle OEB = 44^\circ$$

$$\angle OFY = \angle BFY + \angle OFB$$

$$90^\circ = 68^\circ + \angle OFB$$

$$\angle OFB = 22^\circ$$

$$\angle EBF = \angle BEO + \angle BFO$$

$$\angle EBF = 44^\circ + 22^\circ = 66^\circ$$

S137. Ans.(b)

Sol.

$$18\% = \frac{-9 \rightarrow \text{Loss}}{50 \rightarrow \text{SP}}$$

$$\text{CP of watch} = 50 \rightarrow 570$$

$$1 \rightarrow 11.14$$

$$59 \rightarrow 672.6$$

New selling price of watch.

$$= \frac{672.6}{100} \times 118 = 793.67$$

$$= 794$$

S138. Ans.(b)

Sol.

$$\text{Students enrolled for K.V. School} = (2300 + 2500 + 1800) = 6600$$

$$\text{Students enrolled for Sanik School} = (2000 + 1900 + 1840) = 5740$$

$$\text{Required ratio} = 6600 : 5740$$

$$\boxed{330 : 287}$$

S139. Ans.(d)**Sol.**

$$\text{Selling price of inverter} = 12500 \times \frac{85}{100} = 10,625$$

$$\begin{aligned} \text{Profit} &= \frac{(10,625 - 7580)}{7580} \times 100 \\ &= \frac{3045}{7580} \times 100 \\ &= 40.17\% \end{aligned}$$

S140. Ans.(a)**Sol.**The ratio of Abhilash and Bipasha = $4x : 5x$

Four year ago.

After 8 years from now

$$\frac{4x + 12}{5x + 12} = \frac{11}{13} \quad [\text{Total Year} = 4 + 8 = 12]$$

$$52x + 156 = 55x + 132$$

$$24 = 3x \Rightarrow x = 8$$

Sum of their present age = $4x + 4 + 5x + 4 = 80$ years.**S141. Ans.(a)****Sol.**

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$$

$$121 = 49 + 2(xy + yz + zx)$$

$$36 = xy + yz + zx.$$

Now,

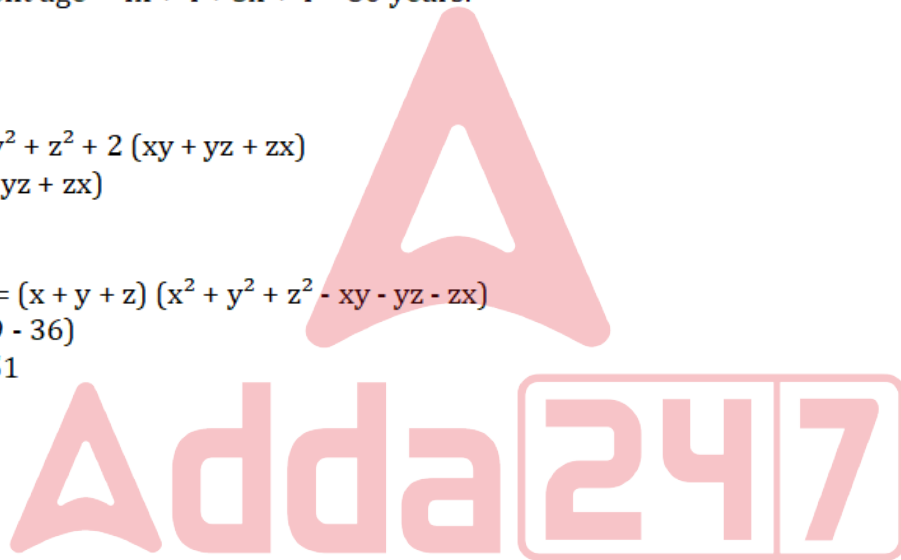
$$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$$

$$251 - 3xyz = 11(49 - 36)$$

$$-3xy = 11 \times 13 - 251$$

$$xyz = \frac{143}{3}$$

$$3\sqrt[3]{xyz} = \sqrt[3]{\frac{143}{3}}$$

**S142. Ans.(b)****Sol.**Let the speed of bus and car be x and y respectively

ATQ,

$$\frac{285}{x} - \frac{285}{y} = 14 \quad \text{----- (i)}$$

$$\frac{285}{2x} - \frac{285}{y} = 4.5 \quad \text{----- (ii)}$$

On solving eq. (i) and (ii)

$$285 \left(\frac{2-1}{2x} \right) = 9.5$$

$$\frac{285}{2x} = 9.5$$

$$X = 15$$

Now, Put $x = 15$ in equation (i)

$$\frac{285}{15} - \frac{285}{y} = 14$$

$$\frac{258}{y} = -5$$

$$y = 57$$

Speed of Balram's car is = 57 km/hr

BILINGUAL

AAI JE ATC

Target Batch

Complete Live Batch



Start Dec 26, 2022
9 AM to 7:30 PM

S143. Ans.(c)**Sol.**

$$\text{Area of base of cylinder} = \pi r^2$$

$$\pi r^2 = 962.5$$

$$\frac{22}{7} \times r^2 = 962.5$$

$$r = 17.5 \text{ cm}$$

$$\text{Curved surface area of cylinder} = 2\pi r h$$

$$= 2 \times \frac{22}{7} \times 17.5 \times h = 9625$$

$$h = 87.5 \text{ cm}$$

$$\text{Volume of cylinder} = \pi r^2 h$$

$$= \frac{22}{7} \times 17.5 \times 17.5 \times 87.5$$

$$= 84218.75$$

S144. Ans.(c)**Sol.**

If a number is divisible by 36 than that number is also is divisible the factor of 36, 9 and 4

If the 2nd last digit of the number = 1, 3, 7, 9

Then the given number is divisible by 4.

For the divisibility of 9, the sum of digit should be divisible by 9.

The given will be divisible s x = 0 and y = 1

Then, The given number is divisible by 9

$$\text{So, } \frac{3x + 7y}{9} = \frac{3 \times 0 + 7 \times 1}{9} = \frac{7}{9}$$

S145. Ans.(a)**Sol.**

Let the 8 consecutive even number is (x + 1) (x + 3) (x + 5) (x + 7) (x + 9) (x + 11) (x + 13)

(x + 15)

$$\frac{(x+1) + (x+3) + (x+5) + (x+7) + (x+9) + (x+11) + (x+13) + (x+15)}{8}$$

$$= 27$$

$$\frac{8x+64}{8} = 27$$

$$x + 8 = 27$$

$$x = 19$$

Now,

Average of last 3 number, 65 and 45

$$= \frac{(x+11) + (x+13) + (x+15) + 65 + 45}{5}$$

$$= \frac{30+32+34+65+45}{5} = 41.2$$

S146. Ans.(b)**Sol.**

we know

$$\sin A = \cos B$$

when A + B = 90°

$$5\alpha - 15^\circ + 15^\circ - 2\alpha = 90^\circ$$

$$3\alpha = 90^\circ$$

$$\alpha = 30^\circ$$

A.T.Q,

$$\sec 30^\circ + \operatorname{cosec} 60^\circ + \tan (1.5 \times 30) =$$

$$\frac{2}{\sqrt{3}} + \frac{2}{\sqrt{3}} + 1 = \frac{4}{\sqrt{3}} + 1 = \frac{4+\sqrt{3}}{\sqrt{3}}$$

S147. Ans.(c)

Sol.

$$\begin{array}{l} \text{Speed} \rightarrow \text{Old} : \text{New} \\ \quad \quad \quad 3 \quad : \quad 1 \\ \text{Time} \rightarrow \quad 1 \quad : \quad 3 \end{array}$$

2 units \rightarrow 200 minutes
1 units \rightarrow 100 min

So, usual time is 1 unit which is equal to 100 min or $\frac{100}{60} = 1\frac{2}{3}$ hrs

S148. Ans.(b)

Sol.

Artists learning Piano in the academy A and C = $57 + 51 = 108$

Artists learning Guitar in the academy B and D = $45 + 45 = 90$

So, Percentage = $\frac{108}{90} \times 100 = 120\%$

S149. Ans.(c)

Sol.

Total imports in 2018 and 2020 = $450 + 550 = 1000$

Total exports in 2016 and 2019 = $400 + 470 = 870$

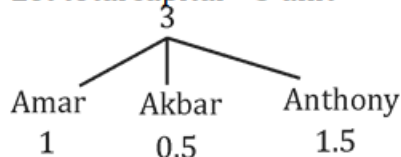
Ratio = $\frac{1000}{870} = \frac{100}{87}$

S150. Ans.(d)

Sol.

$$33.33\% = \frac{1}{3}$$

Let total capital = 3 unit



Profit will also be share in their capital ratio.

3 units = 324000

1 unit = 108000 (Amar's share)

S151. Ans.(a)

Sol. Let the excluded no be x,

Then,

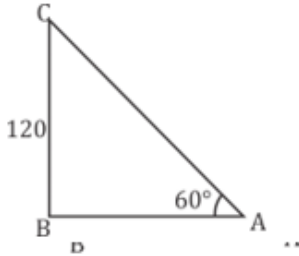
$$45 \times 8 - x = 47 \times 7$$

$$360 - x = 329$$

$$x = 31$$

S152. Ans.(d)

Sol.



Ratio of sides

AB : BC : CA

1 : $\sqrt{3}$: 2

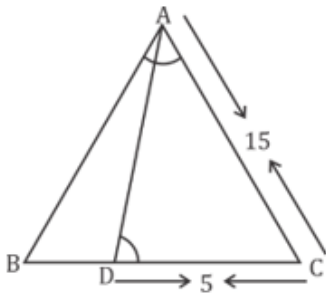
$\sqrt{3} \rightarrow 120$

1 $\rightarrow 40\sqrt{3}$

CA, = $2 \times 40\sqrt{3} = 80\sqrt{3}\text{m}$

S153. Ans.(c)

Sol.



ΔCAB and CDA

$\angle ADC = \angle BAC$ (Given)

$\angle ACD = \angle ACB$ (Common)

By AA, property

$\Delta CAB \sim \Delta CDA$

$\frac{CA}{CB} = \frac{CD}{CA}$

$\frac{15}{CB} = \frac{5}{15}$

$\frac{15}{CB} = \frac{5}{15}$

CB = 45 cm

S154. Ans.(c)

Sol.

9digit number will be divisible by factor of 36, by 9 and 4

For divisible by 4

Largest possible value of Y = 8

Now for divisible by 9

$$\frac{2+x+2+1+2+3+7+8+4}{9} = \frac{29+x}{9}$$

Possible value of x = 7

Now,

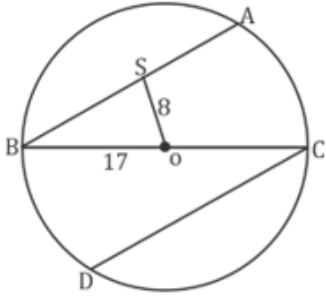
$$11x^2 - 5y^2 = 11 \times 49 - 5 \times 64$$

$$= 539 - 320$$

$$= 219$$

S155. Ans.(d)

Sol.



$$AB = CD$$

$$\text{Radius} = \frac{34}{2} = 17 \text{ cm}$$

$$SB = \sqrt{17^2 - 8^2} = 15$$

$$\text{Then } AB = (SB + SA) = 15 + 15 = 30$$

$$\therefore CD = AB = 30 \text{ cm}$$

S156. Ans.(b)

Sol.

$$5 \sin \theta - 4 \cos \theta = 0$$

$$\frac{\sin \theta}{\cos \theta} = \frac{4}{5}$$

Now,

$$\frac{15 \sin \theta + 4 \cos \theta}{15 \sin \theta + 6 \cos \theta}$$

$$\Rightarrow \frac{15 \times 4 + 4 \times 5}{15 \times 4 + 6 \times 5} = \frac{80}{90}$$
$$= \frac{8}{9}$$

S157. Ans.(c)

Sol.

Let total capital = 100

| P | Q | R |
|----|----|----|
| 68 | 12 | 20 |

$$\text{R's share} = \frac{65496}{100} \times 20$$
$$= 13099.2$$

S158. Ans.(d)

Sol.

Speed of Babita = ?

Time taken by Abhinav after crossing = $\frac{49}{5}$ hours

Speed of Abhinav = 45 km/h

Time taken by Babita = 5 hours

$$\text{Now, } \frac{\text{Speed of Abhinav}}{\text{Speed of Babita}} = \sqrt{\frac{T_2}{T_1}}$$

$$\frac{45}{\text{Speed of Babita}} = \sqrt{\frac{5 \times 5}{49}}$$

$$\frac{45}{\text{Speed of Babita}} = \frac{5}{7}$$

Speed of Babita = 63 km/h.

S159. Ans.(b)

Sol.

$$\begin{aligned} &\Rightarrow 768 \div 8 \text{ of } 6 \times [126 \div 9 \times (19 - 5) \text{ of } 26 - (9-4)] \div 3 \\ &\Rightarrow 768 \div 48 \times [14 \times 364 - 5] \\ &\Rightarrow 16 \times 5091 \div 3 = 16 \times 1697 = 27152 \end{aligned}$$

S160. Ans.(a)

Sol.

Abhinav Completes work,

35% of work \Rightarrow 35 days

100% of work = 100 days

Now, A.T.Q

$$\text{Abhinav} \times 100 = \text{Abhinav} \times 35 + \text{Babita} \times 50$$

$$\frac{\text{Abhinav}}{\text{Babita}} = \frac{10}{13}$$

$$\text{Total Work} = 10 \times 100 = 1000$$

$$75\% \text{ of work will be completed} = \frac{1000}{23} \times \frac{75}{100} = \frac{750}{23} = 32.6 \text{ days}$$

S161. Ans.(b)

Sol.

Let the principal = 8 units

$$\text{SI} = 8 \times \frac{1}{8} = 1 \text{ unit}$$

$$\text{Time} = \frac{\text{Rate}}{2}$$

Now,

$$\text{SI} = \frac{P \times R \times T}{100}$$

$$1 = \frac{8 \times R \times R}{200}$$

$$R^2 = 25$$

$$R = 5$$

SI for 9 years

$$= \frac{38480 \times 9 \times 5}{100}$$

$$= 17,316$$



S162. Ans.(a)

Sol.

Let the cost price of Fan and Table be $60x$ and $110x$

$$\text{SP of Fan} = 60x \times \frac{115}{100} = 69x$$

$$\text{SP of Table} = 110x \times \frac{125}{100} = 137.5x$$

$$(137.5x - 69x) \text{ units} \rightarrow 1644$$

$$x \text{ units} \rightarrow 24$$

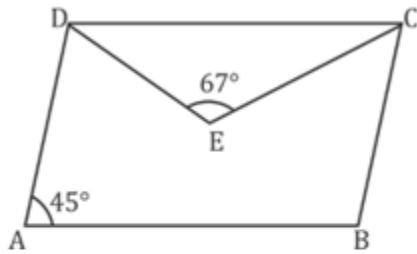
$$\text{CP of Fan} \Rightarrow 60 \times 24 = 1440$$

$$\text{CP of Table} = 110 \times 24 = 2640$$

$$\text{Difference} = 2640 - 1440 = 1200$$

S163. Ans.(d)

Sol.



$$\frac{\angle D}{2} + \frac{\angle C}{2} + \angle DEC = 180$$

$$\angle D + \angle C = 226$$

In Quadrilateral ABCD

$$\angle A + \angle B + \angle C + \angle D = 360$$

$$45^\circ + \angle B + 226^\circ = 360^\circ$$

$$\angle B = 89^\circ$$

S164. Ans.(b)

Sol. The ball begins to tall together again = LCM of (15, 17, 19, 24 and 28)
= 271320

S165. Ans.(b)

Sol.

Let CP of goods be 100

Now, A.T.Q

| CP | SP | MP |
|-----|-------|-----|
| 100 | 87.75 | 135 |

$$\text{Loss} = \frac{100 - 87.75}{100} \times 100$$

$$= 12.25\%$$

S166. Ans.(b)

Sol.

ATQ,

$$A \times \frac{1}{7} = B \times \frac{1}{7}, \quad B = C \times \frac{5}{100}$$

$$B = 980 \times \frac{5}{100} = 49$$

$$A \times \frac{1}{7} = 49 \times \frac{1}{7} = 49$$

Now,

$$= A \times \frac{80}{100} + B \times \frac{40}{100}$$

$$= 49 \times \frac{80}{100} + 49 \times \frac{40}{100}$$

$$= 39.2 + 19.6 = 58.8$$

S167. Ans.(b)

Sol.

$$4a^2 + 9b^2 + 81c^2 + 62 = 36b - 90c - 4a$$

$$4a^2 + 4a + 1 + 9b^2 - 36b + 36 + 81c^2 + 90c + 25$$

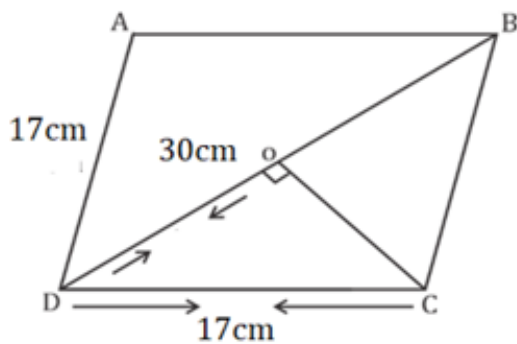
$$(2a + 1)^2 + (3b - 6)^2 + (9c + 5)^2 = 0$$

$$a = -\frac{1}{2}, \quad b = 2, \quad c = -\frac{5}{9}$$

$$\text{Now, } (a + b - c) = \left(-\frac{1}{2} + 2 + \frac{5}{9}\right) = \frac{-9+36+10}{18} = \frac{37}{18}$$

S168. Ans.(d)

Sol.



$$OC^2 = 17^2 - 15^2$$

$$\Rightarrow 289 - 225$$

$$\Rightarrow 64$$

$$OC = 8 \text{ cm, } \quad AC = 2 \times 8 = 16 = d_2$$

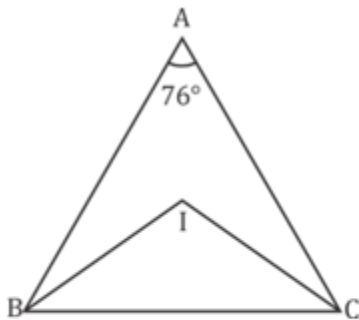
$$\text{Area of Rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 16 \times 30$$

$$= 240 \text{ cm}^2$$

S169. Ans.(a)

Sol.



$$\angle BIC = 90 + \frac{\angle A}{2}$$

$$= 90 + 38$$

$$= 128^\circ$$



S170. Ans.(c)

Sol. A.T.Q

Volume of Sphere = Volume of cylinder

$$\frac{4}{3} \pi r^3 = \pi (2r)^2 h$$

$$\frac{4}{3} \times r \times r \times r = 2r \times 2r \times h$$

$$S \frac{r}{3} = h$$

$$\frac{r}{h} = \frac{3}{1}$$

S171. Ans.(c)

Sol. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$$81 = 31 + 2(ab + bc + ca)$$

$$25 = ab + bc + ca$$

Now,

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

$$267 - 3abc = 9(31 - 25)$$

$$267 - 3abc = 54$$

$$-3abc = -213$$

$$abc = 71$$

$$\text{So, } abc - 3 = 71 - 3 = 68$$

S172. Ans.(c)

Sol.

$$\text{Average of Youths} = \frac{12+8+11.5+10+9}{5} = 10.1$$

S173. Ans.(b)

Sol.

$$\text{Camp (P)} = 160 + 150 = 310$$

$$\text{Camp (Q)} = 240 + 180 = 420$$

$$\text{Required Result} = \frac{310}{420} \times 100 = 73.80\%$$

S174. Ans.(d)

Sol.

$$A = \frac{105}{360} \times 2880 = 840$$

$$B = \frac{20}{360} \times 2880 = 160$$

$$C = \frac{49}{360} \times 2880 = 392$$

$$D = \frac{75}{360} \times 2880 = 600$$

$$E = \frac{111}{360} \times 2880 = 888$$

S175. Ans.(a)

Sol.

$$\frac{77-x}{137-x} = \frac{107-x}{192-x}$$

By option(a)

$$\Rightarrow \frac{77-5}{137-5} = \frac{107-5}{192-5}$$

$$\Rightarrow \frac{72}{132} = \frac{102}{187}$$

$$\Rightarrow \frac{6}{11} = \frac{6}{11}$$

S176. Ans.(b)

Sol. Let the number of guests = x

A.T.Q.

$$\frac{x \times 170 + 10 \times 175}{x + 10} = 170.2$$

$$170x + 1750 = 170.2x + 1702$$

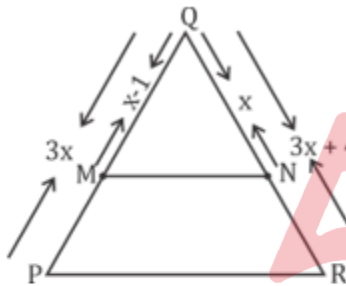
$$0.2x = 48$$

$$x = 240$$

Now, Number of guests in part = 240 + 10 = 250

S177. Ans.(d)

Sol.



In ΔQPR and ΔQMN

$$\frac{PQ}{MQ} = \frac{QR}{QN} \text{ (since } \Delta QPR \approx \Delta QMN)$$

Now,

$$\frac{3x}{x-1} = \frac{3x+4}{x}$$

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

$$x = 4$$

S178. Ans.(c)

Sol.

Total number of girls in science stream = (12 + 56 + 88 + 90) = 246

Total number of boys in commerce stream = (78 + 42 + 34 + 28) = 182

$$\text{Required Result} = \frac{(246-182)}{182} \times 100$$

$$= 35.16\%$$

S179. Ans.(a)**Sol.** Let the certain sum be P.

Now,

$$3,41,824 = P \left(1 + \frac{r}{100}\right)^4 \text{ ----- (i)}$$

$$313,600 = P \left(1 + \frac{r}{100}\right)^3 \text{ ----- (ii)}$$

On solving equ. (i) and (ii)

$$1.09 = 1 + \frac{r}{100}$$

$$r = 9\%$$

SI would be on 36500 in 2 years

$$SI = \frac{P \times r \times t}{100}$$

$$= \frac{36500 \times 9 \times 2}{100} = \text{Rs. } 6,570$$

S180. Ans.(c)**Sol.**

$$\text{Average production of flour by Patanjali} = \frac{(350 + 254 + 300)}{3}$$

$$= 301.3 \sim 301 \text{ tons}$$

S181. Ans.(b)**Sol.**

$$\text{Distance between two points} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$\text{Distance} = \sqrt{(-6 - 4)^2 + (4 - 1)^2}$$

$$= \sqrt{(-10)^2 + (3)^2} = \sqrt{100 + 9} = \sqrt{109}$$

S182. Ans.(a)

$$\text{Sol. Total production of Patanjali in (2016, 2017 and 2019)} = 350 + 240 + 146 = 736$$

$$\text{Total production of Aashirvaad in (2016, 2017 and 2019)} = 325 + 256 + 123 = 704$$

$$\text{Required Ratio} = 736 : 704$$

$$\boxed{23 : 22}$$

S183. Ans.(a)**Sol.** Boys in commerce stream (2017 to 2019)

$$= (42 + 34 + 28) = 104$$

Girls in commerce stream (2017 to 2019)

$$= (87 + 29 + 40) = 156$$

$$\text{Required Result} = 104 : 156$$

$$\boxed{2 : 3}$$

S184. Ans.(a)**Sol.** Marked price = Rs. 2000

$$\text{Selling price after 14\% discount} = 2000 \times \frac{86}{100} = 1720$$

Then,

$$10 = \frac{(1720 - CP)}{CP} \times 100$$

$$CP = 1563.64 \sim 1564$$

Cost price of an item is Rs. 1564

Then,

$$\text{Selling price when discount is 10\%} = 2000 \times \frac{90}{100} = 1800$$

$$\text{Profit \%} = \frac{1800 - 1564}{1564} \times 100 = 15.08\%$$

S185. Ans.(d)**Sol.**

$$x + y = 5 \text{ and } \frac{1}{x} + \frac{1}{y} = \frac{25}{7}$$

$$\frac{x + y}{xy} = \frac{25}{7}$$

$$xy = \frac{7}{5}$$

$$(x + y)^2 = x^2 + y^2 + 2xy$$

$$25 = x^2 + y^2 + \frac{14}{5}$$

$$\frac{111}{5} = x^2 + y^2$$

Now,

$$x^3 + y^3 = (x + y)(x^2 + y^2 - xy)$$

$$= 5 \left(\frac{111}{5} - \frac{7}{5} \right)$$

$$= 5 \times \frac{104}{5} = 104$$

$$x^3 + y^3 = 104$$

**S186. Ans.(c)****Sol.**

$$24 \div 6 \text{ of } 4 \times [8 \div 5 \times (5 - 3)] - (25 \div 5 \text{ of } 7)$$

$$= 1 \times \left(\frac{8}{5} \times 2 \right) - \left(\frac{25}{35} \right)$$

$$= \frac{16}{5} - \frac{5}{7}$$

$$= \frac{87}{35}$$

S187. Ans.(b)**Sol.** Given that

$$a - 3b = 8 \text{ and } ab = 3$$

$$(a - 3b)^2 = a^2 + 9b^2 - 6ab$$

$$64 = a^2 + 9b^2 - 18$$

$$a^2 + 9b^2 = 82$$

Now,

$$a^3 - 27b^3 \Rightarrow (a)^3 - (3b)^3 = (a - 3b) (a^2 + 9b^2 + 3ab)$$

$$a^3 - 27b^3 = 8(82 + 9)$$

$$= 8 \times 91 = 728$$

$$a^3 - 27b^3 = 728$$

S188. Ans.(d)

Sol.

A.T.Q.

$$\frac{27}{x-y} + \frac{33}{x+y} = 6 \text{ ----- (i)}$$

$$\frac{36}{x-y} + \frac{22}{x+y} = 6 \text{ ----- (ii)}$$

Equation (ii) multiply by 1.5

$$\frac{54}{x-y} + \frac{33}{x+y} = 9 \text{ ----- (iii)}$$

On solving eq. (i) and (iii)

$$\frac{27}{x-y} = 3$$

$$x - y = 9 \text{ ----- (iv)}$$

Now put $x - y = 9$ in equation (i)

$$\frac{27}{9} + \frac{33}{x+y} = 6$$

$$x - y = 11 \text{ ----- (v)}$$

On solving eq. (iv) and (v)

$$x = 10, y = 1$$

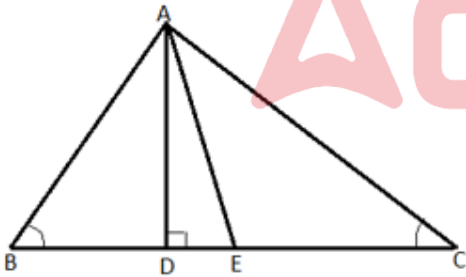
Now,

$$\frac{45}{x-y} + \frac{55}{x+y} \Rightarrow \frac{45}{9} + \frac{55}{11}$$

$$\Rightarrow 5 + 5 = 10 \text{ hrs.}$$

S189. Ans.(b)

Sol.



$$\angle DAE = \frac{\angle B - \angle C}{2} = \frac{60 - 40}{2} = 10^\circ$$

S190. Ans.(c)

Sol.

$$\Rightarrow \frac{1}{\operatorname{cosec} \theta} + \frac{1}{\tan \theta + \cot \theta}$$

$$\Rightarrow \sin \theta + \frac{1}{\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}}$$

$$\Rightarrow \sin \theta + \frac{\sin \theta \cdot \cos \theta}{\sin^2 \theta + \cos^2 \theta}$$

$$= \sin \theta + \sin \theta \cdot \cos \theta$$

$$\Rightarrow \sin \theta (1 + \cos \theta)$$

S191. Ans.(a)**Sol.** Outer radius = R = 5 cm

Inner radius = 4 cm

$$\text{Volume of Spherical shell} = \frac{4}{3} \pi (R^3 - r^3)$$

$$= \frac{4}{3} \pi \times (5^3 - 4^3)$$

$$= \frac{4}{3} \pi \times 61 = \frac{244}{3} \pi$$

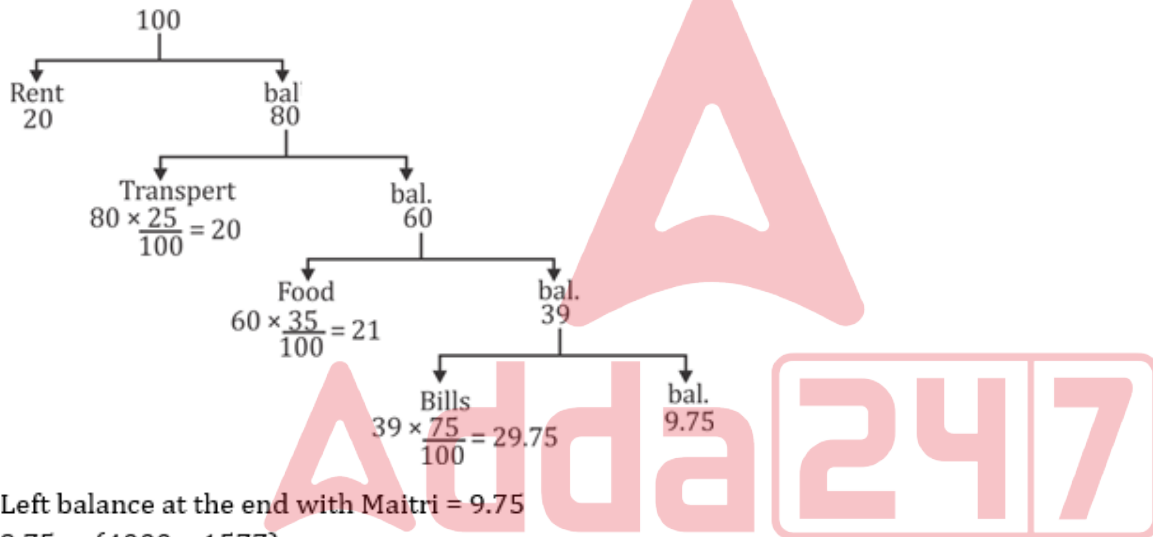
S192. Ans.(d)**Sol.**

A.T.Q.

$$\text{Average earnings} = \frac{5 \times 568 + 7 \times 345}{12}$$

$$= \frac{2840 + 2415}{12} = \frac{5255}{12} = 437.92$$

= Rs. 438

S193. Ans.(d)**Sol.** Let the salary of Maitri = 100

Left balance at the end with Maitri = 9.75

$$9.75 \rightarrow (4000 + 1577)$$

$$9.75 \rightarrow 5577$$

$$1 \rightarrow 572$$

$$100 \rightarrow 57200$$

Her monthly salary = Rs. 57200

S194. Ans.(a)**Sol.**

$$\text{Aditya have to pay SI on sum} = 275000 \times \frac{20}{100} = 55000$$

Chanakya have to pay interest on Sum

= Amount - Principal

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

$$= 275000 \left(1 + \frac{10}{100}\right)^2 - 275000$$

$$= 332750 - 275000 = 57750$$

Amount earned by Aditya = 57750 - 55000 = Rs. 2750

S195. Ans.(a)**Sol.** Length of train = Distance covered by train = x

$$x = 54 \times \frac{5}{18} \times 13$$

$$x = 195 \text{ m}$$

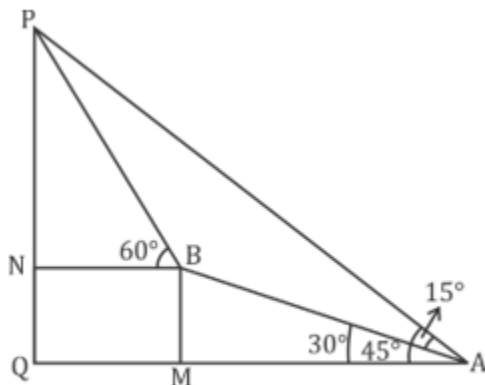
Now,

time taken by train to cross bridge

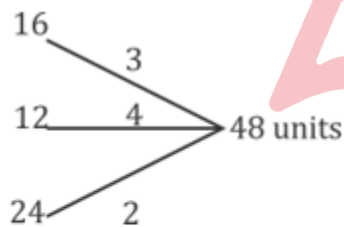
$$\Rightarrow 195 + 405 = 54 \times \frac{5}{18} \times t$$

$$600 = 15 \times t$$

$$t = 40 \text{ sec.}$$

S196. Ans.(a)**Sol.**

$$PQ = AB \left(\frac{\sqrt{3} + 1}{2} \right) = 8 \left(\frac{\sqrt{3} + 1}{2} \right) = 4(\sqrt{3} + 1) \text{ km.}$$

S197. Ans.(b)**Sol.**If all the taps are opened together, water tank filled in 1 hour = $(3 + 4 - 2) = 5$ unitsRemaining capacity = $48 - 5$

= 43 units

Empty tank will be filled = $\frac{43}{5} = 8 \frac{3}{5}$ hr.**S198. Ans.(c)****Sol.**The mean proportion of 12 and 48 = $\sqrt{12 \times 48} = 24$ Third Proportion of 17 and 9 = $17 : 9 :: 9 : x$

$$x = \frac{9^2}{17} = \frac{81}{17} = 4.76$$

Required difference = $24 - 4.76 = 19.24$

S199. Ans.(d)

Sol. A.T.Q.

$$\Rightarrow \text{Total cost} = 25 \times 110 + 21 \times 115 + 39 \times 125 + 2000$$

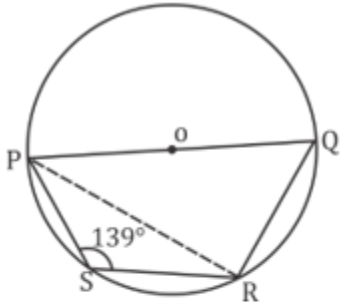
$$\Rightarrow \text{Total cost} = 2750 + 2415 + 4875 + 2000 = 12040$$

$$\text{Total SP} \Rightarrow (25 + 21 + 39) \times 160 = 13600$$

$$\text{Profit \%} = \frac{(13600 - 12040)}{12040} \times 100 = 12.95 \sim 13\%$$

S200. Ans.(a)

Sol.



In $\square PQRS$

$$\angle PSR + \angle PQR = 180$$

$$139 + \angle PQR = 180$$

$$\angle PQR = 41$$

In ΔPQR

$$\angle PRQ = 90^\circ \text{ [Angle made in semi - circle is always right angle]}$$

Now,

In ΔPQR

$$\angle P + \angle R + \angle Q = 180$$

$$\angle P = 180 - (90 + 41) = 49^\circ$$

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