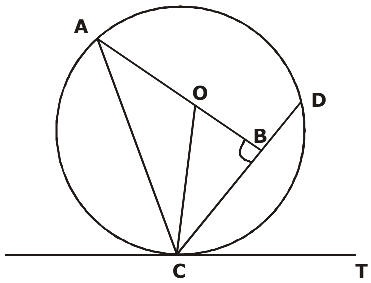
QUANTITATIVE ABILITY - 75 (SOLUTION)

1. (C)



$\angle OCT = 90°$, $\angle DCT = 45°$ and $\angle OCB = 45°$

Also, $\angle COB = 45°$ $(\Delta BOC$ is a right angled triangle$)$

$\angle AOC = 180° - 45° = 135°$

Here, CD = 10

BC = 5 cm = OB

Then, in ΔOBC,

$OC = 5\sqrt{2}$ (using Pythagoras theorem)

$OC = OA = 5\sqrt{2}$

In ΔAOC,

$AC^2 = OA^2 + OC^2 - 2OA.OC.\cos 135°$

$= 2(OA)^2 - 2(OA)^2.\cos 135°$

$= 2\left(5\sqrt{2}\right)^2 - 2\left(5\sqrt{2}\right)^2 \times \frac{-1}{\sqrt{2}}$

$= 100 + \frac{100}{\sqrt{2}}$

$AC^2 = 170.70$

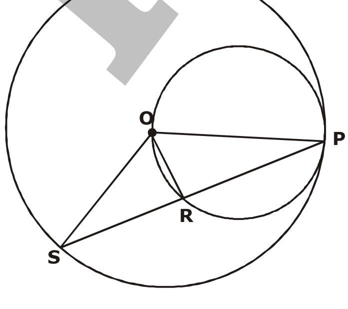
AC = 13 cm

$\therefore$ Perimeter of ΔAOC = AC + OC + OA

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

= 13 + 10 × 1.414 = 27 cm (approx)

2. (C)



In smaller circle, OP is diameter of the circle.

So, $\angle ORP = 90°$

OP = 10 cm (radius of bigger circle)

OR = 8 cm

In ΔOPR,

$OP^2 = OR^2 + RP^2$

$10^2 = 8^2 + RP^2$

$100 - 64 = RP^2$

$RP = \sqrt{36} = 6\text{cm}$

Also, $OR \perp SP$, so it passes through the centre.

$\therefore$ SP = 2RP = 2 × 6 = 12 cm

3. (B) $x + \frac{1}{x} = 1$

$x^2 - x + 1 = 0$

Now, as $x \neq -1$

$(x - 1)(x^2 - x + 1) = 0$

$\therefore$ $x^3 + 1 = 0$

$(x^3)^{1333}\, x = -x$

$x^{4000} = -x$

and $p = -x^{4000} + \frac{1}{x^{4000}}$

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

Now, let x = 2

Then, $q = 2^{2^2} + 1 = 16 + 1 = 17$

Unit's place digit = 7

$\therefore$ p + q = -1 + 7 = 6

4. (D) The given numbers are 2^{2004} and 5^{2004}.

Let a = 2004

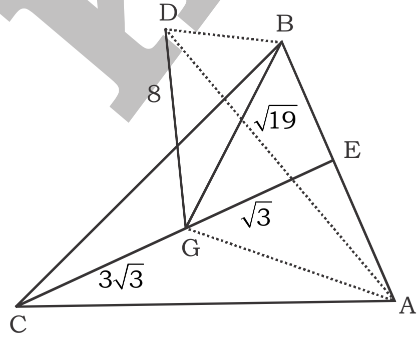
Total number of digits when 2^1 and 5^1 are written side by side (25) = (1 + 1)

Total number of digits when 2^2 and 5^2 are written side by side (425) = (2 + 1)

Similarly for 2^3 and 5^3 = (3 + 1) and so on.

$\therefore$ Total number of digits, when 2^{2004} and 5^{2004} are written one after another is 2004 + 1 = 2005

5. (C)



Since, area of $\Delta ABC = 16\sqrt{3}$

$AB = 16\sqrt{3} \times 4\sqrt{3} = 8\,\text{cm}$

$\therefore \quad \dfrac{\sqrt{3}}{4} \times AB^2 = 16\sqrt{3}$

Since, the given triangle is equilateral, therefore its centre is the centroid.

Since, $\Delta BGD = \Delta AGD$,

$\dfrac{1}{2}(BG)(GD) = \dfrac{1}{2}(AG)(GD)$

BG = GD (G is on the perpendicular bisector of AB)

Also, $BG = \sqrt{19}$, since $\dfrac{1}{2}BG(8) = 4\sqrt{19}$

If E is mid-point of AB, then in right triangle BGE,
$BG^2 = BE^2 + GE^2$

$GE = \sqrt{19-16} = \sqrt{13}$

And CG = CE - GE = $\dfrac{\sqrt{3}}{2}(8) - \sqrt{3} = 3\sqrt{3}$

Area of $\Delta CGD = \dfrac{1}{2}CG(GD) = \dfrac{1}{2}\left(3\sqrt{3}\right)(8) = 12\sqrt{3}\ \text{cm}^2$

6. (C) Let PR = QS = x and RS = y

P x R y S x Q

Case (i)

Let a and b be the speeds of cars A and B respectively.

Car A travelled a distance of x with a speed of 'a' and a distance of y at a speed of $\dfrac{2a}{3}$.

In the time car B has covered SQ (i.e., x), car A at $\dfrac{2a}{3}$ would cover a distance of $\dfrac{2}{3}$(PR) + RS

i.e. $\dfrac{2x}{3} + y$

$\therefore$ The ratio of their speeds $= \dfrac{\frac{2}{3}a}{b} = \dfrac{\frac{2x}{3} + y}{x} = \dfrac{2x+3y}{3x}$ ....(i)

Case (ii)

x x y -x x/9 8x/9

P R M S T Q

Car A travelled PM (or 2x) at a and MT at $\dfrac{2a}{3}$, while car B travelled QT $\left(= \dfrac{8x}{9}\right)$ at b.

In the time car B covered a distance QT, car A at a speed of $\dfrac{2a}{3}$, would cover $\dfrac{2}{3}(PM) + MT$

i.e. $\frac{4x}{3}(y-x)+\frac{x}{9}$

$\therefore$ The ratio of their speeds $=\frac{\frac{2a}{3}}{b}=\frac{\frac{4x}{3}+(y-x)+\frac{x}{9}}{\frac{8x}{9}}=\frac{9y+4x}{8x}$ ....(ii)

Equating (i) and (ii) we get,

$\frac{2x+3y}{3x}=\frac{9y+4x}{8x}$

8(2x + 3y) = 3(9y + 4x)

$y=\frac{4}{3}x$

By substituting the value of y in Equation (i), we get

$\frac{2a}{3b}=\frac{\frac{2x}{3}+\frac{4x}{3}}{x}=\frac{2}{1}$

$\frac{a}{b}=3$

$\therefore$ The ratio speed of A and B is 3 : 1

7. (C) The 12 min saved in filling the drums is because of my contribution of few buckets of water. I poured one-third of each bucket in the smaller drum and the reamaining two thirds in the bigger drum i.e., t min is saved in filling the smaller drum, 2t min are saved in filling the bigger drum.

$\therefore$ 3t = 12

t = 4

So, 4 min are saved in filling the smaller drum,

So, the smaller drum was filled 4 minutes earlier than its normal filling time.

So, it was filled at 1 : 26 pm.

8. (B) The sum of the squares of the first n odd natural numbers = sum of the squares of the first (2n - 1) natural numbers - sum of the squares of the first (n - 1) even natural numbers.

Hence,

$S_n=\frac{(2n-1)(2n)(4n-1)}{6}-4\left[\frac{(n-1)(n)(2n-1)}{6}\right]=\frac{n(2n-1)}{3}(2n+1)$

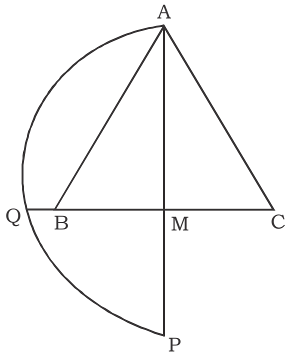
As, S_n = 533n,

n(2n - 1) (2n + 1) = 1599 n

$4n^2$ = 1600

n = 20

9. (B)



$\angle PQA$ (as shown) = 90° (angle in a semicircle)

(MP) (MA) = MQ^2

If BM = 1, MP = 1 and AM = $\sqrt{3}$

$\because$ AM is the median and MQ = $3^{\frac{1}{4}}$

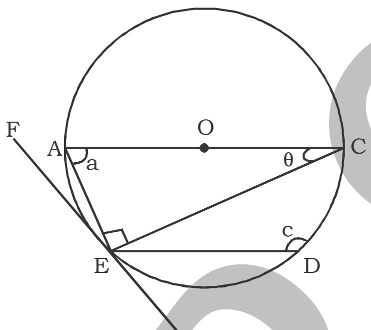
$\therefore$ T = MQ^2 = $\sqrt{3}$, while $S = \frac{\sqrt{3}}{4}(4) = \sqrt{3}$

T = S

10. (B) We get for k $\geq$ 5,

$2.4 + 4 \times 2 + 1.2(k - 5) = 10.4 + 1.2(k - 5)$

11. (C) Given, $\angle GEC = 52°$



$\angle OAE = \angle GEC = 52°$ (Alternate segment theorem)

As O is the centre of the circle A

In ΔOAE,

$\angle OCE = 180° - 90° - 52° = 38°$ ($\because$ $\angle AEC$ is an angle in a semi-circle)

ACDE is a cyclic quadrilateral

c = 180 - a = 180 - 52° = 128°

$\therefore$ $\angle e + \angle c$ = 38° + 128° = 166°

12. (D) For the value of d to be the maximum the number of full unit-squares that Priti counts must be the minimum, which is 4 unit-squares. (i.e., 4 full unit-squares will always fall within the circle)

$\therefore$ $d = \pi r^2 - 4 = 4\pi - 4 = 4(\pi - 1)$

$= 4(3.142 - 1) = 4(2.142) \approx 8.56$

13. (A) Let the capacity of the tank = LCM of 18 and 20 = 180 litres

Efficiency of P = $\frac{180}{18} = 10 \text{ litres / hrs.}$

Efficiency of Q = $\frac{180}{20} = 9 \text{ litres / hrs.}$

If there is no leak, then the total time taken by (P + Q) to fill half of the tank $= \frac{90}{10+9} = \frac{90}{19}$ hrs.

When there is leak, then according to the question

The total time taken by them $= \frac{90}{19} + 1\text{hr} = \frac{109}{19}\text{hrs.}$

Efficiency of (P + Q) + leak = $\frac{90}{\frac{109}{19}}$ (Because $\frac{109}{19}$ hrs is taken by P, Q and leak to fill half of the tank)

$= 90 \times \frac{19}{109}\text{litres / hrs} = \frac{1710}{109}\text{litres / hrs}.$

We know that the efficiency of (P + Q) = (10 + 9) = 19 litres/hr

So, the efficiency of the leak $= 19 - \frac{1710}{109} = \frac{361}{109}$ litres / hrs.

So the total time taken by the leak to empty the filled tank $= \frac{180}{\frac{361}{109}} = \frac{19620}{361}\text{hrs.} = 54\frac{126}{361}\text{hrs.}$

14. (D) Total fare for 3 days = ₹ (500 + 600 + 700) = ₹ 1800

According to their agreement,

A has to pay = $= \frac{2}{2+3+4} \times 1800 =$ ₹ 400

B has to pay = $= \frac{3}{2+3+4} \times 1800 =$ ₹ 600

C has to pay = $= \frac{4}{2+3+4} \times 1800 =$ ₹ 800

Person	Amount Paid during the trip	Due amount according to ratio
A	500	400
B	600	600
C	700	800

But we can see that A paid ₹ 100 more and C paid ₹ 100 less than the amounts they should have paid.

Hence C has to pay ₹ 100 to A.

15. (A)

	Rice A	Rice B
Cost price	15 × x	10 × (x + 5)
	↓ 10% profit	↓ 20% profit
Selling price	110% of 15x	120% of (10x + 5)
	= 16.5x	= 12x + 60

Now, 16.5x = 12x + 60 + 30

4.5x = 90

$x = \frac{90}{4.5}$ = ₹ 20 kg

Now, new selling price of mixture $= \left[15 \times 20 + 10(20+5)\right] \times \frac{120}{100}$ = ₹ 660

∴ SP per kg $= \frac{660}{25}$ = ₹ 26.4/kg

16. (C) The time taken to cover one kilometer for Raghav and Lucky is in the ratio 4 : 3

Their speeds are in the ratio 3 : 4.

Raghav covers $\frac{3}{7}$th of the track and Lucky covers 4/7th from one crossing to the next i.e.

Raghav covers $\frac{3}{7} \times 800$ m from one crossing to the next.

In 90 min, Raghav covers $\frac{90}{12} \times 1000 = 7500$ m

The number of crossings $= \frac{7500 \times \frac{7}{3}}{800} = \frac{175}{8} = 21.87$

So, they will meet 21 times.

17. (A) The amount invested by P was 150% of the amount invested by Q and the amount invested by R is 25% more than the amount invested by Q.

Let Q invested ₹ 4x at the rate of 12.5% per annum.

The investment of P = 150% of 4x = 6x at the rate of 10% per annum and the investment of R = 125% of 4x = 5x at the rate of 20% per annum.

ATQ,

SI received by P in 2 years = ₹ 1.2x

SI received by Q in 2 years = ₹ x

SI received by R in 2 years = ₹ 2x

Total interest received = ₹(1.2x + x + 2x) = ₹ 4.2 x

ATQ,

4.2x = 4200

x = 1000

Difference between amount invested by P and R = (6x - 5x) = x = ₹1000

18. (C) Let the capacity of the tank be x gallons.

Quantity of water filled in the tank in 1 minute when all the pipes A, B and C are opened simultaneously = $\frac{x}{20}+\frac{x}{24}-3$

ATQ,

$$\frac{x}{20}+\frac{x}{24}-3=\frac{x}{15}$$

$$\frac{x}{20}+\frac{x}{24}-\frac{x}{15}=3$$

$$\frac{6x+5x-8x}{120}=3$$

$3x = 3 \times 120$

$x = \frac{3\times120}{3}=120$ gallons

19. (B) Let speed of car = x km/hr.

Here, Distance covered by the car in 27 minutes = Distance covered by the sound in (28 minutes 30 seconds – 27 minutes)

$$x \text{ km/hr} \times \left(\frac{27}{60}\right)\text{hours} = \left(330\times\frac{18}{5}\text{km/hr}\right) \times \left(\frac{1.5}{60}\text{hr}\right)$$

$$x = 330 \times \frac{18}{5}\times\frac{1.5}{60}\times\frac{60}{27} = 66$$

Speed of car = 66 km/hr.

20. (B) $\frac{2x^2+3xy+2y^2}{2x^2-3xy+2y^2} = \frac{2(x^2+y^2+2xy)-xy}{2(x^2+y^2-2xy)+xy} = \frac{2(x+y)^2-xy}{2(x-y)^2+xy}$

$$= \frac{2\times(6)^2-1}{2\times(4\sqrt{2})^2+1} = \frac{2\times36-1}{2\times32+1} = \frac{71}{65}$$

$\because x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $xy = 1 \Rightarrow y = \frac{1}{x} = \frac{\sqrt{2}-1}{\sqrt{2}+1}$

$\Rightarrow x + y = \frac{\sqrt{2}+1}{\sqrt{2}-1}+\frac{\sqrt{2}-1}{\sqrt{2}+1} = 6$

and $x - y = \frac{\sqrt{2}+1}{\sqrt{2}-1}-\frac{\sqrt{2}-1}{\sqrt{2}+1} = 4\sqrt{2}$

21. (D) $\text{x} = \frac{4\text{ab}}{\text{a}+\text{b}}$

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

Apply componendo and dividendo,

$$\frac{x+2a}{x-2a} = \frac{a+3b}{b-a} \quad \text{..... (i)}$$

Again,

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

Apply componendo and dividendo,

$$\frac{x+2b}{x-2b} = \frac{3a+b}{a-b} \quad ..... \text{(ii)}$$

Now,

$$\frac{x+2a}{x+2b} + \frac{x+2b}{x-2b} = \frac{a+3b}{-(a-b)} + \frac{3a+b}{a-b}$$

$$= \frac{-a-3b+3a+b}{a-b} = \frac{2a-2b}{a-b} = 2$$

22. (B) Perimeter = $2(l + b)$

$P = 2(l + w)$

$$\frac{P}{2} - w = l$$

Its area = $l \times b$

$$k = \left(\frac{P}{2} - w\right) \times w$$

$2k = Pw - 2w^2$

$2w^2 - Pw + 2k = 0$

23. (D) Total quantity of milk = 2 × 0.9 + 5 × 0.8 + 9 × 0.7= 12.1 litres

Milk concentration in the resultant mixture = $\frac{12.1}{2+5+9} \times 100$ = 75.625%

Water concentration in the resultant mixture = 100- 75.625% = 24.735%

Milk : Water = $\frac{75625}{24735}$ = 121: 39

24. (A) Let, Average age of 11 member hockey team = x years

Total age of hockey team = $11x$ years

When captain aged 26 years and goalkeeper aged 26 + 3 = 29 years are excluded.

Total age of remaining 9 players = $11x$ - (26 + 29) = ($11x$ - 55) years

ATQ,

$$\frac{11x-55}{9} = x - 1$$

$11x - 55 = 9x - 9$

$2x = 44$

x = 22 years

25. (B) Distance = Difference × $\frac{\text{Sum of speed}}{\text{Difference in speed}}$ = 165 × $\frac{155}{15}$ = 1705 km

26. (C) Volume of the cuboid = $12ky^2 + 8ky - 20k$

$= 4k[3y^2 + 2y - 5]$

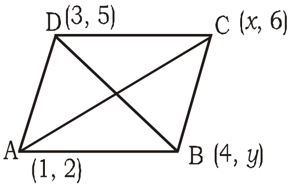
$= 4k[3y^2 + 5y - 3y - 5]$

$= 4k[y(3y + 5) - 1(3y + 5)]$

$= (4k)(y - 1)(3y + 5)$

Third dimension = $3y + 5$

27. (B) $\because$ diagonals of a llgm bisect each other.



$\therefore$ Coordinates of mid point of AC = Coordinates of mid point of BD

$$\left[\frac{1+x}{2},\frac{2+6}{2}\right] = \left[\frac{3+4}{2},\frac{5+y}{2}\right]$$

$$\frac{1+x}{2} = \frac{7}{2} \text{ and } \frac{2+6}{2} = \frac{5+y}{2}$$

$x = 6$ and $y = 3$

28. (A) The given linear equations have no solution.

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{3}{2k-1} = \frac{1}{k-1} \neq \frac{1}{2k+1}$$

$3k - 3 = 2k - 1$

$k = 2$

29. (D) Maximum temperature of Ontario on 1st November = 4°C
Minimum temperature of Bhuj on 1st January = –7°C
$\therefore$ Required difference = 4 – (–7) = 11°C

30. (A) There is second highest temperature of Kabul on 1st October = 37°C
The minimum temperature of Sydney is on 1st January = 13°C

31. (C) Difference of temperature in Bhuj on 1st September = 24 – 14 = 10°C
Difference of temperature in Bhuj on 1st October = 35 – 21 = 14°C
Difference of temperature in Bhuj on 1st November = 19 – 8 = 11°C
Difference of temperature in of Bhuj on 1 st December = 9 – 2 = 7°C
Difference of temperature in Bhuj on 1st January = –7 + 4 = – 3°C.
Hence, the second highest difference in temperature is on 1st November.

32. (D) Required average = $\frac{12+9+15+2+5}{5} = \frac{43}{5}$ = 8.6°C

33. (B) Required ratio = $\frac{9}{15}$ = 3 : 5

34. (D) Let height of glass = h

Then, radius of glass = $\frac{h}{2}$

ATQ,

$$\frac{1}{3}\pi\left(\frac{h}{2}\right)^2 \times h = 32000\left[\frac{4}{3}\times\pi\times\left(\frac{1}{20}\right)^3\right]$$

$$\frac{h^3}{4} = 16$$

$h = 4$ cm

35. (B) Total number of spherical balls = $\dfrac{11 \times 10 \times 5}{\frac{4}{3} \times \pi \times \left(\frac{5}{20}\right)^3}$

$= \dfrac{26400}{\pi} < 8800$ [as given $\pi > 3$]

36. (C) Height of new cone $= \dfrac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2} = \dfrac{(1.6)^2 \times 3.6}{(1.2)^2} = 6.4$ cm

37. (A) Let side of square = x cm

Area of square = x^2 cm^2

Breadth of rectangle = $\dfrac{3}{2}x$

Length of rectangle = 20 cm

ATQ,

$\left(\dfrac{3}{2}x\right) \times 20 = 3 \times x^2$

$x = 10$ cm

38. (B) S_1 4 km/hr — 12 km — 3 hours – 10 minutes

S_2 3 km/hr — 4 hours + 10 minutes

– 1hours – 20 minutes

So, distance between school and his house = $\dfrac{12}{60} \times 20 = 4$ km

39. (B) Runs scored by A = x

Runs scored by B = y

Runs scored by C = z

$x : y = y : z = 3 : 2$ (given)

ATQ,

$x + y + z = 342$

$\dfrac{9z}{4} + \dfrac{3z}{2} + z = 342$

Then, runs scored by A, B and C is 162, 108 and 72 respectively.

40. (C) ATQ,

A + B + C = 900

$A + \dfrac{3}{2}A + 2A = 900$

A = ₹200

Amount received by A, B and C is ₹200, ₹300 and ₹400 respectively.

41. (C)

$$\begin{array}{lccc} P_1 & 8 & & 6 \\ P_2 & 12 & 48 & 4 \\ P_3 & 16 & & 3 \\ P_1 + P_2 + P_3 + P_4 & 3 & & 16 \\ \hline & & P_4 \longrightarrow & 3 \end{array}$$

ATQ,

Fourth person gets = $\frac{3}{16} \times 1200 = ₹225$

42. (B) Let work done by A in one day = a

Let work done by B in one day = b

So, total work = $5(a + b)$

ATQ,

Total work = $3\left(2a + \frac{1}{3}b\right)$

So, $3\left(2a + \frac{1}{3}b\right) = 5(a + b)$

$a = 4b$

$b = \frac{a}{4}$

Total work = $5\left(a + \frac{a}{4}\right) = \frac{25}{4}a$

Time taken by A to complete the work = $\frac{25a}{4 \times a} = 6\frac{1}{4}$ days

43. (C) Let the total number of packages be x.

ATQ,

$\frac{2}{5}x + 3 = \frac{x}{2}$

$\frac{1}{10}x = 3$

$x = 30$

44. (B) If number of individuals be x.

Then, 60% of x – 20% of x = 720

40% of x = 720

$x = \frac{720}{40} \times 100 = 1800$

45. (D) Number of pages in notebook X = 120
Number of pages in notebook Y = 110% of 120 = 132
Number of pages in notebook Z = 90% of 120 = 108
Total number of pages in all the notebooks = 120 + 132 + 108 = 360
Number of pages torn by Shyam
In notebook X = 5% of 120 = 6
In notebook Y = 10% of 132 = 13.2
In notebook Z = 15% of 108 = 16.2
Total number of pages torn = 6 + 13.2 + 16.2 = 35.4

$\therefore$ Required percentage = $\frac{35.4}{360} \times 100\% = 9.837\% \approx 10\%$

46. (B) Quantity of petrol in the mixture = $\frac{1}{2} \times 2 + \frac{3}{5} \times 3 + \frac{4}{5} \times 1$

$= 1 + \frac{9}{5} + \frac{4}{5} = 1 + \frac{13}{5} = \frac{18}{5}$ litres

And quantity of kerosene in the mixture = $\frac{1}{2} \times 2 + \frac{2}{5} \times 3 + \frac{1}{5} \times 1$

$= 1 + \frac{6}{5} + \frac{1}{5} = 1 + \frac{7}{5} = \frac{12}{5}$ litres

Thus, Ratio of petrol and kerosene = $\frac{18}{5} : \frac{12}{5} = 3 : 2$

47. (C) CP for the manufacturer = $30.09 \times \frac{100}{118} \times \frac{100}{120} \times \frac{100}{125}$ = ₹ 17

48. (B) Let the total profit be ₹ x.
Then, 40% of x is distributed in the ratio 125000 : 85000 = 25 : 17

Therefore, the share of the first partner = 40% of $x\left(\frac{25}{25+17}\right)$ = 40% of $x\left(\frac{25}{42}\right)$

$= \left(\frac{40x}{100}\right)\left(\frac{25}{42}\right) = ₹\frac{5x}{21}$

And the share of the second partner = 40% of $x\left(\frac{17}{42}\right) = \frac{17x}{105}$

Now, from the question,

The difference in share = $\frac{5x}{21} - \frac{17x}{105} = 300$

$\frac{x(25-17)}{105} = 300$

$\therefore$ $x = \frac{300 \times 105}{8}$ = ₹3937.50

49. (C) Total number of students = 90

Now, each of 50% of students get 20% of the total number of students *i.e.*, 20% of 90 = 18

Also, each of remaining 50% of students get 10% of the total number of students *i.e.* 10% of 90 = 9

Hence, total number of sweets distributed = 45 × 18 + 45 × 9 = 45 × (18 + 9)

= 45 × 27 = 1215

50. (A) Let the parts of money invested at 10% and 15% per annum be P_1 and P_2 respectively.

ATQ,

$$\frac{P_1 \times 10 \times 1}{100} + \frac{P_2 \times 15 \times 1}{100} = 1900$$

$10P_1 + 15P_2 = 190000$

$2P_1 + 3P_2 = 38000$ ..... (i)

Also, $\frac{P_1 \times 15 \times 1}{100} + \frac{P_2 \times 10 \times 1}{100} = 2100$

$15P_1 + 10P_2 = 210000$

$3P_1 + 2P_2 = 42000$ ... (ii)

On solving equation (i) and (ii), we get

P_2 = ₹ 6000

51. (C) Let total required distance = d

Speed of train = v km/h and time taken = t hour

Then,

According to first condition,

$$\frac{150}{v} + \frac{d-150}{\frac{3}{5}v} = t + 8 \quad \text{... (i)}$$

According to second condition,

$$\frac{410}{v} + \frac{d-410}{\frac{3}{5}v} = t + 4 \quad \text{... (ii)}$$

Subtracting equation (ii) from equation (i),

$$\frac{-360}{v} + \frac{360}{\frac{3}{5}v} = 4$$

$$v = \frac{-360+600}{4} = \frac{240}{4} = 60 \text{ km/h}$$

$\therefore$ Time (t) = $\frac{d}{60}$

Now, from Eq. (i),

$$\frac{150}{60} + \frac{d-150}{\frac{3}{5} \times 60} = \frac{d}{60} + 8$$

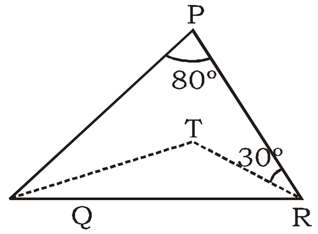
$\frac{d-150}{36} - \frac{d}{60} = 8 - \frac{5}{2}$

$\frac{5(d-150)-3d}{36\times5} = \frac{11}{2}$

$2d - 750 = \frac{11}{2} \times 36 \times 5 = 990$

$d = \frac{1740}{2} = 870$ km

52. (C)



Since the bisectors of $\angle$Q and $\angle$R meet at T.

$\angle QTR = 90° + \frac{1}{2}\angle QPR$

$\angle QTR = 90° + \frac{1}{2}(80)°$

$\angle QTR = 90° + 40° = 130°$

In $\triangle$QTR, we have

$\angle TQR + \angle QTR + \angle TRQ = 180°$

$\angle TQR + 130° + 30° = 180°$ [$\because \angle TRQ = \angle PRT = 30°$]

$\angle TQR = 20°$

Thus, $\angle TQR = 20°$ and $\angle QTR = 130°$

53. (D) Required% = $\left(\frac{48}{40}\times100\right)\%$ = 120%

54. (B) Required ratio = (61 + 54) : (54 + 48) = 115 : 102

55. (C) Required average price per product

$= \frac{(43\times16+44\times15+45\times14.5+48\times16+55\times18+55\times15)}{43+44+45+48+55+55}\times1000$

$= \left(\frac{688+660+652.5+768+990+825}{290}\right)\times1000$

$= \left(\frac{4583.5}{290}\right)\times1000$ = ₹ 15,805.17

56. (A) Required difference = (60 × 75) × 1000 – (44 × 15) × 1000
= 4500000 – 660000 = ₹ 3840000 = ₹ 38.4 lakh

57. (D) Total amount = 57 × 5.6 × 1000 + 45 × 50 × 1000 = 319200 + 2250000
= ₹ 2281900 = ₹ 22.819 lakh

58. (A) $\tan 15° = 2 - \sqrt{3}$

$\tan 15° \cot 75° + \tan 75°.\cot 15°$

$= \tan^2 15° + \frac{1}{\tan^2 15°}$

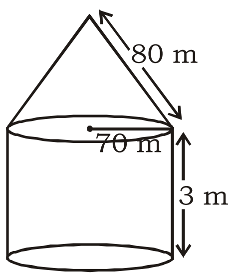
$= (2 - \sqrt{3})^2 + (2 + \sqrt{3})^2$

$= 4 + 3 - 4\sqrt{3} + 4 + 3 + 4\sqrt{3} = 14$

59. (C) Surface area of the tent = $2\pi rh + \pi rl$

$= \pi r(2h + l) = \frac{22}{7} \times 70(6 + 80)$

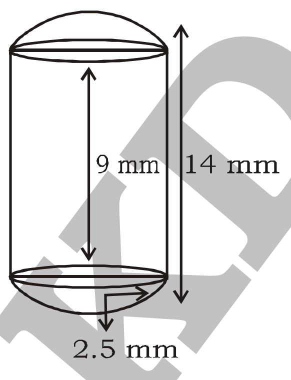
$= 220 \times 86 = 18920 \text{ m}^2$



Width of canvas = 2m

$\therefore$ Length of canvas = $\frac{18920}{2} = 9460$ m

60. (C)



Required surface area = $2 \times 2\pi r^2 + 2\pi rh$

$= 4 \times \frac{22}{7} \times 2.5 \times 2.5 + 2 \times \frac{22}{7} \times 2.5 \times 9$

$= 2 \times \frac{22}{7} \times 2.5(5 + 9) = 220 \text{ mm}^2$

61. (B) $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \frac{\pi}{2} + \frac{\pi}{2} + \frac{\pi}{2}$

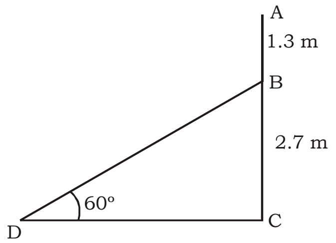
On comparing

$\sin^{-1}x = \sin^{-1}y = \sin^{-1}z = \frac{\pi}{2}$

$x = y = z = \sin\frac{\pi}{2} = 1$

$x + y + z = 1 + 1 + 1 = 3$

62. (D) Let the height of ladder BD = x m



In ΔBCD,

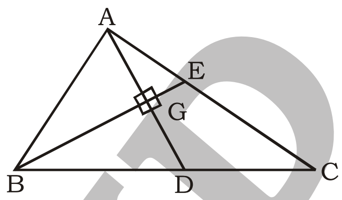
$\sin 60° = \frac{2.7}{BD}$

$\frac{\sqrt{3}}{2} = \frac{2.7}{BD}$

BD = $\frac{2.7}{\sqrt{3}} \times 2$

BD = $\frac{5.4 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{9\sqrt{3}}{5}$ m

63. (C)



AD and BE are medians.

AD = 9 cm, BE = 6 cm

In ΔBGD,

$\angle$G = 90°

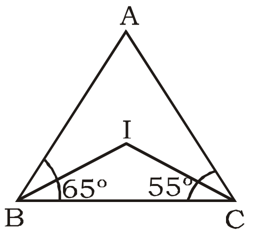
BG = $\frac{2}{3} \times$ BE = $\frac{2}{3} \times 6 = 4$ cm

GD = $\frac{1}{3} \times$ AD = $\frac{1}{3} \times 9 = 3$ cm

$BD^2 = BG^2 + GD^2 = 4^2 + 3^2 = 16 + 9 = 25$

$\therefore$ BD = $\sqrt{25}$ = 5 cm

64. (A) $\angle BIC = 180° - (\angle IBC + \angle ICB)$



$= 180° - \left(\frac{\angle ABC}{2} + \frac{\angle ACB}{2}\right)$

$= 180° - \left(\frac{65°+55°}{2}\right) = 180° - 60°$

$\therefore \angle BIC = 120°$

65. (B) $\because$ AB + BC = 12
BC + CA = 14
CA + AB = 18
2(AB + BC + CA) = 44
$\therefore$ AB + BC + CA = 22

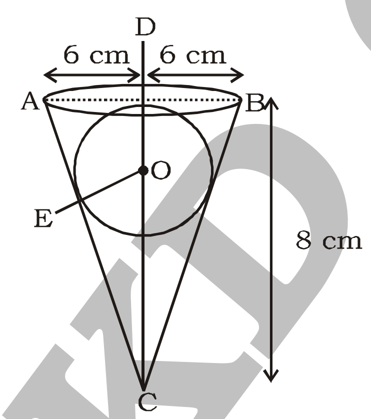
Perimeters of the circle = $2\pi r$

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

$r = \frac{7}{2} = 3.5$ cm

Hence, the radius of circle = 3.5 cm

66. (C) Here, BD = 6 cm



DC = 8 cm

$BC = \sqrt{(6)^2 + (8)^2} = \sqrt{36 + 64} = 10$ cm

In ΔACD and ΔEOC,

$\angle ADC = \angle OEC = 90°$

$\angle ACD = \angle OCE$ (common angles)

$\angle CAD = \angle EOC$ (remaining angles)

ΔACD ~ ΔEOC

Also, AD = AE = 6 cm (the length of two tangents drawn from an external point to circle are equal)

EC = AC – AE = 10 – 6 = 4 cm

In similar ΔACD and ΔEOC,

$$\frac{DC}{AD} = \frac{EC}{OE}$$

$$OE = \frac{AD \times EC}{DC} = \frac{6 \times 4}{8} = 3 \text{ cm}$$

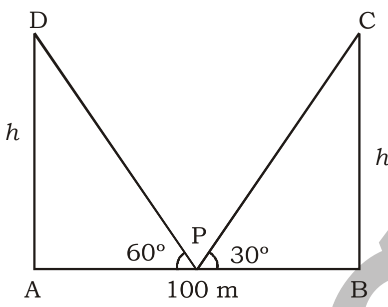
Required of sphere = 3 cm

Now, volume of cone = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 36 \times 8$

And volume of sphere = $\frac{4}{3}\pi r^3 h = \frac{4}{3} \times \pi \times 27$

Required fraction of water = $\dfrac{\frac{4}{3}\pi \times 27}{\frac{1}{3}\pi \times 36 \times 8} = \dfrac{4 \times 27}{36 \times 8} = \dfrac{3}{8}$

67. (A)



In ΔADC,

$$\tan 60° = \frac{h}{AP}$$

$$\sqrt{3} = \frac{h}{AP}$$

$$AP = \frac{h}{\sqrt{3}}$$

In ΔBPL,

$$\tan 30° = \frac{h}{PB}$$

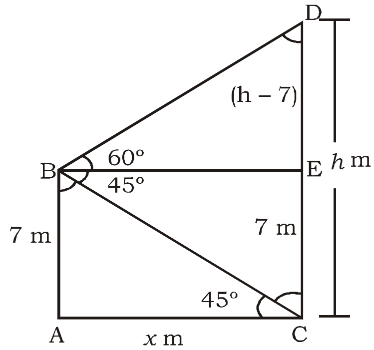
$$PB = \frac{h}{\tan 30} = \frac{h}{\frac{1}{\sqrt{3}}} = h\sqrt{3}$$

$$AP + PB = \frac{h}{\sqrt{3}} + h\sqrt{3}$$

$$100 = \frac{h + 3h}{\sqrt{3}}$$

$$h = 25\sqrt{3} \text{ m}$$

68. (A)



AB = 7 m

CD = h m = Height of Tower

Let AC = x m

In ΔABC,

$\tan 45° = \frac{7}{x}$

$x = 7$ m

Now,

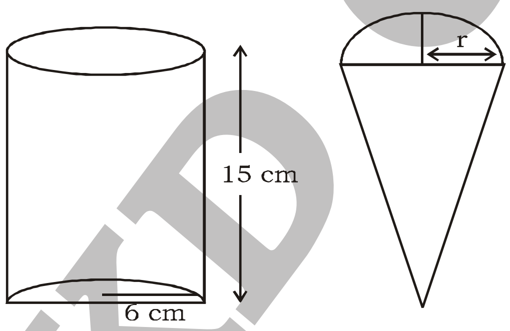
In ΔBED,

$\tan 60° = \frac{h-7}{x}$

$\sqrt{3} = \frac{h-7}{x}$

$h = 7(\sqrt{3}+1)$ m

69. (D)



Let radius of cone = r cm

Clearly, Volume of cylinder = 10[Volume of cone + Volume of hemisphere]

$\pi \times 6 \times 6 \times 15 = 10\left[\frac{1}{3}\pi \times r^2 \times 4r + \frac{2}{3}\pi r^3\right]$ [$\because$ height of cone = 4 × radius]

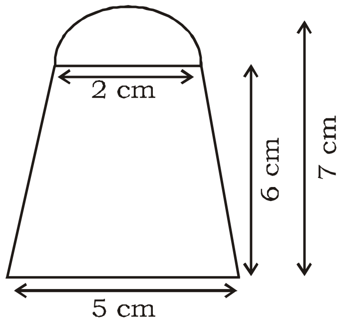
$36 \times 15\pi = 10 \times \pi \times 2 \times r^3$

$r^3 = 27$

$r = 3$

Hence, diameter of ice-cream cone = 2 × 3 = 6 cm

70. (B) External surface area of the shuttlecock = External surface area of frustrum + External surface area of hemisphere



$= \pi (R + r) l + 2\pi r^2$

$= \pi (R + r)\left(\sqrt{h^2 + (R-r)^2}\right) + 2\pi r^2$

where R = 2.5 cm, r = 1 cm, h = 6 cm

Required surface area = $\frac{22}{7} \times 3.5\sqrt{36 + 1.5^2} + 2 \times \frac{22}{7} \times 1$

$= 11 \times 6.18 + 6.28 = 74.26$ cm^2

71. (A) In ΔORS, OR = OS = Radii

$\angle$ORS = $y°$

$\angle$POR$=y° + y°= 2y°$ [external angle property]

In ΔPOR,

$\angle$OPR + $\angle$POR + $\angle$PRO = 180°

$x° + 2y° + 90° = 180°$

$x° + 2y° = 90°$

72. (B) $(x + 1)$ and $(x - 2)$ are factors of $x^3 + (a+1)\, x^2 - (b - 2)\, x - 6$

At $x = -1$,

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

$-1 + a + 1 + b - 2 - 6 = 0$

$a + b = 8$ ...... (i)

At $x = 2$,

$2^3 + (a + 1)\, 2^2 - (b - 2) \times 2 - 6 = 0$

$8 + 4a + 4 - 2b + 4 - 6 = 0$

$2a - b = -5$ .... (ii)

On adding (i) and (ii),

$3a = 3$

$a = 1$ and $b = 7$

73. (A) tan (x + y) tan (x – y) = 1

$\tan(x + y) = \frac{1}{\tan(x - y)} = \cot(x - y)$

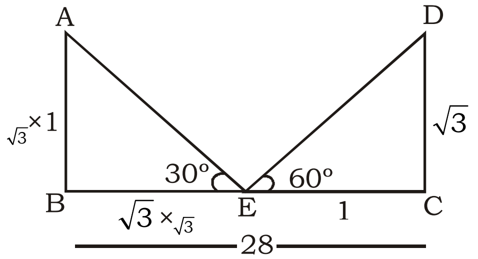
$\tan(x + y) = \tan[90° - (x - y)] = x + y = 90° - (x - y)$

$2x = 90°$

$\frac{2x}{3} = 30°$

$\tan\frac{2x}{3} = \tan 30° = \frac{1}{\sqrt{3}}$

74. (D)



BC (ratio value) = 4

4 = 28

1 = 7

$\sqrt{3}$ = 7$\sqrt{3}$

h = 7$\sqrt{3}$ m

75. (C) Let x km/hr be the speed of the car in the return journey.

Speed of the car in onward journey $= \frac{130}{100} \times x = \frac{13x}{10}$ km/hr

$$= \frac{2\times\frac{13x}{10}\times x}{\frac{1.3x}{10}+x} = \frac{26x}{23} \text{ km/hr}$$

Average speed = 500 × $\frac{23}{26x}$ = 17

x = 26 km/hr

Speed in the onward journey = $\frac{13\times 26}{10}$ = 33.8 km/hr

76. (D) Speed of the first train = 54 kmph = 54 × $\frac{5}{18}$ = 15 m/s

Time = $\frac{\text{Sum of lengths of both trains}}{\text{Sum of speed of both trains}}$

$12 = \frac{195+225}{(15+x)}$

180 + 12x = 420

12x = 420 – 180 = 240

x = 20 m/s = $\left(20\times\frac{18}{5}\right)$ km/hr = 72 kmph

77. (B) Ratio of men to women (15 × 10)M = (25 × 8)W

150 M = 200 W

3M = 4W

W = $\frac{3}{4}$ M

1 man's work = $\frac{1}{150}$

(10W + 3M) = $\frac{21}{2}$ M can do the work in $\frac{1}{150} \times \frac{21}{2} = \frac{7}{100}$ days

$\frac{65}{100}$ work done by 10 women in x days.

8 women complete a piece of work in 25 days

10 women complete the $\frac{65}{100}$ work in $25 \times \frac{8}{10} \times \frac{65}{100}$ = 13 days

78. (A) Time = $\frac{\text{Distance}}{\text{Speed}}$

Let the speed of the boat be x km/hr and speed of the stream be y km/hr.

Relative speed of boat while going upstream = $(x + y)$ km/hr

Given, A man rows to a place 90 km away and back to the starting point in 9 hours 36 minutes.

Time taken = $(9 + \frac{36}{60})$ hrs = 9.6 hours

ATQ,

$$\frac{90}{x-y} + \frac{90}{x+y} = 9.6$$

$$\frac{1}{x-y} + \frac{1}{x+y} = \frac{8}{75} \quad \text{........ (i)}$$

Also the time taken to travel 5 km downstream is equal to time taken to travel 3 km upstream.

ATQ,

$$\frac{5}{x+y} = \frac{3}{x-y}$$

$5x - 5y = 3x + 3y$

$x = 4y$

Substituting value of x in equation (i), we get

$$\frac{1}{3y} + \frac{1}{5y} = \frac{8}{75}$$

$$\frac{8}{15y} = \frac{8}{75}$$

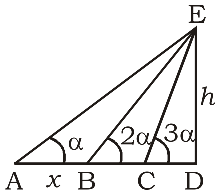
$y = 5$ km/hr

$x = 4 \times 5 = 20$ km/hr

Time taken for the boat to cover a distance of 60 km in still water = $\frac{60}{20}$ = 3 hours

79. (B) In ΔEAD,

$\tan\alpha = \frac{h}{AD}$



$AD = \frac{h}{\tan\alpha}$ $\left(\because \frac{1}{\tan\alpha} = \cot\alpha\right)$

AB + BD = $h\cot\alpha$

BD = $h\cot\alpha - x$

In ΔEBD,

$\tan 2\alpha = \frac{h}{BD}$

$BD = \frac{h}{\tan 2\alpha} = h\cot 2\alpha$

$h\cot\alpha - x = h\cot 2\alpha$

$\frac{h\cos\alpha}{\sin\alpha} - x = h\frac{\cos 2\alpha}{\sin 2\alpha}$

$\frac{h\cos\alpha}{\sin\alpha} - \frac{h\cos 2\alpha}{\sin\alpha} = x$

$h\left[\frac{\cos 2\alpha - \sin\alpha - \sin\alpha.\cos 2\alpha}{\sin\alpha.\sin 2\alpha}\right] = x$

$h\left[\frac{\sin(2\alpha - \alpha)}{\sin\alpha.\sin 2\alpha}\right] = x$

$h\left[\frac{\sin\alpha}{\sin\alpha.\sin 2\alpha}\right] = x$

$h = x\sin 2\alpha$

80. (C) $x + y = z$

Now, $\cos^2 x + \cos^2 y + \cos^2 z = 1 + (\cos^2 x - \sin^2 y) + \cos^2 z$

$= 1 + \cos(x + y)\cos(x - y) + \cos^2 z$

$= 1 + \cos z\cos(x - y) + \cos^2 z$

$= 1 + [\cos(x - y) + \cos(x + y)]$

$= 1 + \cos z\,[\cos(x - y) + \cos(x + y)]$

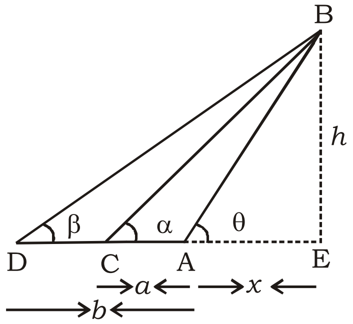
$= 1 + \left[2\cos\frac{(x - y + x + y)}{2}.\cos\frac{(x - y - x - y)}{2}\right]$

$= 1 + 2\cos z . \cos x . \cos y$

$= 1 + 2\cos x . \cos y . \cos z$

81. (B) Let AB be the leaning tower and Let C and D be two given stations at distance a and b respectively from the foot A of the tower.

Let AE = x and BE = h



In ΔAEB, we have

$\tan\theta = \frac{h}{x}$

$x = h\cot\theta$

In ΔCEB, we have

$\tan\alpha = \frac{h}{a+x}$

$a + x = h\cot\alpha$

$x = h\cot\alpha$ .... (i)

In ΔDEB, we have

$\tan\beta = \frac{h}{b+x}$

$b + x = h\cot\beta$

$x = h\cot\beta - b$ ....(ii)

On equation the values of x obtained from equations (i) and (ii), we have

$h\cot\theta = h\cot\alpha - a$ ... (iii)

$h(\cot\alpha - \cot\theta) = a$

$h = \frac{a}{\cot\alpha - \cot\theta}$ ... (iv)

On equation the values of x obtained from equations (i) and (ii), we get (iv)

$h\cot\theta = h\cot\beta - b$

$h(\cot\beta - \cot\theta) = b$

$h = \frac{b}{\cot\beta - \cot\theta}$ ... (v)

Equation the value of h from equation (iv) and (v), we get

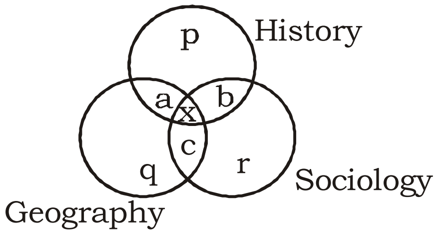
$\frac{a}{\cot\alpha - \cot\theta} = \frac{b}{\cot\beta - \cot\theta}$

$a(\cot\beta - a\cot\theta) = b(\cot\alpha - \cot\theta)$

$(b - a)\cot\theta = \text{b}\cot\alpha - a\cot\beta$

$\cot\theta = \frac{b\cot\alpha - a\cot\beta}{b-a}$

82. (D)



From the diagram, it is given that

$a + x = 40$; $b + x = 40$

$c + x = 30$

$a + b + c + 3x = 100$ .....(i)

Since no students have failed in all the three subjects,

$p + q + r + a + b + c + x = 150$

$p + q + r + 110 - 2x = 150$ [From (i), $a + b + c + x = 110 - 2x$]

$p + q + r = 150 - 110 + 2x$

$p + q + r = 150 - 110 + 20$ [$x = 10$, given]

$p + q + r = 60$

Hence, the required number of students is 60.

83. (B) $P = 25\% = \frac{1}{4}$, $x = 10$ km/h

$Q = 45\% = \frac{45}{100} = \frac{9}{20}$, $y = 5$ km/h

$R = 30\% = \frac{30}{100} = \frac{3}{10}$, $z = 15$ km/h

Required average speed $= \dfrac{1}{\frac{P}{x} + \frac{Q}{y} + \frac{R}{z}} = \dfrac{1}{\frac{1}{4 \times 10} + \frac{9}{20 \times 5} + \frac{3}{10 \times 15}}$

$= \dfrac{1}{\frac{5 + 18 + 4}{200}} = \dfrac{200}{27} = 7.40$ km/h

84. (C) $\dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{5}{2} - \frac{3-2}{12}\right)\right\}\right]}{4 \times \frac{1}{12}} = \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{5}{2} - \frac{1}{12}\right)\right\}\right]}{\frac{1}{3}}$

$= \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{30-1}{12}\right)\right\}\right]}{\frac{1}{3}} = \dfrac{\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{29}{24}\right\}\right]}{\frac{1}{3}}$

$= \dfrac{\left[\frac{13}{4} \div \frac{1}{24}\right]}{\frac{1}{3}} = \frac{13}{4} \times 24 \times 3$

$= 13 \times 18 = 234$

85. (C) LCM of $\left(2 \text{ and } 5\frac{1}{2}\right)$ = LCM of $\left(2 \text{ and } \frac{11}{2}\right)$

Required answer = $\frac{\text{LCM of 2 and 11}}{\text{HCF of 1 and 2}} = \frac{22}{1}$ = 22 feet

86. (D) Let the number of first class tickets = x

Number of 2^{nd} class tickets = $18 - x$

ATQ,

$10x + 4(18 - x) = 110$

$x = 8$

2^{nd} class tickets = 10

New cost = 10 × 10 + 3 × 38 = ₹ 124

87. (C) Let the fixed charges be ₹ x and charge per km be ₹ y.

Then,

$x + 20y = 205$ .... (i)

$x + 25y = 255$ .... (ii)

Solving equation (i) and equation (ii), we get

$y = 10$, $x = 5$

Putting the value of y in (i), we get

$x + 20 \times 10 = 205$

$x + 200 = 205$

$x = 5$

∴ Amount paid for a distance of 50 km = $x + 50y = 5 + 50 \times 10$ = ₹ 505

88. (D) $\frac{5\sin 75^\circ \sin 77^\circ + 3\cos 13^\circ \cos 15^\circ}{\cos 15^\circ . \sin 77^\circ} + \frac{7\sin 81^\circ}{\cos 9^\circ}$

$\frac{5\sin(90^\circ - 15^\circ)\sin 77^\circ + 2\cos(90^\circ - 77^\circ)\cos 15^\circ}{\cos 15^\circ . \sin 77^\circ} + \frac{7\sin(90^\circ - 9^\circ)}{\cos 9^\circ}$

$\frac{5\cos 15^\circ \sin 77^\circ + 2\cos 15^\circ \sin 77^\circ}{\cos 15^\circ . \sin 77^\circ} + \frac{7\cos 9^\circ}{\cos 9^\circ} = (5 + 2) + 7 = 14$

89. (B) $\tan A + \sin A = p$

$\tan^2 A + \sin^2 A + 2 \tan A \sin A = p^2$ ...... (i)

Again, $\tan A - \sin A = q$

$\tan^2 A + \sin^2 A - 2 \tan A \sin A = q^2$ ...... (ii)

Subtracting Eq. (ii) from (i), we get

$p^2 - q^2 = 4 \tan A \sin A$

$\tan A \sin A = \frac{p^2 - q^2}{4}$ ...... (iii)

Also, $(\tan A - \sin A)(\tan A + \sin A) = pq$

$\tan^2 A - \sin^2 A = pq$

$\frac{\sin^2 A}{\cos^2 A} - \sin^2 A = pq$

$\frac{\sin^2 A(1-\cos^2 A)}{\cos^2 A} = pq$

$\frac{\sin^2 A \sin^2 A}{\cos^2 A} = pq$

$\tan^2 A \sin^2 A = pq$

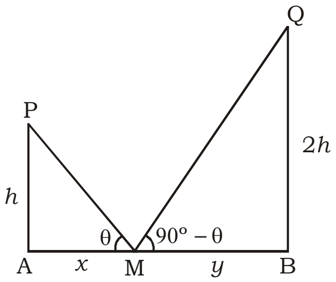
$\tan^2 A \sin^2 = pq$

Also, $\tan A \sin A = \frac{p^2 - q^2}{4}$ [From equation (iii)]

$\sqrt{pq} = \frac{p^2 - q^2}{4}$

$p^2 - q^2 = 4\sqrt{pq}$

90. (C)



In ΔABC,

$\tan\theta = \frac{h}{x}$ ... (i)

In ΔDEC,

$\tan(90° - 0) = \frac{2h}{y}$ ... (ii)

To get $2h^2$, we have to multiply equation (i) and (ii), we get

$\tan\theta \times \tan(90° - \theta) = \frac{h}{y} \times \frac{2h}{y}$

$\tan\theta \cot\theta = \frac{2h^2}{xy}$

$1 = \frac{2h^2}{xy}$

$2h^2 = xy$

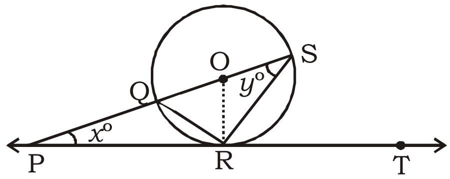
91. (D) $\sin x + \sin y = a$ and $\cos x + \cos y = b$

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

$= 1 + 1 + 2[\sin x \sin y + \cos x \cos y]$

$\frac{a^2 + b^2 - 2}{2} = \cos x \cos y + \sin x \sin y$

92. (A)



$\angle SRQ = 90^o$
$\angle QRP = \angle QSR = y^o$
$\angle PRS = 90^o + y^o$
In ΔPRS,
$\angle SRP + \angle RPS + \angle PSR = 180^o$
$(90^o + y^o) + x^o + y^o = 180^o$
$x^o + 2y^o = 90^o$

93. (B) Ratio of the capital invested by A, B and C = 20000 × 5 + 15000 × 7 : 20000 × 5 + 16000 × 7 : 20000 × 5 + 26000 × 7 = 205 : 212 : 282

B's share in total profit = $69900 \times \frac{212}{699}$ = ₹ 21200

94. (B) Let his speed is x and y is speed of wind.
ATQ,

$\frac{1}{x+y} = \frac{3}{60}$

$x + y = 20$

$\frac{1}{x-y} = \frac{4}{60}$

$x - y = 15$

$x = \frac{35}{2}$ km/h

Time = $\frac{1}{\frac{35}{2}} = \frac{2}{35} = \frac{2}{35} \times 60 = 3\frac{3}{7}$ min

95. (B) Let the height and radius be 'r'.

Ratio of volumes = $\frac{1}{3}\pi r^2 \times r : \frac{2}{3}\pi r^3 : \pi r^2 \times r$ = 1 : 2 : 3

96. (A) Girls in college R and S = 1500 + 3000 = 4500
Boys in college R and S = 2500 + 4500 = 7000
Ratio of Girls & Boys = 4500 : 7000 = 9 : 14

97. (A) Required Percentage = $\frac{4500}{3500} \times 100 = 128.57\% \approx 129\%$

98. (C) Boys = 5500 + 3500 + 2500 + 4500+ 4000

Average of boys = $\frac{20000}{5} = 4000$

99. (B) Girls in college R and S = 1500 + 3000 = 4500
Girls in College P and T = 2500 +1500 = 4000
Required ratio = 4500 : 4000 = 9 : 8

100. (C) Total number of students from College S = 4500 + 3000 = 7500
Total number of students from college P = 5500 + 2500 = 8000
Required Ratio = 7500 : 8000 = 15 : 16

QUANTITATIVE ABILITY - 75 (ANSWER KEY)

1.	(C)	26.	(C)	51.	(C)	76.	(D)
2.	(C)	27.	(B)	52.	(C)	77.	(B)
3.	(B)	28.	(A)	53.	(D)	78.	(A)
4.	(D)	29.	(D)	54.	(B)	79.	(B)
5.	(C)	30.	(A)	55.	(C)	80.	(C)
6.	(C)	31.	(C)	56.	(A)	81.	(B)
7.	(C)	32.	(D)	57.	(D)	82.	(D)
8.	(B)	33.	(B)	58.	(A)	83.	(B)
9.	(B)	34.	(D)	59.	(C)	84.	(C)
10.	(B)	35.	(B)	60.	(C)	85.	(C)
11.	(C)	36.	(C)	61.	(B)	86.	(D)
12.	(D)	37.	(A)	62.	(D)	87.	(C)
13.	(A)	38.	(B)	63.	(C)	88.	(D)
14.	(D)	39.	(B)	64.	(A)	89.	(B)
15.	(A)	40.	(C)	65.	(B)	90.	(C)
16.	(C)	41.	(C)	66.	(C)	91.	(D)
17.	(A)	42.	(B)	67.	(A)	92.	(A)
18.	(C)	43.	(C)	68.	(A)	93.	(B)
19.	(B)	44.	(B)	69.	(D)	94.	(B)
20.	(B)	45.	(D)	70.	(B)	95.	(B)
21.	(D)	46.	(B)	71.	(A)	96.	(A)
22.	(B)	47.	(C)	72.	(B)	97.	(A)
23.	(D)	48.	(B)	73.	(A)	98.	(C)
24.	(A)	49.	(C)	74.	(D)	99.	(B)
25.	(B)	50.	(A)	75.	(C)	100.	(C)