QUANTITATIVE ABILITY - 82 (SOLUTION)

1. (C) SI = $\frac{PRT}{100}$

ATQ,

$$113600 = \frac{P\times10\times5+P\times8\times7+P\times12\times3}{100}$$

$$113600 = \frac{50P+56P+36P}{100}$$

$$113600 = \frac{142P}{100}$$

$\therefore$ P = ₹ 80,000

2. (B) Price of plot after 3 years = 12,00,000 × $\left(1+\frac{20}{100}\right)^3$

= 12,00,000 × $\left(\frac{6}{5}\right)^3$ = 12,00,000 × $\frac{216}{125}$ = ₹ 20,73,600

Price of car after 3 years = 16,00,000 × $\left(1+\frac{25}{100}\right)^3$

= 16,00,000 × $\left(\frac{3}{4}\right)^3$ = 16,00,000 × $\frac{27}{64}$ = ₹ 6,75,000

$\therefore$ Required difference = 20,73,600 – 6,75,000 = ₹ 13,98,600

3. (B) Suppose the trains meet at a distance of x kms from Delhi. Let the trains from Delhi and Amritsar be A and B respectively.

ATQ,

[Time taken by A to cover x km] – [Time taken by B to cover (450 – x) km] = $\frac{50}{60}$

[$\because$ 4 pm – 3.10 pm = 50 min = $\frac{50}{60}$ hrs]

$$\frac{x}{20}-\frac{450-x}{60}=\frac{50}{60}$$

$3x - 450 + x = 50$

$4x = 500$

$x = 125$ km

Thus, the trains meet at a distance of 125 kms from Delhi.

Time taken by A to cover 125 km = $\frac{125}{20}$ = 6 hrs 15 min

So the trains meet at 9:25 pm.

4. (C) According to question,

	A		B		C
Efficiency	3	:	2	:	6
No. of days	2	:	3	:	1

Number of days taken by A = 12

Number of days taken by B =18 and number of days taken by C = 6

1 day's work of (A + B) = $\frac{5}{36}$

1 day's work of (B + C) = $\frac{8}{36}$

1 day's work of (C + A) = $\frac{9}{36}$

In 5 days total work done = $\frac{5}{36} + \frac{8}{36} + \frac{9}{36} + \frac{5}{36} + \frac{8}{36} = \frac{35}{36}$

Now, the rest of the work $\left(ie, \frac{1}{36}\right)$ is done by AC

Number of days taken by AC for the rest of the work = $\frac{\frac{1}{36}}{\frac{9}{36}} = \frac{1}{9}$

Therefore, total time taken to complete the work = 5 + $\frac{1}{9}$ = $5\frac{1}{9}$ days

5. (A) Sum lent at 6% rate of interest = ₹ x

S.I. = 19000 – 16800 = ₹ 2200

$\therefore \quad \frac{x \times 6 \times 2}{100} + \frac{(16800 - x) \times 8 \times 2}{100}$ = ₹ 2200

$12x + 16800 \times 16 - 16x = 220000$

$4x = 268800 - 220000$

$4x = 48800$

x = ₹ 12,200

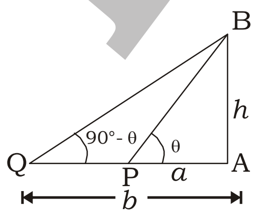
6. (A) According to question,

A + B = 210

Using, options, we find that

A = 110 and B = 100 is correct.

7. (A)



here, h = height of tower AB

$\tan\theta = \frac{h}{a}$ ---------- (i)

$\tan(90^\circ - \theta) = \frac{h}{b}$

$\cot\theta = \frac{h}{b}$

$\tan\theta = \frac{b}{h}$ ---------- (ii)

From (i) and (ii),

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

$h = \sqrt{ab}$

8. (A) Let the cost price of 1 orange = ₹ 1

$\therefore$ C.P. of 1 banana = ₹ $\frac{3}{4}$ and C.P. of 1 apple = ₹ $\frac{3}{2}$

New prices:

1 orange = ₹ 1.1

1 banana $\equiv \frac{3}{4} \times \frac{110}{100} =$ ₹ 0.825

1 apple $\equiv \frac{3}{2} \times \frac{110}{100} =$ ₹ 1.65

$\therefore$ Original price of (4 bananas + 2 apples + 3 oranges) = ₹ (3 + 3 + 3) = ₹ 9

New price of (4 banana + 2 apples + 3 oranges)

= ₹ (4 × 0.825 + 2 × 1.65 + 3 × 1.1)

= ₹ (3.3 + 3.3 + 3.3) = 9.9

$\therefore$ Percentage increase = $\frac{9.9 - 9}{9} \times 100$ = 10%

9. (D) H.C.F. = x and L.C.M. = y

A × B = $x \times y$

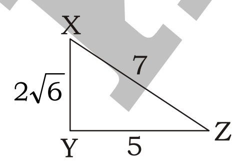
So, $A^3 + B^3 = (A + B)^3 - 3AB(A + B)$

$= (x + y)^3 - 3xy\,(x + y)$

$= x^3 + y^3 + 3xy\,(x + y) - 3xy\,(x + y)$

$= x^3 + y^3$

10. (B)



XZ – YZ = 2 ____________(i)

$XY^2 + YZ^2 = XZ^2$

$\left(2\sqrt{6}\right)^2 = XZ^2 - YZ^2$

$24 = (XZ - YZ)(XZ+YZ)$

$XZ + YZ = 12$ ______(ii)

Adding both the equations,

$2 \times Z = 14$

$XZ = 7$

$\therefore$ $YZ = 7 - 2 = 5$

$\therefore$ $\sec X = \frac{7}{2\sqrt{6}}$

$\tan X = \frac{5}{2\sqrt{6}}$

$\sec X + \tan X = \frac{7}{2\sqrt{6}} + \frac{5}{2\sqrt{6}} = \frac{12}{2\sqrt{6}} = \sqrt{6}$

11. (A) Angles of triangle are $(a - d)^\circ$, a° and $(a + d)^\circ$

ATQ,

$a - d + a + a + d = 180^\circ$

$3a = 180^\circ \Rightarrow a = 60^\circ$

$\frac{a-d}{a+d} = \frac{60}{\pi} = \frac{60}{180} = \frac{1}{3}$

$\frac{60-d}{60+d} = \frac{1}{3}$

$180 - 3d = 60 + d$

$4d = 120^\circ \Rightarrow d = 30^\circ$

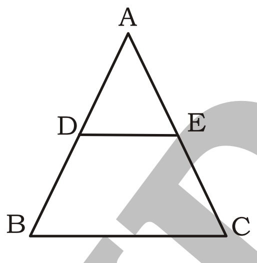
$a - d = 60^\circ - 30^\circ = 30^\circ$

$a = 60^\circ$

$a + d = 60^\circ + 30^\circ = 90^\circ$

So, Angles of triangle are $30^\circ, 60^\circ$ and 90°

12. (B)



$DE \parallel BC$

$\angle ADE = \angle ABC$

$\angle AED = \angle ACB$

$\Delta ADE \sim \Delta ABC$

$\therefore$ $\frac{\square BDEC}{\Delta ADE} = \frac{1}{1}$

$\frac{\square BDEC}{\Delta ADE} + 1 = 1 + 1$

$\frac{\Delta ABC}{\Delta ADE} = 2 = \frac{AB^2}{AD^2}$

$\frac{AB}{AD} = \sqrt{2}$

$\frac{AB}{AD} - 1 = \sqrt{2} - 1$

$\frac{BD}{AD} = \sqrt{2} - 1$

$\frac{AD}{BD} = \frac{1}{\sqrt{2-1}}$

AD : BD $= 1 : \frac{1}{\sqrt{2-1}} = 1 : \sqrt{2}$

13. (D) Relative speed of both the trains = 90 km/hr = $90 \times \frac{5}{18}$ = 25 m/sec

Total length of both the trains = S × T = 25 × 12 = 300 m
Let the length of train in the ratio 2 : 1.
Length of faster train = 200 m
∴ Length of slower train = 100 m
Distance in 45 seconds by faster train

D = S × T = $54 \times \frac{5}{18} \times 45$ = 675 m

D = $L_T + L_P$
L_P = 675 – 200 = 475 m

14. (D) Total work = 72

4, 3, 2

P 18 days, Q 24 days, R 36 days

1st Round (3 days) work will complete = 4 + 3 + 2 = 9

So, 72 unit will complete = $\frac{72}{9}$ = 8 days

As they are working alternately, so number of days to complete the work = 8 × 3 = 24 days

90 (work)

P 30, Q 90

Work will be completed in = $\frac{90}{4} = 22\frac{1}{2}$ days

15. (C) 24

3, 2

8 –A, 12 – A+ B

B = $\frac{24}{1}$ = 24 hours

Capacity of tank = 24 × 60 × 6 = 8640 l

16. (C) Interest for 2 yrs = 10 + 10 + $\frac{10\times10}{100}$ = 21%

Interest for 3 yrs = 21 + 10 + $\frac{21\times10}{100}$ = 33.1%

Now, (33.1 – 21)% of P = 24200

12. 1% of P = 24200

P = $\frac{24200\times100}{12.1}$ = 2 lakh

17. (D) $\left(1+\frac{1}{x}\right)\left(1+\frac{1}{x+1}\right)\left(1+\frac{1}{x+2}\right)\left(1+\frac{1}{x+3}\right)$

$=\left(\frac{x+1}{x}\right)\times\left(\frac{x+2}{x+1}\right)\left(\frac{x+3}{x+2}\right)\left(\frac{x+4}{x+3}\right) = \frac{x+4}{x}$

18. (D) EF || DC (Given)

$\Delta EGF \sim \Delta CGD$ (by AA Similarity)

$\frac{EG}{GC}=\frac{EF}{DC}$

$\frac{5}{10}=\frac{EF}{18}$

EF = $\frac{18\times5}{10}$ = 9 cm

19. (A) Let the distance PQ be A km and they meet x hrs after the first man starts

Average speed of first man = $\frac{A}{4}$ km/hr

Average speed of second man = $\frac{A}{4}$ km/hr

Distance travelled by first man = $\frac{A}{4}\times x$ km = $\frac{Ax}{4}$ km

They meet x hrs after the first man starts. The second man, as he starts 1 hrs late, meets after (x – 1) hrs from his start. Therefore distance travelled by the second man = $\frac{A(x-1)}{4}$

Now, $\frac{Ax}{4}+\frac{A(x-1)}{4}$ = A

$2x - 1$ = 4

x = $\frac{5}{2}$ = $2\frac{1}{2}$ hrs

$\therefore$ Required time = $2\frac{1}{2}$ hrs

$\therefore$ They meet at 8 am + $2\frac{1}{2}$ hrs = at 10 : 30 am

20. (A) 2A 30
3B 20 60
6C 10
ABC discharge chemical in 1 min
= 6 + 3 + 2 = 11

So, proportion of R = $\frac{6\times3}{11\times3}$ = $\frac{6}{11}$

21. (B) Marks obtained by Joya in Science = $\frac{150\times56}{100}$ = 84

Total marks obtained by Joya in all subjects = $\frac{450\times54}{100}$ = 243

$\therefore$ Marks obtained in GK = 243 – 73 – 84 = 86

22. (B) Let the expenditure of mess/student = x
then exp. of 40 students = 40x
exp. of 48 students = 48 (x – 2) = 40x + 48
48x – 96 = 40x + 48
8x =144
x = 18
Total expenditure =18 ×40 = ₹ 720

23. (A) Let salary = ₹ 100
Expenses on education = ₹ 40
Expenses in purchasing books of ₹40

= 40 × $\frac{60}{100}$ = ₹24

Remaining = 40 – 24 = ₹16
Expenses in purchasing stationary items

= 16 × $\frac{1}{2}$ = ₹ 8

ATQ,

8 × $\frac{1}{4}$ $\rightarrow$ 160

$\therefore$ 100 $\rightarrow$ $\frac{160}{2}\times100$ = ₹ 8000

24. (C) Total manes obtained by Q in all the subjects together
= 75 + 90 + 82 + 54 + 38 + 60 = 399

$\therefore$ Required % = $\left(\frac{399}{600}\times100\right)$% = 66.5%

25. (D) Total marks obtained by P in all the subjects together
= 84 + 66 + 73 + 61 + 24 + 52 = 360
Total marks obtained by U in all the subjects together
= 142 + 84 + 48 + 81 + 42 + 38 = 435
$\therefore$ Required ratio = 360 : 435 = 72 : 87

26. (A) Required average = $\frac{66+90+48+75+78+84}{6}$ = 73.5

27. (B) Total marks obtained by all the students together in Maths

= 84 + 75 + 96 + 128 + 108 + 142 = 633

$\therefore$ Required average = $\frac{633}{6}$ = 105.5

28. (D) Total marks obtained by T in all the subjects together

= 108 + 78 + 78 + 70 + 39 + 48 = 421

Total marks obtained by P in all the subjects together

= 84 + 66 + 73 + 61 + 24 + 52 = 360

$\therefore$ Required more% = $\left(\frac{421-360}{360}\times 100\right)\%$

= 16.94% $\approx$ 17%

29. (B) $\dfrac{\frac{1}{2}}{\dfrac{1+\frac{3}{8}}{\frac{5}{3}+\frac{9}{\frac{1}{3}}}} = \dfrac{1}{1+\dfrac{2}{\frac{5}{3}+\frac{8}{9}\times 3}}$

$= \dfrac{\frac{1}{\frac{2}{3}}}{1+\frac{13}{3}} = \dfrac{1}{1+\frac{2}{13}} = \dfrac{13}{15}$

30. (D)

Original	3	:	5
After increase	7	:	9
	4	:	4

$4 \xrightarrow{\times 5} 20$

Original number ⇒ 3 × 5 = 15

2nd number = 5 × 5 = 25

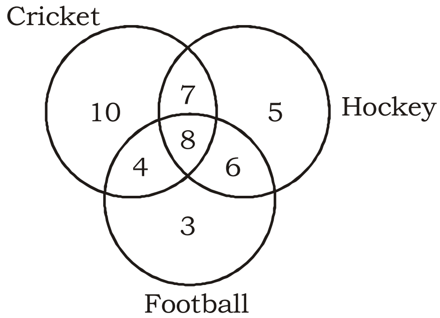
31. (C) Ist team → 10 — 2

2nd team → 20 — 1

20

Number of days → $\frac{20}{3}$ = $6\frac{2}{3}$ days

32. (D)



Number of students = 10+7+8+4+5+6+3 = 43
Number of students who do not play any game = 2
Total students in the class = 43 + 2 = 45

33. (D) Let the number of workers be x.
ATQ,

Total work = x + (x – 1) + (x – 2) + ... 1 = $\frac{x(x+1)}{2}$

When there is no worker withdrawn at any stage.
Total work = x × x = x^2
therefore,

$$\frac{x(x+1)}{2} = x^2 \times \frac{55}{100}$$

10x + 10 = 11x
x = 10

34. (C) {0.9 – [2.3 – 3.2 – (7.1 – 5.4 – 3.5)]}
{0.9 – [2.3 – 3.2 – (–1.8)]}
{0.9 – [2.3 – 3.2 + 1.8]}
{0.9 – [0.9]}
{0.9 – 0.9} = 0

35. (A) Radius and height of cylinder are 1 cm and 16 cm.
Let the radius of one sphere = r cm.
Now,
Volume of cylinder = 12 × vol. of sphere

$$\pi \times 1^2 \times 16 = 12 \times \frac{4}{3}\pi \times r^3$$

$r^3 = 1$
$r = 1$ cm
∴ Diameter of sphere = 2 cm

36. (C) $\frac{3}{4} = 0.75,\ \frac{5}{6} = 0.833$

∴ $\frac{1}{2} = 0.5,\ \frac{2}{3} = 0.66$

$\frac{4}{5} = 0.8,\ \frac{9}{10} = 0.9$

∴ $\frac{4}{5}$ lies between $\frac{3}{4}$ and $\frac{5}{6}$

37. (C) By Alligation

$20\% = \frac{1}{5}$

C.P	S.P
5	6
$\downarrow$	$\downarrow^{\times 1.2}$
6	7.20

8   5

6 Cost Price

1   2

$\downarrow$ $\downarrow^{\times 18}$

Quantity 18kg   36

38. (D) S.I = ₹ (15500 – 12500)
= ₹ 3000

$\therefore$ Rate % = $\frac{100 \times 3000}{12500 \times 4} = 6\%$

39. (C) In class X, percentage of students who passed with Ist division = $\frac{24}{30} \times 100 = 80\%$

In class Y, percent of students who passed with Ist division = $\frac{28}{35} \times 100 = 80\%$

$\therefore$ C is the right answer.

40. (C) Let the no. of students be 100

$\therefore$ Total no. of marks 100 × 80 = 8000

marks scored by 10% students = 10 ×95 = 950

marks scored by 20% students = 20 × 90 = 1800

Average marks of remaining students = $\frac{8000 - (1800 + 950)}{70}$

$= \frac{5250}{70} = 75$

41. (A) A $\rightarrow$ 60 — 2
120
B $\rightarrow$ 40 — 3

Let the time be x

ATQ,

$\frac{x}{2} \times 3 + \frac{x}{2} \times 5 = 120$

$\frac{3x}{2} + \frac{5x}{2} = 120$

$4x = 120$

$x = 30$ mins

42. (A) Circle has the largest area.

43. (C) C.P for the retailer = 24 × 5 = ₹ 120

S.P for the retailer = 25 × 6 = 150

Profit percent = $\frac{30}{120} \times 100$ = 25%

44. (C) Total distance = 60 + 50 = 110 kms

Total time = $\frac{60}{40} + \frac{50}{30} = \frac{19}{6}$ kms

$\therefore$ Average speed = $\frac{110}{\frac{19}{6}} = \frac{660}{19} = 37\frac{14}{19}$ km/hours

45. (D) Let the total original weight = 100 units

$\therefore$ Weight of cylindrical container = $\frac{100}{6}$ units

Weight of liquid = $100 - \frac{100}{6} = \frac{500}{6}$ units

Now, the total weight left after some liquid is removed = $\frac{100}{3}$ units

Weight of remaining liquid = $\frac{100}{3} - \frac{100}{6} = \frac{100}{6}$ units

Liquid removed = $\frac{500}{6} - \frac{100}{6} = \frac{400}{6}$ units

$\therefore$ Required fraction = $\frac{\frac{400}{6}}{\frac{500}{6}} = \frac{4}{5}$

46. (C) Principal = ₹1800

Rate = 10%

C.I. = ₹378

$\therefore$ A = 1800 + 378 = ₹1278

Let time = t years.

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

$2178 = 1800\left(1+\frac{100}{100}\right)^t$

$\frac{2178}{1800} = \left(\frac{11}{10}\right)^t$

$\frac{121}{100} = \left(\frac{11}{10}\right)^t$

$\left(\frac{11}{10}\right)^2 = \left(\frac{11}{10}\right)^t$

t = 2 years

47. (A) Let Arun's weight be x kg.
According to Arun, 65 < x < 72
According to Arun's brother, 60 < x < 70
According to Arun's mother x < 68
The values satisfying all the above conditions are 66, 67 & 68
$\therefore$ Required average = $\left(\frac{66+67+68}{2}\right)$ = 67 kg

48. (A) Sum of temperatures on 1st, 2nd, 3rd and 4th days = (58 × 4) = 232 degrees
Sum of tempratures on 2nd, 3rd, 4th and 5th days = (60 × 4) = 240 degrees
Temprature on 5th day – temprature on 1st day = 8 degrees
Let the temprature on 1st and 5th days be $7x$ and $8x$ degrees respectively
Then, $8x - 7x = 8$
$\therefore$ 8 × 8 – 7 × 8
$x = 8$
Temprature on 5th day = 8 × 8 = 64°

49. (B) Required decrease% = $\left(\frac{70-64}{70}\times100\right)\%$ = $8\frac{4}{7}\%$

50. (D) Required average = $\frac{55+48+75+50}{4}$ = 57

51. (C) Average production of sugar in India = $\frac{70+64+45+60+60+73}{6}$ = 62
$\therefore$ Required ratio = 73 : 62

52. (C) Total production of sugar in India = 70 + 64 + 45 + 60 + 60 + 73 = 372
Total production of sugar in China = 55 + 48 + 75 + 50 + 64 + 58 = 350
$\therefore$ Required difference = 372 – 350 = 22

53. (B) Increase in the year **2009** = $\left(\frac{75-48}{48}\times100\right)\%$ = 56.25

54. (D) If the required distance be x km, then

$$\frac{x}{5}-\frac{x}{6}=\frac{30-5}{60}$$

$$\frac{6x-5x}{30}=\frac{25}{60}=\frac{5}{12}$$

$$x=\frac{30\times5}{12}=12.5 \text{ km}$$

55. (C) Let the present age of boy's father be x years.
Then, boy's age = $\frac{2x}{7}$ years
boy's brother's age = $\frac{2x}{7}+3 = \frac{2x+21}{7}$

Now ratio between the present age of boy's father and the of boy's brother

$= \frac{x}{2x+21} = \frac{14}{5}$

$\frac{x}{2x+21} = \frac{2}{5}$

$x = 42$ years

$\therefore$ boy's present age = $42 \times \frac{2}{7}$ = 12 years

56. (B) According to question,

(2M + 7C)'s 1 day work = $\frac{1}{4}$

It means that 1 work will be finished by (8M + 28C)

Again, (4M + 4C)'s 1 day's work = $\frac{1}{3}$

1 work will be completed by 12M + 12C

8M + 28C = 12M + 12C

M = 4C

$\therefore$ 4M + 4C = 5M

Since, 5 M complete a work in 3 days. Then, 1 M will complete it in 15 days.

57. (C) Let the cost price of Sunil be x. Then the cost price of Anil will be $1.2x$ and the cost price of Ramesh will be $1.2x \times 1.10 = 1.32x$

Then the cost price of Suresh = $x \times 1.2 \times 1.10 + 116$ = ₹ $132x + 116$

Now, $1.32x + 116 - x = 500$

$0.32x = 500 - 116 = 384$

$\therefore$ $x = \frac{384}{32} \times 100$ = ₹1200

Anil's cost price = 1200 × 1.2 = ₹ 1440

Hence Anil paid to Sunil ₹1440

58. (A) $\frac{P\left(1+\frac{r}{100}\right)^2}{P\left(1+\frac{r}{100}\right)^3} = \frac{2420}{2662} = \frac{10}{11}$

$1+\frac{r}{100} = \frac{11}{10}$

$\frac{r}{100} = \frac{11}{10} - 1 = \frac{1}{10}$

$r = 10\%$

59. (B) $\frac{2x-3y+1}{2} = \frac{x+4y+8}{3}$

$6x - 9y + 3 = 2x + 8y + 16$

$4x - 17y = 13$

Also, $\frac{2x-3y+1}{2} = \frac{4x-7y+2}{5}$ ________(i)

$10x - 15y + 5 = 8x - 14y + y$

$2x - y = -1$

$4x - 2y = -2$________(ii)

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

$15y = -15 \Rightarrow y = -1$

Puting value of y in equation (ii) we have,

$x = -1$

$x + y = (-1)(+)(-1) = -2$

60. (C) $x^2 + \frac{1}{x^2} = P \Rightarrow \left(x + \frac{1}{x}\right)^2 - 2 = P$

$x + \frac{1}{x} = \sqrt{P+2}$ and

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

$= \sqrt{P+2}\ (P-1) = (P-1)\sqrt{(P+2)}$

61. (C) Suppose the train meet at distance of x km from A. Then,

[Time taken by second train to cover $(450 - x)$ km] – [Time taken by first train to cover x km]

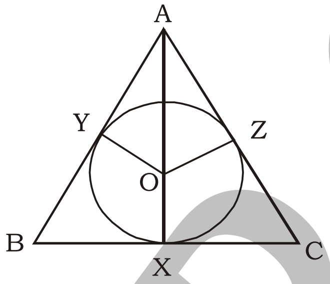
$= \frac{20}{60}$

$\frac{450 - x}{20} - \frac{x}{15} = \frac{1}{3}$

$6750 - 35x = 100$

$x = \frac{6650}{35} = 190$ km

62. (B)



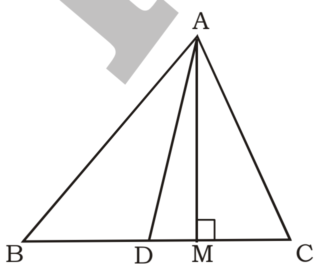
$\because$ OX < AX also OY < CY

and OZ < BZ

$\therefore$ 3OX < 3AX

OX $\angle$ AX

63. (B)



$$\frac{Area\ of\ \triangle ABD}{Area\ of\ \triangle ADC} = \frac{\frac{1}{2}\times BD\times AM}{\frac{1}{2}\times DC\times AM}$$

$$\frac{60}{area(\triangle ADC)} = \times\ \frac{4x}{5x}$$

area ($\triangle$ ADC) = 75 cm sq.

64. (D) Total amount spent = $\left(\frac{591}{3}+\frac{45}{60}\times 780\right)$ paise

= 197 + 585 = 782 paise = ₹ 7.82

65. (A) Let the amount invested by A and B is $3x$ and $5x$ respectively and after 6 month C joined amount equal to B.

Then, Ratio of A, B and C in profit = $3x \times 12 : 5x \times 12 : 5x \times 6 = 6 : 10 : 5$

66. (C) Let the work is completed in x days.

Work done by (P + Q) in 1 day = $\frac{1}{10}$ work

Work done by (Q + R) in 1 day = $\frac{1}{18}$ work

P's 5 day's work + Q's 10 day's work + R's 15 day's work = 1

(P + Q)'s 5 day's work + (Q + R)'s 5 day's work + R's 10 day's work = 1

$$\frac{5}{10}+\frac{5}{18}-\frac{10}{x} = 1$$

x = 45 days

67. (A) Let the amount given at 4% per annum be ₹ x.

$\therefore$ Amount given at 5% per annum = ₹ (1200 – x)

$$\therefore\ \frac{x\times 4\times 2}{100}+\frac{(1200-x)\times 5\times 2}{100} = 110$$

$$\frac{-2x+12000}{100} = 110$$

x = ₹ 500

Aslo, (1200 – x) = 1200 – 500 = ₹ 700

68. (C) Given: $x(x + y + z) = 9$, $y(x + y + z) = 16$ and $z(x + y + z) = 144$

Now Let us add all three equations, then we have

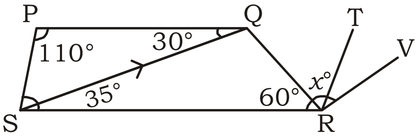
$(x + y + z)(x + y + z) = 9 + 16 + 144$

$x + y + z = \sqrt{169} = 13$

$\because$ $x(x + y + z) = 9 \Rightarrow x \times 13 = 9$

$$x = \frac{9}{13}$$

69. (B)



QSR + ∠SRT = 180° [∵ SQ||RT]

35° + 60° + x° = 180°

x = 85°

70. (D) Let the radius of solid spheres be r_1 and r_2 respectively.

A.T.Q

Surface area of B = 400% of surface area of A = 4 ×surface area of A

$4\pi r_2^2 = 16\pi r_1^2$

$\frac{r_1}{r_2} = \sqrt{\frac{1}{4}} = \frac{1}{2}$ or 1 : 2

Now, Volume of B × $\frac{(100-k)}{100}$ = Volume of A

$\frac{4}{3}\pi r_2^3\left(\frac{100-k}{100}\right) = \frac{4}{3}\pi r_1^3$

$\left(\frac{r_1}{r_2}\right)^3 = \frac{100-k}{100}$

$\frac{1}{8} = \frac{100-k}{100}$

$k = \frac{700}{8} = 87.5$

71. (D) Side of an equilateral triangle = $\frac{2}{\sqrt{3}}(l+m+n)$

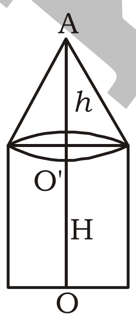
= $\frac{2}{\sqrt{3}}$ (6 + 9 + 12)= 18$\sqrt{3}$

∴ Perimeter of a triangle = 3 × side

= 3 ×18$\sqrt{3}$ = 54$\sqrt{3}$ cm

72. (B) Let the height of circular cylinder = H

∵ Total volume of the solid = 3× volume of the cone



$\therefore \quad \dfrac{\text{Total volume of the solid}}{\text{Volume of circular cone}} = 3$

$$\frac{\pi r^2 H + \frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi r^2 h} = 3$$

$$\pi r^2 H + \frac{1}{3}\pi r^2 h = \pi r^2 h \Rightarrow \pi r^2 H = \frac{2}{3}\pi r^2 h$$

$$H = \frac{2}{3}h$$

73. (A) Let the sides of the base are $5x$ *cm*, $12x$ *cm* and $13x$ *cm* respectively.
Given, perimeter of base = 60 *cm*
$5x + 12x + 13x = 60$

$x = \dfrac{60}{30} = 2$

The sides of base are 10cm, 24cm and 26cm.

$\therefore$ Volume of prism = $\dfrac{1}{2} \times 10 \times 24 \times 50 = 6000$ cm^2

74. (D) Let the amount be ₹ x and the rate of interest = r% p.a.
A.T.Q,
Amount after Ist year = ₹ 1200

$x\left(1+\dfrac{r}{100}\right) = 1200$ ______(i)

also, Amount after IIIrd year = 1587

$x\left(1+\dfrac{r}{100}\right)^3 = 1587$ _____(ii)

On dividing Eq. (ii) by Eq. (i), we get

$$\left(1+\frac{r}{100}\right)^2 = \frac{1587}{1200}$$

$$1+\frac{r}{100} = \frac{23}{20}$$

$$\frac{r}{100} = \frac{3}{20}$$

r = 15%

75. (C) Formula = $\dfrac{\text{Days}}{\dfrac{\text{And}}{\text{Or}}}$

$$= \frac{938}{\frac{7}{2}+\frac{5}{5}+\frac{2}{7}} = \frac{938}{\frac{245+70+20}{70}}$$

$$= \frac{938 \times 70}{335} = 196 \text{ days}$$

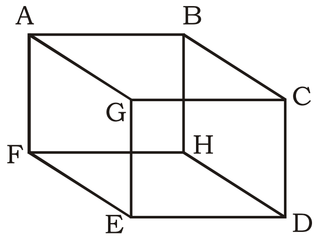
76. (B) At the time of marriage = Mother + Father + Son = 42 × 3 = 126 years
After 6 years = 126 + 6 + 6 + 6 = 144 years
Current: M + F + Son + Daughter in law + child = 36 × 5 = 180 years
144 + Daughter in law + 4 = 180 [as child was born after 2 years of marriage so he is of 4 years now]
Daughter-in-law = 180 – 148 = 32 years
At the time of marriage = 32 – 6 = 26 years

77. (B)

	A : B
Original –	4 : 5
After reduction –	3 : 4
Reduction –	1 : 1

1 unit = 30
A = 4 × 30 = 120

78. (B)



V = 8, S = 6, E = 12
∴ V + S – E = 2

79. (C) $\dfrac{\sqrt{x+2}+\sqrt{x-2}}{\sqrt{x+2}-\sqrt{x-2}} = \dfrac{3}{2}$

$2\sqrt{x+2}+2\sqrt{x-2} = 3\sqrt{x+2}-3\sqrt{x-2}$

$5\sqrt{x-2} = \sqrt{x+2}$

$\dfrac{\sqrt{x+2}}{\sqrt{x-2}} = \dfrac{5}{1}$

Squaring both the sides

$\dfrac{x+2}{x-2} = \dfrac{25}{1}$

x + 2 = 25x – 50
∴ 24x = 52

$x = \dfrac{52}{24} = \dfrac{13}{6}$

$\boxed{6x = 13}$

80. (D) $\dfrac{\sin A - \sin C}{\cos C - \cos A} = \dfrac{2\cos\left(\dfrac{A+C}{2}\right)\sin\left(\dfrac{A-C}{2}\right)}{2\sin\left(\dfrac{A+C}{2}\right)\sin\left(\dfrac{A-C}{2}\right)}$

$= \cot\left(\dfrac{A+C}{2}\right) = \cot\left(\dfrac{\pi}{2}-\dfrac{B}{2}\right)$ [$\because$ A + B + C = π]

$= \tan\left(\dfrac{B}{2}\right)$

81. (A) Let C.P of article = Rs. 100

Marked Price = x

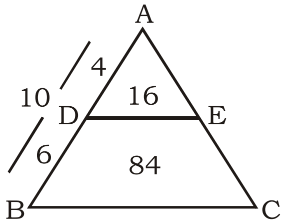
Single equivalent discount = $\left(20+\frac{25}{4}-\frac{20\times25}{400}\right)\%$ = 25%

$\therefore$ $x\times\frac{75}{100}$ = 120

x = $\frac{120\times100}{75}$ = 160

160 – 100 = 60%

82. (C)



Ratio = 16 : 84 = 4 : 21

83. (B) Given expression, $10x + y = 7(x + y)$

$3x - 6y = 0$

$x = 2y$

Now, When each digit is increased by 3,

Then, $10(x + 3) + (y + 3) = 6(x + 3 + y + 3) + 6$

$4x - 5y = 9$

$8y - 5y = 9$

Form eq. (i)

$y = 3$ & $x = 6$

The given number is 63.

84. (C) $\because \frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ca}=a+b+c$

So, $\frac{(1.5)^3+(4.7)^3+(3.8)^3-3\times1.5\times4.7\times3.8}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times4.7-4.7\times38-3.8\times1.5}$

= 1.5 + 4.7+ 3.8 =10

85. (B) Sum of temperature of first 3 days = 22°C × 3 = 66°C

Sum of temperature of last 3 days = 24 °C × 3 = 72°C

Sum of temperature of whole week = 23.5°C × 7 = 164.5°C

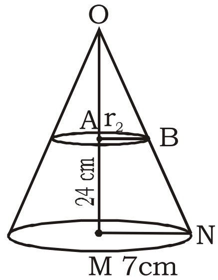
The temperature of the last day = (164.5 - 66- 72)°C = 26.5°C

86. (B) In such type of question,

CP = $\frac{\text{Total cost }(100+\text{percent profit})}{(100-\text{percent loss})+(100+\text{percent profit})}$ = $\frac{720\times119}{85+119}$

= $\frac{720\times119}{204}$ = ₹ 420

87. (B)



Height of the upper part of the cone $= \frac{1}{2} \times 24 = 12\,\text{m}$

OA = 12 cm

$\because$ ΔAOB ~ ΔOMN

$\frac{OA}{OM} = \frac{AB}{MN}$

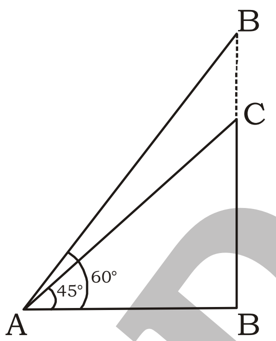
$\frac{12}{24} = \frac{AB}{7}$

$\therefore$ AB = $\frac{7}{2}$ cm

Volume of the upper part = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 = 154\ \text{cm}^2$

88. (C)



Distance of point A from base of pillar = 100 m
ATQ,

$\frac{BC}{AB} = \tan 45°$

BC = 100 × 1 = 100
Length of incomplete pillar = 100 m

$\frac{BD}{AB} = \tan 60°$

BD = 100 × $\sqrt{3}$ = $100\sqrt{3}$

Length of the complete pillar is to be increased by = $\left(100\sqrt{3} - 100\right) = 100\left(\sqrt{3} - 1\right)$ m

89. (C) tanA =1

cosA = SinA = $\frac{1}{\sqrt{2}}$

tanB = $\sqrt{3}$

cosB = $\frac{1}{2}$, sin B = $\frac{\sqrt{3}}{2}$

$\cos(A+B)$ = cosAcosB – sinASinB

$= \frac{1}{\sqrt{2}}\times\frac{1}{2}-\frac{1}{\sqrt{2}}\times\frac{\sqrt{3}}{2}-\frac{1-\sqrt{3}}{2\sqrt{2}} = \frac{1-\sqrt{3}}{2\sqrt{2}}$

90. (B) Let the distance of the office from the house of the man be x m.

Speed = 4 km/h = 4 × $\frac{5}{18}$ = $\frac{10}{9}$ m/s

$= 4\times\frac{1000}{60}\text{m/min} = \frac{200}{9}$ m/min

Time taken = $\frac{3x}{200}$ min

New speed = $\frac{5\times1000}{60}=\frac{250}{3}\text{m/min}$

Time taken = $3x/250$ min

ATQ,

$\frac{3x}{200} - 5 = \frac{3x}{250} + 4$

$\frac{3x}{1000} = 9$

x = 3000 m = 3 km

91. (B) $4\cot^2 45^0 - \sec^2 60^0 + \sin^2 30^0$

$4(1)^2 - (2)^2 + (1/2)^2$

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

92. (B) $3\tan^2 30^0 - \frac{4}{3}\sin^2 60^0 - \frac{1}{2}\text{cosec}^2 45^0 + \frac{4}{3}\sin^2 90^0$

$3\left(\frac{1}{\sqrt{3}}\right)^2 - \frac{4}{3}\left(\frac{\sqrt{3}}{2}\right)^2 - \frac{1}{3}\left(\sqrt{2}\right)^2 + \frac{4}{3}(1)^2$

$3\times\frac{1}{3}-\frac{4}{3}\times\frac{3}{4}-\frac{1}{2}\times2+\frac{4}{3}$

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

93. (B) The diagonal of a square = $\sqrt{2}$ × side

$$12\sqrt{2} = \sqrt{2} \times S$$

S = 12 cm

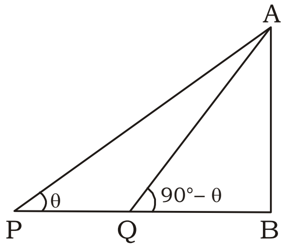
Perimeter of the square = 4 × s = 4×12 = 48cm

Perimeter of the equilateral Δ = 48cm

Its side = $\frac{48}{3}$ = 16 cm

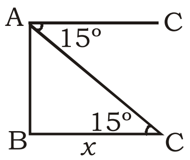
Its area = $\frac{\sqrt{3}}{4} \times 16 \times 16 = 64\sqrt{3}\text{cm}^2$

94. (A)



If angles are complimentary then height of tower (AB) = $\sqrt{PB \times QB}$ = $\sqrt{ab}$ m

95. (B)



AB = 60 m (Light house)

Boat is at point C and ∠CAE = ∠ACB = 15°

tan 15° = tan (45°–30°) = $\frac{\tan 45^o - \tan 30^o}{1 + \tan 45^o . \tan 30^o}$

$$= \frac{1 - \frac{1}{\sqrt{3}}}{1 + \frac{1}{\sqrt{3}}} = \frac{\sqrt{3} - 1}{\sqrt{3} + 1}$$

∴ tan 15° = $\frac{AB}{BC}$

$$x = \frac{60\left(\sqrt{3} + 1\right)}{\sqrt{3} - 1}$$

∴ Required distance = $\frac{60\left(\sqrt{3} + 1\right)}{\sqrt{3} - 1}$ m

96. (B) Simple interest for 1 year at the rate of = 6% per annum is = 6

C. I for 1 year when it is compounded half yearly = $6 + 6 + \frac{6\times6}{100} = 12.36$

Difference between C. I. & S. I = 12.36 – 6 = 6.36

Sum which was lended = $\frac{127.20}{6.36} \times 100 = 2000$

97. (A) No. of men selecting Product C = $\frac{56340\times45}{100} = 25353$

No. of men selecting Product F = $\frac{35580\times15}{100} = 5337$

$\therefore$ Required percent = $\frac{5337}{25353} \times 100 = 21.05\%$

98. (D) Total no. of people selecting all products = 284894

Number of women selecting product E = $\frac{48300\times44}{100} = 21252$

$\therefore$ Required percentage = $\frac{21252}{284894} \times 100 = 7.5\%$ (Approx)

99. (D) Total no. of children selecting Product A = $\frac{45525\times36}{100} = 16389$

100. (A) Avg. no. of women selecting all products together

$$= \frac{\frac{45525\times44}{100}+\frac{36800\times33}{100}+\frac{56340\times30}{100}+\frac{62350\times28}{100}+\frac{48300\times44}{100}+\frac{35580\times35}{100}}{6} = 16707$$

QUANTITATIVE ABILITY - 82 (ANSWER KEY)

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