QUANTITATIVE ABILITY - 66 (SOLUTION)

1. (B) Required number = $\frac{77}{(17-6)} \times 100 \times \frac{25}{100}$ = 175

2. (A)

8	6561	81
8	64	
161	161	
×1	161	
	0	

Hence, 0 is subtracted from 6561 to make it a perfect square.

3. (A) 97 102 127 188 **301**
1^2+2^2 3^2+4^2 5^2+6^2 7^2+8^2

4. (B) $\frac{6+4\sqrt{2}}{34+24\sqrt{2}} = \frac{3+2\sqrt{2}}{17+12\sqrt{2}} = \frac{3+2\sqrt{2}}{\left(3+2\sqrt{2}\right)^2}$

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

5. (D) Let the natural number are x and y then the sum = 24x + 16y = 8(3x + 2y)
Hence, sum should be multiple of 8.
So option (D) is only divisible by 8.

6. (C) Let the number of boys is x.
ATQ,
$2x \times x = 3200$
$x^2 = 1600$
x = 40
Hence, the required number = 40

7. (A) $\frac{6}{7}$ = 0.857, $\frac{7}{8}$ = 0.875

$\frac{9}{11}$ = 0.818, $\frac{13}{15}$ = 0.867

Hence, required order = $\frac{9}{11} < \frac{6}{7} < \frac{13}{15} < \frac{7}{8}$

8. (A) Required total number = $\frac{900\times55}{100} + \frac{1300\times56}{100} + \frac{900\times35}{100}$ = 1538

9. (D) Required total number = $\frac{850\times80}{100} + \frac{900\times55}{100} + \frac{650\times60}{100}$
= 680 + 495 + 390 = 1565

10. (B) Total male population except village C

$= \frac{900\times45}{100} + \frac{60\times1100}{100} + \frac{44\times1300}{100} + \frac{650\times40}{100} + \frac{900\times65}{100}$
= 405 + 660 + 572 + 260 + 585 = 2482

Require ratio = $\frac{850\times20}{100} : \frac{2482}{5}$ = 25 : 73

11. (C) Total number of villages = 900 + 1100 + 850 + 1300 + 650 + 900 = 7500

Average number = $\frac{5700}{6}$ = 950

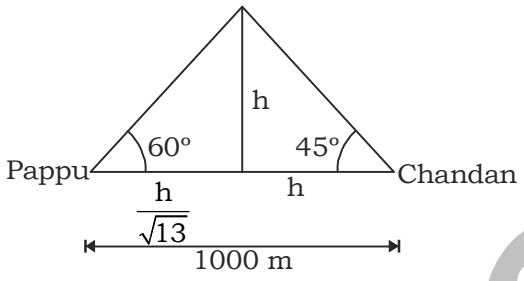
12. (B) Required ratio = $\frac{850 \times 20}{100} : \frac{1300 \times 56}{100}$ = 85 : 364

13. (C) $13\left(\frac{5}{13}\cos A + \frac{12}{13}\sin A\right) + 13$

Let there is angle for which sin B = $\frac{5}{13}$ and cos B = $\frac{12}{13}$

13(sin B cos A + sin A cos B) + 13
13 sin(A + B) + 13
For maximum value sin(A + B) = 1
Then 13 + 13 = 26
Hence, maximum value of 5 cos A + 12 sin A + 13 = 26

14. (B) ATQ,



$\frac{h}{\sqrt{3}} + h = 1000$

$\left(\sqrt{3}+1\right)h = 1000\sqrt{3}$

$h = \frac{1000\sqrt{3}}{\sqrt{3}+1} = \frac{1000\sqrt{3}\left(\sqrt{3}-1\right)}{2}$

$h = 500\sqrt{3}\left(\sqrt{3}-1\right)$

Hence, height of balloon = $500\sqrt{3}\left(\sqrt{3}-1\right)$ m

15. (A) As we know,
$\sec^2 A - \tan^2 A = 1$

$\sec A - \tan A = \frac{1}{\sec A + \tan A}$

Similarly,

$\text{cosec } A - \cot A = \frac{1}{\text{cosec } A + \cot A}$

Then, $\frac{\sec A - \tan A}{\text{cosec } A + \cot A} = \frac{1}{(\sec A + \tan A)} \times (\text{cosec } A - \cot A)$

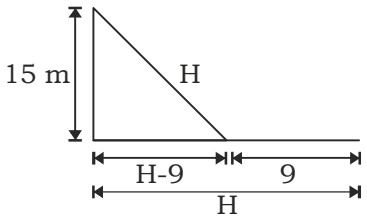
$= \frac{\text{cosec } A - \cot A}{\sec A + \tan A}$

16. (D) $\frac{\sqrt{1+\cot^2 A}}{\sec A} = \frac{\operatorname{cosec} A}{\sec A} = \frac{\cos A}{\sin A}$

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

$= 2\ \operatorname{cosec} 2A - \tan A$

17. (A)



$H^2 = (H-9)^2 + 15^2$

$18H = 225 + 81 = 306$

$H = 17$

Hence, the required height = 17 m

18. (C) $1 + \cot^2\theta - 1 + \sin^2\theta - \frac{\sec^2\theta}{\tan^2\theta} + \cot^2\theta \sin^2\theta$

$= \operatorname{cosec}^2\theta - \cos^2\theta - \operatorname{cosec}^2\theta + \cos^2\theta = 0$

19. (D)

20. (D) $\cot\theta + \operatorname{cosec}\theta = 8$ .....(i)

Then, $\cot\theta - \operatorname{cosec}\theta = -\frac{1}{8}$ ..... (ii)

Adding equation (i) and (ii),

$2\cot\theta = 8 - \frac{1}{8} = \frac{63}{8}$

$\tan\theta = \frac{1}{\cot\theta} = \frac{8\times 2}{63} = \frac{16}{63}$

21. (B) $1 - \sin^2\theta - \sec\theta = \cos^2\theta - \sec\theta = \frac{\cos^3\theta - 1}{\cos\theta}$

$= \frac{(\cos\theta - 1)(\cos^2\theta + 1 + \cos\theta)}{\cos\theta} = (1 - \sec\theta)(\cos^2\theta + 1 + \cos\theta)$

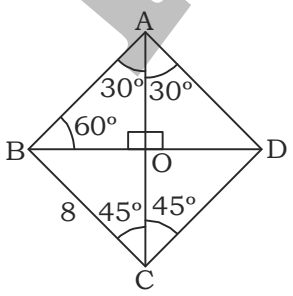
22. (D) $x + 5x = 180°$

$x = 30°$

Hence, required angle = 30°

23. (C)

24. (C)



In ΔDOC,

$OC = \frac{8}{\sqrt{2}} = 4\sqrt{2}$

In ΔAOB,

$OA = 4\sqrt{2} \times \sqrt{3} = 4\sqrt{6}$

Hence, required length = OC + OA = $4\sqrt{2} + 4\sqrt{6} = 4\left(\sqrt{2} + \sqrt{6}\right)$

25. (D) $y - y_1 = \frac{(y_2 - y_1)(x - x_1)}{(x_2 - x_1)}$

$y - 7 = \frac{(3-7)(x-9)}{(4-9)}$

$5y - 35 = 4x - 36$

$4x - 5y = 1$

Hence, required equation = $4x - 5y = 1$

26. (C) Length of diagonal of square = $\sqrt{2}a$ and the length of BG = $\frac{\sqrt{3}a}{2}$

Then, required ratio = $\frac{\sqrt{3}a}{2} : \sqrt{2}a = \sqrt{3} : 2\sqrt{2}$

27. (A) Slope of $(3x - 2y = 13) = \frac{3}{2}$

Slope of $(4x + ky = 7) = -\frac{4}{k}$

For perpendicular, the product of the slopes = –1

Then, $\frac{3}{2}\left(-\frac{4}{k}\right) = -1$

k = 6

Hence, the value of k = 6

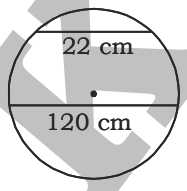
28. (C) $\frac{n(n-3)}{2} = 3n$

n = 9

Hence, required number = 9 × 3 = 27

29. (B)

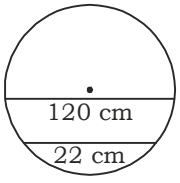
Case-I



When chords are present on opposite sides of centre, then distance

$= \frac{120}{2} + \frac{22}{2} = 71\,\text{cms}$

Case-II



When chords are present on the same side of centre, then distance

$= \frac{120}{2} - \frac{22}{2} = 49\,\text{cms}$

Hence, required distance = 71 cm, 49 cm

30. (C) $\angle BDC = 180° - 60° - \angle ADB = 30°$ [$\because \angle ADB = 90°$ angle in half circle]
and $\angle ACD = 180° - 54° - \angle ACB = 36°$ [$\because \angle ACB = 90°$ angle in half circle]
Hence, $\angle BDC + \angle ACD = 30° + 36° = 66°$

31. (C) Required difference = $\frac{180}{15} \times (7 - 3) = 48°$

32. (A) $\frac{28°}{360°} \times 2\pi \times r_A = \frac{140°}{360°} \times 2\pi r_B$

$\frac{r_A}{r_B} = \frac{5}{1}$

Then the ratio = $\pi r_A^2 : \pi r_B^2 = 25 : 1$

33. (B) Let the number of persons is x.
ATQ,
$50 \times x = (x - 5) \times 55$
$x = 55$
Hence, required person = 55

34. (B) $\frac{144 \times 42}{560} = \frac{36 \times M}{200}$
$M = 60$
Hence, required men = 60

35. (C) $\frac{8 \times 6}{8400} = \frac{6 \times 9}{x}$
$x = 9450$
Hence, required amount = ₹ 9450

36. (B) $8 \times 7 \times 6 = (8 + 4) \times 2 \times x$
$x = 14$
Hence, required hours = 14 hours.

37. (D) $P \rightarrow 20$, $Q \rightarrow 25$ → 100 → 5 : 4

Hence, required time = $\frac{100 - (9 \times 4)}{4}$ = 16 minutes

38. (C) $A \rightarrow 9$, $B \rightarrow 12$ → 36 → 4 : 3

Hence, required time = $\frac{36 - [(4+3) \times 2]}{4} = \frac{36 - 14}{4} = 5\frac{1}{2}$ hours

39. (B) Required amount = $\frac{8000 \times 8000}{10000}$ = ₹ 6400

40. (C) 350 → 6% → 21, 10% → 35, 2.1

Hence, required amount = 350 + 21 + 35 + 2.1 = ₹ 408.1

41. (B) $P \times \left(\frac{8}{100}\right)^2 = 160$

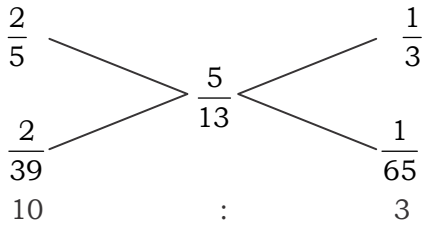
$P = \frac{160 \times 100 \times 100}{64} = ₹\,25000$

Hence, required amount = ₹ 25000

42. (D) Let the total quantity of mixture = (LCM of 16 and 18) = 144

Required ratio = 81 + 56 : 63 + 88 = 137 : 151

43. (C)



10 : 3

Hence, required ratio = 10 : 3

44. (D) x + y = 80 .....(i)

x – y = 18 .....(ii)

From equation (i) and (ii)

x = 49 and y = 31

Hence, required ratio = 49 : 31

45. (B)

A	B	C
3	1	
	6	1
18	6	1

Hence, required ratio = 18 : 6 : 1

46. (C) Required marks = $\frac{550}{68.75} \times \frac{100}{2} = 400$

47. (B) $\frac{8}{2}(6 + 7d) = \frac{2 \times 5}{2}(6 + 4d)$

$24 + 28d = 30 + 20d$

$d = \frac{30 - 24}{28 - 20} = \frac{6}{8} = \frac{3}{4}$

Hence, required difference = $\frac{3}{4}$

48. (A) $35^{100} = (36 - 1)^{100}$

$= 36^{100} \times (-1)^0 + 36^{99} \times (-1)^1 + \ldots + 36^1 \times (-1)^{99} + 36^0 \times (-1)^{100}$ [By Binomial Theorem]

Except $36^0 \times (-1)^{100}$, all others are multiple of 36

So, required remainder = $36^0 \times (-1)^{100} = 1$

49. (C) $4x + 3 = 3x + 8$

$x = 5$

Hence, $(x + 1)^3 = 216$

50. (C) $a - b = -6$
Squaring both side,
$a^2 + b^2 - 2ab = 36$
$44 - 2ab = 36$
$ab = 4$

51. (D)

a	b	c
9	11	
	5	9

Hence, required ratio = 45 : 55 : 99

52. (C) $x^{288} + 1 = (x^{96} + 1)(x^{192} + 1 - x^{96})$

53. (B) $\frac{5}{9} \neq \frac{8}{12}$, Thus, there is one solution of the linear equations.
[Read the property of linear equation]

54. (A) $x^2 + \frac{1}{x^2} = 2$

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

Here, x = 1 and $\frac{1}{x} = 1$

Hence, $x^{99} + \frac{1}{x^{90}} = 1 + 1 = 2$

55. (B) $a^4 + b^4 = a^2 b^2$

$\frac{(a^2 + b^2)a^4 + b^4 - a^2b^2}{(a^2 + b^2)} = 0$

$a^6 + b^6 = 0$
Hence, $a^6 + b^6 = 0$

56. (B) $\frac{x + b + \frac{a}{x}}{bx - x^2} = \frac{x + \frac{a}{x} + b}{bx - x^2} = \frac{b + b}{a} \left[\because x + \frac{a}{x} = b\right] = \frac{2b}{a}$

57. (C) $7x - 2 = \frac{7}{x}$

$x - \frac{1}{x} = \frac{2}{7}$

Taking cube on both sides,

$x^3 - \frac{1}{x^3} = \left(\frac{2}{7}\right)^3 - 3 \times \frac{2}{7} = \frac{8}{343} - \frac{294}{343} = \frac{-286}{343}$

58. (D) $\frac{x^2 + 5x + 1}{x^2 + 12x + 1} = \frac{x + \frac{1}{x} + 5}{x + \frac{1}{x} + 12} = \frac{7}{14} = \frac{1}{2}$ $\left[\because x + \frac{1}{x} = 2\right]$

59. (C) Let the speed of train be y m.
ATQ,

$9 \times (y-2) \times \frac{5}{18} = (y-4) \times \frac{5}{18} \times 10$

$9y - 18 = 10y - 40$

$y = 22$

Hence, length of train $= 9 \times (22-2) \times \frac{5}{18} = 50$ m

60. (A) Final selling price $= \frac{100000 \times 110 \times 95}{100 \times 100} = 104500$

Then, profit for X = 110000 – 104500 = ₹ 5500

61. (A) Selling price (100 + 10) textbooks = 6000 + 600 = ₹ 6600
The selling price for 100 books = 6600

Then, profit $= \frac{(6600-6000)}{6000} \times 100 = 10\%$

62. (A)

1^{st}	:	2^{nd}	:	3^{rd}
140	:	160	:	100
7	:	8	:	5

Hence, required ratio = 7 : 8

63. (B) Ratio of height of A and B = 135 : 100 = 27 : 20

Then, required percentage $= \frac{(27-20)}{27} \times 100 = 25.92\%$

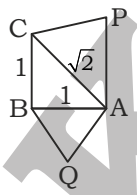
64. (B) Sumit's salary $= \frac{780}{6} \times 100 \times \frac{140}{100} =$ ₹ 18200

65. (C) $\frac{A \times 70}{100} = \frac{B \times 600}{100}$

$\frac{A}{B} = \frac{6}{7}$

Then, required percentage $= \frac{B}{A} \times 100 = \frac{7}{6} \times 100 = 116\frac{2}{3}$

66. (A)



Ratio between area of ΔACP and ΔABQ $= \frac{\sqrt{3}}{4}\left(\sqrt{2}\right)^2 : \frac{\sqrt{3}}{4}(1)^2 = 2 : 1$

67. (B) Refrigerator's price $= \frac{4500}{(3-2)} \times 3 =$ ₹ 13500

68. (A) Cost price $= \frac{1440 \times 100}{120} =$ ₹ 1200

69. (B) Required time = (6 hr + 35 min) × 2 – (6 hr + 35 min – 2 hr) = 8 hr 35 min

70. (C) Let the speed of the current be x km/hr.
ATQ,

$$\frac{4.8}{(34+x)} = \frac{8}{60}$$

34 + x = 36
x = 2
Hence, required speed = 2 kmph

71. (A) Let the distance be x km.
ATQ,

$$\frac{x}{40} - \frac{x}{60} = 2$$

20x = 2 × 2400
x = 240 km
Hence required distance = 240 kms

72. (B) Required difference = $1800 \times \frac{20}{100} \times \frac{3}{5} - 1800 \times \frac{12}{100} \times \frac{5}{12}$ = 216 – 90 = 126

73. (B) Total sum = $1800 \times \frac{12}{100} \times \frac{5}{12} + 1800 \times \frac{18}{100} \times \frac{2}{3} + 1800 \times \frac{15}{100} \times \frac{8}{15} + 1800 \times \frac{35}{100} \times \frac{11}{14} + 1800 \times \frac{20}{100} \times \frac{3}{5}$ = 90 + 216 + 144 + 495 + 216 = 1161

Required average = $\frac{1161}{5} \approx 232$

74. (A) Required number = $1800 \times \frac{12}{100} \times \frac{7}{12} + 1800 \times \frac{35}{100} \times \frac{3}{14}$ = 126 + 135 = 261

75. (A) Required ratio = $1800 \times \frac{20}{100} \times \frac{3}{5} : 1800 \times \frac{18}{100} \times \frac{1}{3}$ = 2 : 1

76. (B) Required number = 1800 – 1161 = 639

77. (B) Required number = 1236 – 7 × 29 – 4 × 45
= 7 × 36 + 180 – 7 × 29 – 180 = 7(36 – 29) = 49

78. (C)

A	:	B	:	C
3	:	1		
		5	:	1
15	:	5	:	1

Then, required number = $\frac{441 \times 3}{21} \times 15 = 945$

79. (D) $\frac{xy}{yz} = \frac{527}{992} = \frac{17 \times 31}{31 \times 32}$

$\frac{x}{z} = \frac{17}{32}$

So, numbers are 17, 31, 32
Then, required sum = 17 + 31 + 32 = 80

80. (B) HCF of (989 – 5) and (1327 – 7) = 24
Hence, required number = 24

81. (A) $\frac{d^2}{2} = 10 \times 16$

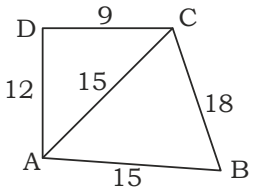
$d = \sqrt{2 \times 16 \times 10} = 4 \times 2\sqrt{5} = 8\sqrt{5}$

82. (B) Time taken by pipe $= \frac{450 \times 250 \times 8}{0.3 \times 0.2 \times 30,000} = 500$ hours

83. (C) Distance travelled by A is one minute $= \frac{2\pi r \times 10}{50}$

Then, distance travelled by A in new circumstance $= \frac{2\pi r \times 10}{2\pi r \times 10} \times 50 = 50$ minutes

84. (B)



ADC is a right angle triangle and ABC is a scalene triangle.

Then, area of $\Delta ADC = \frac{1}{2} \times 12 \times 9 = 54$ cm^2

and area of $\Delta ABC = \sqrt{24(24-15)(24-15)(24-18)} = 108$ cm^2

Hence, height of pyramid $= \frac{1458 \times 3}{(54+108)} = 27$ cm

85. (A) Slant height $= \sqrt{(12)^2 + (3.5)^2} = 12.5$

Then, required area $= \frac{22}{7} \times 12.5 \times 12 = 471$ cm^2

86. (B) $4 \times \pi \times 5 \times 5 = 5 \times \pi \times 4 \times l$

$l = 5$

Then, $h = \sqrt{5^2 - 4^2} = \sqrt{9} = 3$

Hence, height of come = 3 cm

87. (C) Surface area of sphere $= 4\pi r^2$

Curved surface area of cylinder $= 2\pi r \times 2r$

Hence, required ratio = 1 : 1

88. (B) Required amount $= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 \times \frac{1600}{1000} = 739.2$ litres

89. (B) Required number $= \frac{\frac{4}{3}\pi \times 6 \times 6 \times 6}{\frac{4}{3}\pi \times 3 \times 3 \times 3} = 8$

90. (D) Required amount $= \frac{10,000 \times 50}{100} - \frac{10,000 \times \left(40 + 10 - \frac{40 \times 10}{100}\right)}{100} = ₹\ 400$

91. (B) Required percent = $\frac{(10-9)}{9} \times 100 = 11\frac{1}{9}\%$

92. (A) Effective discount = $\frac{2\times25+4\times43}{6} = \frac{222}{6} = 37\%$

93. (B) Charudatta's share = $\frac{936000\times5}{100}$ = ₹ 187200

94. (C) Profit = $\frac{\left(x-\frac{(100-20)x}{100}\right)}{\frac{(100-20)x}{100}} \times 100 = 25\%$

95. (D) Let the cost price = ₹ 100
and the article = 300
Then, 1st condition,
Selling price of 1st half article = 150 × 150 = ₹ 225000
2nd condition,
Selling price of remaining 1/3rd article = 50 × $\frac{150}{100}$ × 75 = ₹ 5625
3rd condition,
Selling price for remaining article = 100 × $\frac{150\times80}{100}$ = ₹ 12000
Then, Total selling price = 22500 + 5625 + 12000 = 40125
Now, Profit% = $\frac{(40125-300\times100)}{30000} \times 100 = 33.75\%$

96. (C) 9% + 7% = 80
16% = 80
100% = $\frac{80}{16} \times 100$ = ₹ 500
Hence, cost price of type writer = ₹ 500

97. (B) Cost price of milk in mixture = $\frac{9}{120} \times 100$ = ₹ 7.5
Hence, required ratio = 750 : 1000 - 750 = 3 : 1

98. (B) Cost price of mixture = $\frac{40\times9+40\times8}{80}$ = ₹ 8.5
Then, profit% = $\frac{(9.35-8.5)}{8.5} \times 100 = 10\%$

99. (B) LCM of 4, 5, 9 = 180
Then,

Item	Price	
1 — 5	180	36
1 — 4	180	45
2 — 9	360	80

There is a loss of ₹ 1 for 360 items
Then, for a loss of ₹ 4 = 360 × 4 = 1440 items

100. (C) Marked price = $\frac{240\times120}{90}$ = ₹ 320

QUANTITATIVE ABILITY - 66 (ANSWER KEY)

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