K D Campus
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SSC TIER II (MATHS) MOCK TEST - 26 (ANSWER KEY)

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

SSC TIER II (MATHS) MOCK TEST - 26 (SOLUTION)

1. (C) Let the number = $100x + 10y + z$
A.T.Q
$100x + 10y + z = x + y + z$
$\Rightarrow 99x - 9y = 0$
$\Rightarrow 9(11x - y)$
Hence it divided by 3 or 9.

2. (B) Given that
$m_1 = 2 - \sqrt{3}$ $m_2 = 2 + \sqrt{3}$
If the angle between lines is θ
then, $\tan\theta = \left|\frac{m_1 - m_2}{1 + m_1 m_2}\right| = \left|\frac{2 - \sqrt{3} - 2 - \sqrt{3}}{1+1}\right|$

$\Rightarrow \tan\theta = \frac{2\sqrt{3}}{2} = \sqrt{3}$

$\Rightarrow \theta = 60°$

3. (B) A.T.Q
$= \cos\frac{2\pi}{7} + \cos\frac{4\pi}{7} + \cos\frac{6\pi}{7}$

Multiplying and dividing by 2 $(\sin\frac{\pi}{7})$

$= \frac{2\sin\frac{\pi}{7}\cos\frac{2\pi}{7} + 2\sin\frac{\pi}{7}\cos\frac{4\pi}{7} + 2\sin\frac{\pi}{7}\cos\frac{6\pi}{7}}{2\left(\sin\frac{\pi}{7}\right)}$

$= \frac{\sin\frac{3\pi}{7} - \sin\frac{\pi}{7} + \sin\frac{5\pi}{7} - \sin\frac{3\pi}{7} + \sin\pi - \sin\frac{5\pi}{7}}{2\left(\sin\frac{\pi}{7}\right)}$

$= \frac{\left(-\sin\frac{\pi}{7} + \sin\pi\right)}{2\left(\sin\frac{\pi}{7}\right)} \Rightarrow \frac{\left(-\sin\frac{\pi}{7} + 0\right)}{2\left(\sin\frac{\pi}{7}\right)}$

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

4. (D) $1 + \sin x + \sin^2 x \ldots\ldots\ldots \infty = 4 + 2\sqrt{3}$

$\Rightarrow \frac{1}{(1 - \sin x)} = 4 + 2\sqrt{3}$

$\Rightarrow 1 - \sin x = \frac{1}{4 + 2\sqrt{3}}$

$\Rightarrow 1 - \sin x = \frac{4 - 2\sqrt{3}}{4}$

$\Rightarrow 1 - \sin x = 1 - \frac{\sqrt{3}}{2}$

$\Rightarrow \sin x = \frac{\sqrt{3}}{2} = \sin\frac{\pi}{3} = \sin\frac{2\pi}{3}$

$\therefore x = \frac{\pi}{3}$ or $\frac{2\pi}{3}$

5. (A) Relative speed B with respect to A = 6 – 1 = 5 rounds/hour
Time taken to complete one round = 12 minutes
They will meet after 12 minutes at 7: 42 am.

6. (A) Let the average expenditure of one student = ₹x
According to question,
$\Rightarrow (45 \times x) + 54 = 54 (x - 1)$
$\Rightarrow 45x + 54 = 54x - 54$
$\Rightarrow 108 = 9x \Rightarrow x = 12$
Initial expenditure = 45 × 12 = ₹540

7. (C) A.T.Q
$\frac{1}{24} + \frac{1}{48} + \frac{1}{80} + \frac{1}{120} + \frac{1}{168}$
$= \frac{1}{4\times6} + \frac{1}{6\times8} + \frac{1}{8\times10} + \frac{1}{10\times12} + \frac{1}{12\times14}$
$= \frac{1}{2}\left[\frac{1}{4} - \frac{1}{6} + \frac{1}{6} - \frac{1}{8} + \frac{1}{8} - \frac{1}{10} + \frac{1}{10} - \frac{1}{12} + \frac{1}{12} - \frac{1}{14}\right]$
$= \frac{1}{2}\left[\frac{1}{4} - \frac{1}{14}\right] = \frac{1}{2} \times \frac{5}{28} = \frac{5}{56}$

8. (A) A.T.Q

$\cos^2\theta - \sin\theta = \frac{1}{4}$

$\Rightarrow 1 - \sin^2\theta - \sin\theta = \frac{1}{4}$

$\Rightarrow \sin^2\theta + \sin\theta - \frac{3}{4} = 0$

$\Rightarrow \sin\theta = \frac{-1 \pm \sqrt{1+3}}{2} = \frac{-1 \pm 2}{2} = \frac{1}{2}$ or $\frac{-3}{2}$

Hence, $\sin\theta = \frac{1}{2}$

9. (A) A.T.Q

$\Rightarrow$ HCF of 435, 439 and 551 = 29

$\Rightarrow$ Each container contain 29 litres of milk.

$\therefore$ Maximum number of containers required = $\frac{435}{29} + \frac{493}{29} + \frac{551}{29} = \frac{1479}{29} = 51$

10. (C) Water : Milk

3 : 5 = 8

1 × 5 = 5 1 × 5 = 5 = 10

$\therefore$ Water add in final mixture = $\frac{2}{10} = \frac{1}{5}$

11. (B) A.T.Q

4(A + D + P) = 36% of work

and, 8(A + D) = 64% of work

$\therefore$ A + D = 8% of work in a day

$\Rightarrow$ 5A = 3D

$\therefore$ A = 3% of work

D = 5% of work

In four days (A + D) × 4 = 8 × 4 = 32% of work

Remaining work in first four days

= 36 – 32 = 4%

$\therefore$ Pooja would done 1.33% work in day.

Thus, Dolly would complete the work in 20 days.

12. (A) Volume of prism = Area of Base × Height

Area of base = $\sqrt{s(s-a)(s-b)(s-c)}$

s = $\frac{15+17+10}{2}$ = 21 cm

Area of Base = $\sqrt{21\times6\times4\times11}$

= $6\sqrt{154}$ cm^2

Volume of Prism = $6\sqrt{154} \times 9$

= $54\sqrt{154}$ cm^3

13. (B) Rice buys in Ist year = $\frac{4200}{7}$ = 600 kg

Rice buys 2nd year = $\frac{4800}{8}$ = 600 kg

Rice buys 3rd year = $\frac{6800}{8.5}$ = 800 kg

Total rice buy in 3 years = 2000 kg

Total money spend in 3 years = ₹ 15800

Average rate of rice = $\frac{15800}{2000}$ = ₹ 7.9 /kg

14. (A) Let the speed of car = x km/hr

A.T.Q

$\frac{100}{x} = \frac{100\times4}{7x} + \frac{20}{60}$

$\Rightarrow \frac{100}{x} - \frac{400}{7x} = \frac{1}{3}$

$\Rightarrow \frac{700-400}{7x} = \frac{1}{3}$

$\Rightarrow x = \frac{900}{7}$ km/hr

$\Rightarrow$ Speed of the car = $\frac{900}{7}$ km/hr

15. (B) $x = \frac{2\sqrt{6}\sqrt{4}}{\sqrt{6}+\sqrt{4}}$ ..... (i)

$\Rightarrow \frac{x}{\sqrt{6}} = \frac{2\sqrt{4}}{\sqrt{6}+\sqrt{4}}$

Applying C and D rule,

$\frac{x+\sqrt{6}}{x-\sqrt{6}} = \frac{2\sqrt{4}+\sqrt{6}+\sqrt{4}}{2\sqrt{4}-\sqrt{6}-\sqrt{4}} = \frac{3\sqrt{4}+\sqrt{6}}{\sqrt{4}-\sqrt{6}}$ ..(ii)

And from (i),

$\frac{x+\sqrt{4}}{x-\sqrt{4}} = \frac{2\sqrt{6}+\sqrt{6}+\sqrt{4}}{2\sqrt{6}-\sqrt{6}-\sqrt{4}} = \frac{3\sqrt{6}+\sqrt{4}}{\sqrt{6}-\sqrt{4}}$ ..(iii)

Adding equation (ii) and (iii)

$\frac{x+\sqrt{6}}{x-\sqrt{6}} + \frac{x+\sqrt{4}}{x-\sqrt{4}} = \frac{3\sqrt{4}+\sqrt{6}}{\sqrt{4}-\sqrt{6}} + \frac{3\sqrt{6}+\sqrt{4}}{\sqrt{6}-\sqrt{4}}$

$= \frac{3\sqrt{4}+\sqrt{6}-3\sqrt{6}-\sqrt{4}}{\sqrt{4}-\sqrt{6}} = \frac{2\sqrt{4}-2\sqrt{6}}{\sqrt{4}-\sqrt{6}}$

$= \frac{2\left(\sqrt{4}-\sqrt{6}\right)}{\left(\sqrt{4}-\sqrt{6}\right)} = 2$

16. (C) $\sqrt[3]{4}$, $\sqrt{2}$, $\sqrt[6]{3}$, $\sqrt[4]{5}$
$(4)^{1/3}$, $(2)^{1/2}$, $(3)^{1/6}$, $(5)^{1/4}$,
$(4)^{4/12}$, $(2)^{6/12}$, $(3)^{2/12}$, $(5)^{3/12}$,
$(256)^{1/12}$, $(64)^{1/12}$, $(9)^{1/12}$, $(125)^{1/12}$,
Descending order is $\sqrt[3]{4}$, $\sqrt[4]{5}$, $\sqrt{2}$, $\sqrt[6]{3}$

17. (A) L.C.M = $\frac{\text{L.C.M of } 6,3,15}{\text{H.C.F of } 5,5,11} = \frac{30}{1}$

H.C.F $\frac{\text{H.C.F of } 6,3,15}{\text{L.C.M of } 5,5,11} = \frac{3}{55}$

18. (A) Total population = x

Male = $\frac{5}{8}x$

Educated Male = $\frac{5}{8}x \times \frac{1}{7} = \frac{5}{56}x$

Educated Female = $\frac{3}{8}x \times \frac{3}{14} = \frac{9}{112}x$

Number of uneducated people

$= x - \frac{5}{56}x - \frac{9}{112}x$

$= \frac{112x - 10x - 9x}{112} = \frac{93x}{112}$

$\therefore$ Percentage of uneducated people

$= \frac{93x}{112 \times x} \times 100 = \frac{2325}{28} \approx 83\%$

19. (D) According to question,

$= \sqrt{\sqrt{121} + \sqrt{\sqrt{441} + \sqrt{9 + \sqrt{\sqrt{81} + \sqrt{1600}}}}}$

$= \sqrt{11 + \sqrt{21 + \sqrt{9 + \sqrt{9 + 40}}}}$

$= \sqrt{11 + \sqrt{21 + \sqrt{9 + 7}}}$

$= \sqrt{11 + \sqrt{21 + \sqrt{16}}}$

$= \sqrt{11 + \sqrt{21 + 4}}$

$= \sqrt{11 + \sqrt{25}}$

$= \sqrt{11 + 5} = 4$

20. (A) Side of the square inscribed in triangle

$= \frac{P \times B}{P + B} = \frac{48}{14} = \frac{24}{7}$ cm

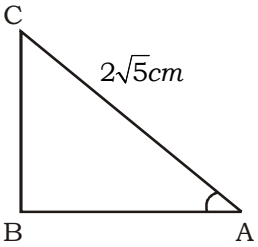
Area of largest square

$= \left(\frac{24}{7}\right)^2 = \frac{576}{49} cm^2$

21. (B) Distance between incenter and circumcenter $= \sqrt{R_c^2 - 2R_i R_c}$

$= \sqrt{(5)^2 - 2 \times 2 \times 5} = \sqrt{25 - 20} = \sqrt{5}$ cm

22. (B)

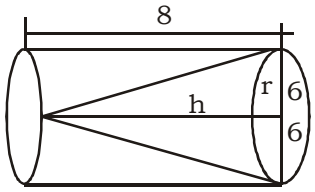


In ΔABC,
$AB^2 + BC^2 = AC^2$
$AB^2 + BC^2 = 20$ ..... (i)
and, AB – BC = 2 (given) ..... (ii)
From equation (i) and (ii), we get
AB = 4 cm and BC = 2 cm

Now, $\cos^2 A - \cos^2 C = \left(\frac{4}{2\sqrt{5}}\right)^2 - \left(\frac{2}{2\sqrt{5}}\right)^2$

$= \frac{4}{5} - \frac{1}{5} = \frac{3}{5}$

23. (D)



Slant height $(l) = \sqrt{h^2 + r^2}$

$\Rightarrow l = \sqrt{64 + 36} = 10$ cm

Total surface area of Remaining wood
$= \pi rl + 2\pi rh + \pi r^2 = \pi r \times (10 + 16 + 6)$

$= \frac{22}{7} \times 6 \times 32 = \frac{4224}{7} = 603\frac{3}{7}$ cm^2

24. (B) By joining the centers, an equilateral triangle is formed length of whose side is m + m = 2m *cm*
And, Area of triangle

$= \frac{\sqrt{3}}{4} \times (2m)^2 = \frac{\sqrt{3}}{4} \times 4m^2 = \sqrt{3}\, m^2 cm^2$

Area of semi-circle = $\frac{1}{2}\pi r^2 = \frac{1}{2}\pi\, m^2\, cm^2$

$\therefore$ Area of shaded region = $\sqrt{3}m^2 - \frac{1}{2}\pi\, m^2$

$= m^2\left(\sqrt{3} - \frac{\pi}{2}\right) cm^2$

25. (D) According to question,

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

$\Rightarrow x^3 + \frac{1}{x^3} + 3(3) = 27$

$\Rightarrow x^3 + \frac{1}{x^3} = 18$

Now, $\left(x^3+\frac{1}{x^3}\right)\left(x^3+\frac{1}{x^3}\right) = 18 \times 18$

$\Rightarrow x^6 + 1 + 1 + \frac{1}{x^6} = 324$

$\Rightarrow x^6 + \frac{1}{x^6} = 322$

26. (A) A.T.Q

So, $\frac{30}{x+y} + \frac{18}{x-y} = 6$

Let D = $\frac{1}{x+y}$ and U = $\frac{1}{x-y}$

30D + 18U = 6

5D + 3U = 1 ..... (i)

and, $\frac{40}{x+y} + \frac{20}{x-y} = \frac{22}{3}$

$\Rightarrow 40D + 20U = \frac{22}{3}$

$\Rightarrow 20D + 10U = \frac{11}{3}$ ..... (ii)

Solving equation (i) by (ii), we have

U = $\frac{1}{6}$, D = $\frac{1}{10}$

$x + y = 10$

$\underline{x - y = 6}$

$2x = 16$

$\Rightarrow x = 8$

Speed of boat = 8 km/hr

27. (A) $7200 = 2^5 \times 3^2 \times 5^2$

$\therefore$ Number of divisors = (5 + 1) (2 + 1) (2 + 1)

= 6 × 3 × 3 = 54

28. (A) The number must be greater than 65300 and less than 65399

$\frac{65300}{80} = 816.25$

$\therefore 817 \times 80 = 65360$

$\therefore x + y = 6 + 0 = 6$

29. (C) Numbers of apples should be a perfect square because at last n apples are packed in n boxes and no apples left.

$\therefore$ Number of boxes = 1444

30. (B) $\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

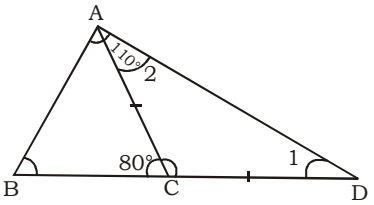
$\Rightarrow \frac{1\times1\times(6+4)}{1} = \frac{1\times1\times(6+6+x)}{1\frac{1}{2}}$

$\Rightarrow 10 = \frac{(12+x)2}{3}$

$\Rightarrow 30 = 24 + 2x$

$\Rightarrow x = 3$

31. (A)



CD = AC

$\therefore \angle 1 = \angle 2$ (opposite angle of equal sides)

$\Rightarrow \angle ACD = 180° - 80 = 100°$

$\Rightarrow \angle 1 + \angle 2 = 180° - 100° = 80°$

$\Rightarrow \angle 1 = \angle 2 = \frac{80°}{2} = 40°$

$\therefore \angle ABC = 180° - 110° - 40° = 30°$

32. (C) A.T.Q

C.P. – 100 $\xrightarrow{5\% \text{ less}}$ 95

M.P. – 120

S.P = $\frac{120\times90}{100} = 108$

Selling Price when he sell it at 40% profit

= $\frac{95\times140}{100} = 133$

Now, 133 – 108 = 25 unit = ₹ 36

$\therefore$ cost price = $\frac{36}{25} \times 100 = ₹144$

33. (B) A.T.Q

Weight	Price
9 ×	1100 – 1000
11 ×	900 – 1080
9900 –	9000
9900 –	11880

Profit % = $\frac{2880}{9000}\times100$

= 32%

34. (B) Given that

$\frac{\left(x+\sqrt{x^2-1}\right)}{\left(x-\sqrt{x^2-1}\right)} + \frac{\left(x-\sqrt{x^2-1}\right)}{\left(x+\sqrt{x^2-1}\right)} = 34$

$\Rightarrow \frac{\left(x+\sqrt{x^2-1}\right)\left(x+\sqrt{x^2-1}\right)}{\left(x-\sqrt{x^2-1}\right)\left(x+\sqrt{x^2-1}\right)} + \frac{\left(x-\sqrt{x^2-1}\right)\left(x-\sqrt{x^2-1}\right)}{\left(x+\sqrt{x^2-1}\right)\left(x-\sqrt{x^2-1}\right)} = 34$

$\Rightarrow \frac{x^2+x^2-1+2x\sqrt{x^2-1}+x^2+x^2-1-2x\sqrt{x^2-1}}{x^2-x^2+1} = 34$

$\Rightarrow 2x^2 + 2x^2 - 36 = 0 \Rightarrow 4x^2 = 36$

$\Rightarrow x = 3$

35. (A) Put a = 2 and b = 0
$4(2) + 4(2)(0) + 4(0) = 8$
and, $2(2) + 2(0) + 2(0) = 4$
$\therefore ab = 2 \times 0 = 0$

36. (C) According to question,
$116 - x = x - 88$
$\Rightarrow 2x = \frac{204}{2}$
$\Rightarrow x = 102$
Selling price an 25% profit
$= \frac{102 \times 125}{100} = ₹127.5$

37. (B)
$A + B - 20 \xrightarrow{3}$
$B + C - 15 \xrightarrow{4} 60$
$C + A - 12 \xrightarrow{5}$
$2(A + B + C) = 12$
$A + B + C = 6$
efficiency of $A = A + B + C - B - C = 6 - 4 = 2$
After increasing his efficiency 50% = 3
$\therefore$ Required time taken $\frac{60 \times 2}{3} = 40$ days

38. (A) $\sqrt[3]{8000} \longrightarrow \sqrt[3]{9261}$
$20 \qquad 21$
Required rate $= \frac{1}{20} \times 100 = 5\%$

39. (D) $\cos 75° = \cos(30° + 45°)$
We know that,
$\cos(A + B) = \cos A \cos B - \sin A \sin B$
$\Rightarrow \cos(30° + 45°)$
$= \cos 30° \cos 45° - \sin 30 \sin 45°$
$= \frac{1}{\sqrt{2}}\left(\frac{\sqrt{3}}{2} - \frac{1}{2}\right) = \frac{\sqrt{3} - 1}{2\sqrt{2}}$

40. (C) Total run scored in 50 innings = 50 × 60
= 3000 run
Run scored in 48 innings = 55 × 48
= 2640 run
Run scored in 2 innings = 3000 – 2640
= 360 run
Let lowest inning is x run
$\therefore x + x + 158 = 360$
$\Rightarrow 2x = 360 - 158 = 202$
$\Rightarrow x = 101$ run

41. (A)

Price	Number			
$5_{\times 20}$	$3_{\times 20}$	100	60	CP of 120 = 184
$7_{\times 12}$	$5_{\times 12}$	84	60	
$6_{\times 15}$	$4_{\times 15}$	90	60	SP of 120 = 180

$\therefore \text{loss}\% = \frac{4}{184} \times 100 = 2\frac{4}{23}\%$

42. (B) A.T.Q
$\Rightarrow \frac{7}{2} - \frac{10}{3} = \frac{21 - 20}{6} = \frac{1}{6}\%$
Required amount $= 18000 \times \frac{1}{600} = ₹ 30$

43. (D) Let C invest = ₹ x
$\therefore B = x + 12000$
$A = x + 12000 + 7000 = x + 19000$
Now, $3x + 31000 = 85000$
$\Rightarrow 3x = 54000$
$\Rightarrow x = 18000$
Investment of A = 18000 + 19000 = ₹ 37000
B = ₹ 18000 + 12000 = ₹ 30000
C = ₹ 18000
Ratio of their profit
37 : 30 : 18
Hence, profit of C $= \frac{34000 \times 18}{85} = ₹ 7200$

44. (A) A.T.Q
$\Rightarrow \frac{5}{100} = \frac{1}{20}$

21×20	21×21
400	441
420	441
400	441
820	882

instalment same
820 units = 16400
441 units $= \frac{16400}{820} \times 441 = ₹8820$
$\therefore$ Amount of each instalment = ₹ 8820

45. (C) Let AP = x m
$\tan(90° - \theta) = \frac{20\sqrt{3}}{x}$
$\cot\theta = \frac{20\sqrt{3}}{x}$ ..... (i)
Similarly,
$\tan(\theta) = \frac{20\sqrt{3}}{(x + 40)}$ ..... (ii)
Multiplying equation (i) and (2),
$\cot\theta \cdot \tan\theta = \frac{20\sqrt{3}}{x} \cdot \frac{20\sqrt{3}}{(x + 40)}$
$\Rightarrow 1 = \frac{400 \times 3}{x^2 + 40x} \Rightarrow x^2 + 40x - 1200 = 0$
$\Rightarrow x^2 + 60x - 20x - 1200 = 0$
$\Rightarrow x(x + 60) - 20(x + 60) = 0$
$\Rightarrow x = 20$ m
Distance from point P to Building is 20 meter

46. (A) Let the distance between his house and his school = x km

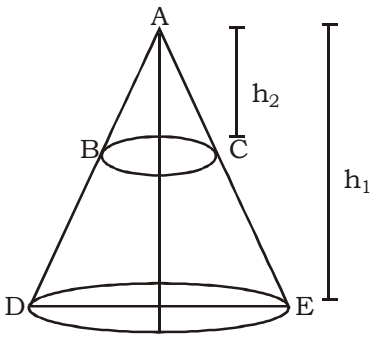
A.T.Q,

$$\frac{x}{3} - \frac{x}{4} = \frac{10}{60}$$

$$\Rightarrow \frac{x}{12} = \frac{10}{60}$$

Distance of his school from house = 2 km

47. (C)



$$\frac{\text{Volume of cone ABC}}{\text{Volume of BCDE}} = \frac{1}{1}$$

$$\frac{\text{Volume of ADE}}{\text{Volume of ABC}} = \frac{2}{1}$$

$$\left(\frac{\text{Height of cone } (h_1)}{\text{Height of cone } (h_2)}\right)^3 = \frac{2}{1}$$

$$\therefore \frac{h_1}{h_2} = \frac{\sqrt[3]{2}}{1}$$

$$\therefore \frac{h_1}{h_2} - 1 = \frac{\sqrt[3]{2}}{1} - 1$$

$$\therefore h_1 - h_2 : h_2 = \sqrt[3]{2} - 1 : 1$$

$$\therefore h_2 : h_1 - h_2 = 1 : \sqrt[3]{2} - 1$$

48. (A) A.T.Q

Milk : Water

(3 : 2 = 5)$_{\times 7 \times 3}$

(4 : 3 = 7)$_{\times 5 \times 4}$

(5 : 2 = 7)$_{\times 5 \times 5}$

63 : 42

80 : 60

125 : 50

268 : 152

67 : 38

49. (A) Let the number are p, q, r, s .....

New numbers = (p + 2), (q + 4), (r + 8) .....

Average of new numbers

$$= \frac{(p+2)+(q+4)+(r+8)}{n} \ldots$$

$$= \left(\frac{p+q+r+s}{n} \ldots\ldots\right) + \left[\frac{2+4+8+16}{n} \ldots\ldots\right]$$

$$= a + \frac{\text{sum of progression in } G.P}{n}$$

$$= a + \frac{\left(2\left(2^n - 1\right)\right)}{2-1} / n = a + \frac{\left(2\left(2^n - 1\right)\right)}{n}$$

50. (B) A.T.Q

$\cos^2\theta + \cos^4\theta = 1$

$\Rightarrow \cos^4\theta = 1 - \cos^2\theta$

$\Rightarrow \cos^4\theta = \sin^2\theta$

Now, $\tan^2(\tan^2 + 1)$

$$\frac{\sin^2\theta}{\cos^2\theta} \times \frac{1}{cos^2\theta} = \frac{\sin\theta}{\sin\theta} \times \frac{1}{\sin\theta} = 1$$

51. (B) CP of total weight = 3 × 30 + 48 × 5 = ₹ 330

SP of total weight = 3 × 45 + 5 × 60

= 135 + 300 = ₹ 435

$$\therefore \text{Profit \%} = \frac{105}{330} \times 100 = 31.82\%$$

52. (A) Volume of Ist sphere = $\frac{4}{3}\pi(1)^3$ cm^3

Volume of 2nd sphere = $\frac{4}{3}\pi(6)^3$ cm^3

$= 216.\frac{4}{3}\pi$ cm^3

Let the inner radius of new sphere = a cm

$$\therefore \frac{4}{3}\pi(9)^3 - \frac{4}{3}(a)^3 = \frac{4}{3}\pi + \frac{4}{3}\pi 216$$

$$\Rightarrow \frac{4}{3}\pi(729 - a^3) = 217.\frac{4}{3}\pi$$

$\Rightarrow a^3 = 512$

$\Rightarrow a = 8$ cm

$\therefore$ Thickness = 9 – 8 = 1 cm

53. (D) Total age of 30 students = $30 \times \frac{43}{3}$

= 430 years

Total age of 35 students = $35 \times \frac{55}{4}$

$= \frac{1925}{4}$ years

Total age of new 5 students = $\frac{1925}{4} - 430$

$= \frac{1925 - 1720}{4} = \frac{205}{4}$ years

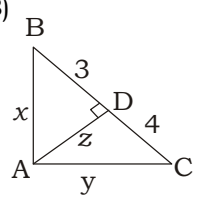
Total of 4 students = $\frac{205}{4} - \frac{119}{12}$

$= \frac{124}{3}$ years

$$\therefore \text{Average of 4 students} = \frac{124}{3 \times 4}$$

$= \frac{31}{3} = 10$ years 4 months.

54. (B)



Length of AD = $\sqrt{BD \times CD}$

$\Rightarrow$ Length of AD = $2\sqrt{3}$ cm

55. (D) Volume of the cubical tank = $a^3 = (1.2)^3$ = 1.728 cm^3

A.T.Q

Total number of buckets to fill the tank

$= \frac{64}{2} \times 3 = 96$ buckets

$\therefore$ Volume of one bucket = $\frac{1.728 \times 100}{96}$

= 1.8 litre

56. (A) Perimeter of equilateral triangle = circumference of circle

$3a = 2\pi r$ a : side of triangle, r : radius of circle

$\Rightarrow r = \frac{3a}{2\pi}$

Now, $\frac{\sqrt{3}}{4}a^2 : \pi\left(\frac{3a}{2\pi}\right)^2$

$\Rightarrow \frac{\sqrt{3}}{4}a^2 : \frac{\pi.9a^2}{4\pi^2} \Rightarrow 22 : 21\sqrt{3}$

57. (B) $a = 2 + \sqrt{5} \Rightarrow \frac{1}{a} = \sqrt{5} - 2$

$\Rightarrow a + \frac{1}{a} = 2 + \sqrt{5} + \sqrt{5} - 2 = 2\sqrt{5}$

$\Rightarrow \left(a + \frac{1}{a}\right)^2 = 4 \times 5 = 20$

$\therefore a^2 + \frac{1}{a^2} = 20 - 2 = 18$

58. (C) Let the number of students of A, B and C is x, y and z respectively.

$\therefore$ Total number of marks obtained by class A = $83x$

By class B = $76y$ and $C = 85z$

Average of class A and class B is 79.

$\therefore \frac{83x + 76y}{(x+y)} = 79$

$\Rightarrow 83x + 76y = 79x + 79y$

$\Rightarrow 4x = 3y$ ..... (i)

Average score of B and C is 81

$\therefore \frac{76y + 85z}{y+z} = 81$

$\Rightarrow 5y = 4z$ ..... (ii)

$\Rightarrow 5x = 3z$ ..... (iii)

$\therefore x : y : z = 3 : 4 : 5$

Average score of class A, B and C

$\Rightarrow \frac{(83 \times 3 + 76 \times 4 + 85 \times 5)}{(3+4+5)}$

$\Rightarrow \frac{249 + 304 + 425}{12}$ = 81.5 marks

59. (A) A.T.Q

$$\frac{9x - 32 \times \frac{9}{16}}{7x - 32 \times \frac{7}{16} + 10} = \frac{3}{4}$$

$\Rightarrow \frac{9x - 18}{7x - 4} = \frac{3}{4}$

$\Rightarrow 36x - 72 = 21x - 12$

$\Rightarrow 15x = 60$

$\Rightarrow x = 4$

Quantity of P in initial mixture

= 9 × 4 = 36 litre

60. (A) A.T.Q

Area of the isosceles triangle = $\frac{1}{2} \times a^2 \times \sin\theta$

$= \frac{1}{2} \times 10 \times 10 \times \sin 60°$

$= 50 \times \frac{\sqrt{3}}{2} = 25\sqrt{3}\ cm^2$

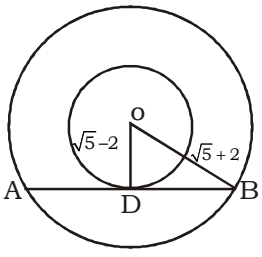
61. (C) Sum is Ist six numbers = 45 × 6 = 270

$\Rightarrow$ Sum of last six numbers = 52 × 6 = 312

$\Rightarrow$ First number = sum of Ist six numbers – (sum last six numbers – last number)

$\therefore$ First number = 270 – (312 – 55) = 13

62. (B)



In right angle triangle DOB

$OB^2 - OD^2 = DB^2$

$\Rightarrow \left(\sqrt{5}+2\right)^2 - \left(\sqrt{5}-2\right)^2 = DB^2$

$\Rightarrow 5 + 4 + 4\sqrt{5} - 5 - 4 + 4\sqrt{5} = DB^2$

$\Rightarrow 8\sqrt{5} = DB^2$

$\Rightarrow DB = \sqrt{8\sqrt{5}}\ cm = 2\left(2\sqrt{5}\right)^{1/2}$

$\therefore AB = 4\left(2\sqrt{5}\right)^{\frac{1}{2}}\ cm$

63. (C) A.T.Q

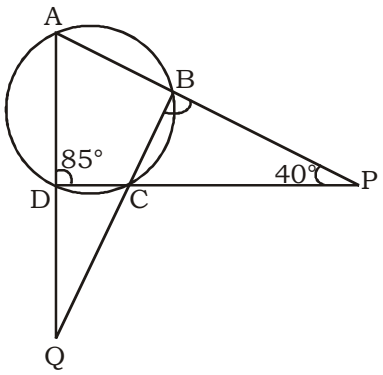
$\Rightarrow$ CP = 100

$\Rightarrow$ SP = 120

$\Rightarrow$ MP = $\frac{120\times100}{75}$ = 160

$\therefore$ Required gain = $\frac{60\times100}{100}$ = 60%

64. (A) A.T.Q



$\angle ADC = 85°$ ..... (i)

$\angle BPC = 40°$

In quadrilateral ABCD,

$\angle ADC = \angle CBP$ (exterior angle of cyclic quadrilateral is equal to interior opp. angle)

In ΔBCP,

$180° - (\angle CBP + \angle BPC) = \angle PCB$

$\Rightarrow \angle PCB = 180° - 85° - 40° = 55°$

$\Rightarrow \angle PCB = \angle DCQ$ (vertically opposite)

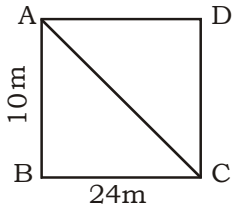
$\Rightarrow \angle CDQ = 180° - 85° = 95°$

$\Rightarrow \angle CQD = 180° - \angle CDQ - \angle DCQ$

$= 180° - 95° - 55°$

$\angle CQD = 30°$

65. (B)



According to question,

In right angle triangle ABC,

$AC^2 = AB^2 + BC^2 = 100 + 576$

$\Rightarrow AC^2 = 676$

$\Rightarrow AC = 26$ m

$\therefore$ perimeter of $\Delta ADC = 25 + 25 + 26 = 76$ m

$\Rightarrow S = \frac{76}{2}$ = 38 m

Area of $\Delta ADC = \sqrt{S(S-25)(S-25)(S-26)}$

$= \sqrt{38(13)(13)(12)} = 26\sqrt{114}$ m^2

Area of $\Delta ABC = \frac{1}{2}\times 10 \times 24 = 120$ m^2

Area of Plot = $120 + 26\sqrt{114}$ m^2

$= 2\left(60 + 13\sqrt{114}\right)$ m^2

66. (A) According to question,

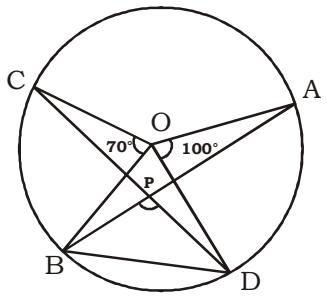
$= x^5 - 17x^4 + 17x^3 - 17x^2 + 17x - 1$

$= x^5 - x^4 - 16x^4 + 16x^3 + x^3 - x^2 - 16x^2 + 16x + x - 1$

$= x^4(x-16) - x^3(x-16) + x^2(x-16) - x(x-16) + x - 1$

$= 0 + 16 - 1 = 15$

67. (D) A.T.Q



$\angle AOD = 2\angle ABD$ (angle subtended by an arc at the center is double of angle subtended at any point of circle)

$\Rightarrow \angle BOC = 2\angle CDB$

$\therefore \angle ABD = 50°$

and, $\angle CDB = 35°$

In ΔBPD,

$\angle BPD = 180° - \angle PBD - \angle PDB$

$\Rightarrow \angle BPD = 180° - 85° = 95°$

and, $\angle BPD = \angle APC$

(Vertically opposite angles)

$\therefore \angle APC = 95°$

68. (B) A.T.Q

gain of 12% = $\frac{12}{100} = \frac{3}{25}$

loss of 4% = $\frac{4}{100} = \frac{1}{25}$

	CP	SP		
Ist	$25\times_6$	$28\times_6$	$\times6$	168
2nd	$25\times_7$	$24\times_7$	$\times7$	
150		168		
175		168		
325		336		

$\therefore$ Profit % = $\frac{11}{325}\times 100 = \frac{44}{13} = 3\frac{5}{13}\%$

69. (B) A.T.Q

Water filled in tank in 1 min. $= \frac{x}{24} + \frac{x}{40} - 30$

$\Rightarrow 60\left(\frac{x}{24} + \frac{x}{40} - 30\right) = x$

$\Rightarrow \frac{x}{24} + \frac{x}{40} - \frac{x}{60} = 30$

$\Rightarrow \frac{5x + 3x - 2x}{120} = 30$

$\Rightarrow x = \frac{120 \times 30}{6}$ = 600 gallons

70. (C) A.T. Q

Let the cost price of watch = ₹ x

$\therefore \frac{x - 21}{x} \times 100 = x$

$\Rightarrow x^2 - 100x + 2100 = 0$

$\Rightarrow x - 70x - 30x + 2100 = 0$

$\Rightarrow x = 70$ and $x = 30$

$\therefore$ Cost price of watch = ₹ 70 or ₹ 30

71. (B) A.T.Q

$\sqrt{16 \times 4} = \sqrt{64} = 8$

Hence, A and B complete the work in 8 days.

72. (B) A.T.Q

Let the speed of boy in still water is x km/hr in time t hour

$(x + 3)\, t = 2(x - 3)t$

$\Rightarrow x + 3 = 2x - 6$

$\Rightarrow x = 9$ km/hr

73. (D) A.T.Q

sum of square of n numbers

$= \frac{n(n+1)(2n+1)}{6}$

$n = 19$

$\Rightarrow 10^2 + 11^2 + \ldots\ldots + 19^2 = 1^2 + 2^2 + 3^2 \ldots$

$19^2 - (1^2 + 2^2 + 3^2 \ldots\ldots 9^2) = 2470 - 285$

$= 2185$ cm^2

Hence, sum of the Area of given 10 squares is 2185 cm^2

74. (C) A.T.Q

Tank filled by pipe A = 6 × 3 = 18 hours

Tank filled by pipe B = $\frac{6 \times 3}{2}$ = 9 hours

A + B fill the tank = $\begin{matrix} 18 \\ 9 \end{matrix} \diagdown\!\!\diagup \begin{matrix} 1 \\ 2 \end{matrix}$ 18 = 6 hours

$\begin{matrix} \text{A + B} - 6 \\ \text{A + B + C} - 9 \end{matrix} \diagdown\!\!\diagup \begin{matrix} 3 \\ 2 \end{matrix}$ 18

$\therefore$ Time taken to empty the tank

$= \frac{18}{(3-2)}$ = 18 hours.

75. (C) A.T.Q

M.R.P = 750

$\therefore$ CP = $\frac{750 \times 100 \times 100}{150 \times 125}$ = ₹400

Now taking option (c)

$\begin{matrix} \text{S.P.} = 500 \\ \text{C.P.} = 400 \end{matrix} \diagdown\!\!\diagup$ Profit = 100

SP by 20% = $\frac{500 \times 120}{100}$ = 600

CP = 400

Profit = 200

Hence option (c) is correct.

76. (D)

77. (B) A.T.Q

$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\frac{1 \times 50 \times 15}{1} = \frac{2 \times D_2 \times 6}{2}$ = 125 days

78. (B) A.T.Q

$x + \frac{x + 4 \times 5}{100} = 600$

$\Rightarrow 6x = 600 \times 5$

$\Rightarrow x = 500$

$\Rightarrow$ Required discount = 600 – 500 = ₹100

79. (B) (P + R = 37) ×2

2P = 55

2P + 2R = 74 ..... (i)

2P = 55 ..... (ii)

Subtract equation (ii) from equations (i), we get

2R = 19

19 min. will be taken to ride both ways.

80. (A) Let the total weight of body is x kg.

Ratio between weight of protein in bones and other dry elements in skin is

$\Rightarrow \left(x \times \frac{1}{6}\right) \times \frac{16}{100} : \left(x \times \frac{1}{10}\right) \times \frac{14}{100}$

$\Rightarrow$ 40 : 21

81. (D) A.T.Q

$\Rightarrow \frac{1}{10} \times 100 = 10\%$

$\Rightarrow \frac{1}{6} \times 100 = \frac{50}{3}\%$

Now, $\frac{50}{3} + 10 = \frac{80}{3}\%$

$\therefore$ Required angle = $360 \times \frac{80}{3} \times \frac{1}{100}$

= 96°

82. (B) A.T.Q
Quantity of water in human body
$= \frac{80\times70}{100} = 56$ kg

83. (A) Part made of neither skin nor hormones and enzymes $= \left[1-\left(\frac{1}{10}+\frac{2}{5}\right)\right] = \frac{1}{2}$

84. (A) Let the weight of body = x kg
The weight of other dry elements in bones $= \left[\left(x\times\frac{1}{6}\right)\times\frac{14}{100}\right]$
$\Rightarrow$ Required % $= \frac{100}{x}\left(\frac{x}{6}\times\frac{14}{100}\right) = 2\frac{1}{3}\%$

85. (A) Circumference of circle = $2\pi r$
$= 2\times\frac{22}{7}\times35 = 220$ cm
Distance cover in 1 sec = 220 × 9
= 1980 cm
Speed of the car = 1980 cm/s

86. (C) A.T.Q
Time taken to cover distance of 15 km = 20 minutes
$\therefore$ Speed of train $= \frac{15}{20}\times60 = 45$ km/hr
Speed after decreasing = 45 – 5 = 40 km/hr
Now,
Time taken by train $= \frac{15}{40}\times60$
$= \frac{45}{2}$ minutes $= 22\frac{1}{2}$ minutes

87. (D) Let the original speed = x km/hr
A.T.Q,
$\frac{x(x+5)}{5}\times\frac{20}{60} = \frac{x(x-3)}{3}\times\frac{20}{60}$
$\Rightarrow 3x + 15 = 5x - 15$
$\Rightarrow 2x = 30$
$\Rightarrow x = 15$ km/h
$\therefore$ Required distance $= \frac{15(15+5)}{5}\times\frac{20}{60}$
= 20km

88. (C) According to question
3 Pens + 5 pencils = 30 ..... (i)
5 pens + 3 pencils = 34 ..... (ii)
Multiplying (1) by 3 and (2) by 5
9 pens + 15 pencils = 90
25 pens + 15 pencils = 170
– – –
– 16 pens = – 80
cost of one pen = ₹5

89. (B) According to question,
Let $x = 90°$ and other angle is y.
$x + y = 180°$
$y = 90°$

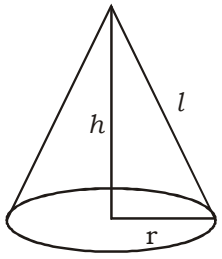
90. (C) We know that,
A + B + C = 90°, Put A = B = C = 30°
tan60° + tan60° + tan60°
$= \frac{1}{\sqrt{3}}+\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{3}} = \frac{1+1+1}{\sqrt{3}} = \frac{3}{\sqrt{3}} = \sqrt{3}$

91. (A) According to question,
$(43)^{17}-1$
when $(x^n - a^n)$ it is exactly divisible by $(x - a)$
$\therefore$ $(43)^{17}-(1)^{17}$ is exactly divided by (43–1)
and, (43 – 1) = 42
and, 42 is multiple of 7.
Hence, $(43)^{17}-1$ is divided by 7.

92. (C) Area of trapezium $= \frac{1}{2}$(sum of parallel sides) × height $= \frac{1}{2}(25 + 17)\times15$
$= \frac{1}{2}\times42\times15 = 315$ cm^2

93. (D) According to question
$2^{12x} - 6^{4x}$
$(2^3)^{4x} - 6^{4x}$
$\Rightarrow 8^{4x} - 6^{4x}$
$\Rightarrow (8^2)^{2x} - (6^2)^{2x}$
$\Rightarrow 64^{2x} - 36^{2x}$ $(x = 1)$
$\Rightarrow 64^2 - 36^2$
$\Rightarrow (64 + 36)(64 - 36)$
$\Rightarrow 100\times28$
Required number is 100

94. (C) A.T.Q



Radius of semi circle will be become slant height of cone.
Circumference of semi circular sheet = circumference of cone
$\Rightarrow \pi R = 2\pi r$
$\Rightarrow \pi(18) = 2\pi r$
$\Rightarrow r = 9$
$\Rightarrow r = 9$ cm
$\Rightarrow$ slant height = 18 cm

$\Rightarrow$ height = $l^2 - r^2 = 324 - 81 = 243$

$\Rightarrow h = \sqrt{243} = 9\sqrt{3}$ cm

$\therefore$ Volume of cone = $\frac{1}{3} \times \pi \times 9 \times 9 \times 9\sqrt{3}$

$= 420.80\,\pi$ cm^3

95. (A) According to question,

a = 11, b = 9

$\Rightarrow$ a + b = 11 + 9 = 20

and, $a^3 - b^3 = (11)^3 - (9)^3 = 1331 - 729 = 602$

$\therefore$ a – b = 11 – 9 = 2

96. (D) According to question

$\Rightarrow$ Percentage increase

$= \left(\frac{3360 - 2520}{2520}\right) \times 100$

$= \frac{840}{2520} \times 100$

$= \frac{100}{3}\% = 33\frac{1}{3}\%$

97. (B) A.T.Q

$\frac{5040}{3360} = 1.5$

98. (A) (1997-98) year has the maximum foreign exchange reserves

99. (C) According to question

For 1992-93 = $\left[\frac{(3720 - 2640)}{2640} \times 100\right]\%$

$= 40.91\%$

1994 – 95 = $\left[\frac{(3360 - 2520)}{2520} \times 100\right]\%$

$= 33.33\%$

1996 – 1997 = $\left[\frac{(4320 - 3120)}{3120} \times 100\right]\%$

$= 38.46\%$

1997 – 1998 = $\left[\frac{(5040 - 4320)}{4320} \times 100\right]\%$

$= 16.67\%$

100. (B) According to question,

Average of the foreign exchange reserves over the period under review = [1/8 (2640 + 3720 + 2520 + 3360 + 3120 + 4320 + 5040 + 3120)] = 3480

Foreign exchange reserves in 1991-92 = 2640

$\therefore$ Required percentage = $\frac{2640}{3480} \times 100 = 75.8\%$

Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts. Join the group and you may also share your suggestions and experience of Sunday Mock

Note:- If you face any problem regarding result or marks scored, please contact 9313111777