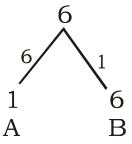
MATHS (TIER II) MOCK TEST-13 (SOLUTION)

1. (B) Let $\theta = 30°$

$$7 \times \left(\frac{1}{2}\right)^2 + 3 \times \left(\frac{\sqrt{3}}{2}\right)^2 = 4$$

So, $\tan 30° = \frac{1}{\sqrt{3}}$

2. (A)



$$\frac{6}{6-1} \times 60 \text{ min} = 72 \text{ min}$$

Required time = 7 :30 + 72 = 7:42am

3. (A) $\frac{(\sin A + \cos A)^2 + (\sin A - \cos A)^2}{(\sin A - \cos A)(\sin A + \cos A)}$

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

4. (C) $1x \times 4x = 21 \times 81$

$x = 21$

Larger number = 21 ×4 = 84

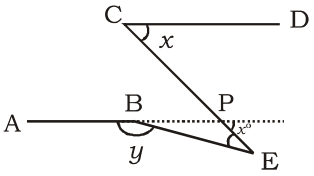
5. (A) $\frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}}$

$$= \frac{(3^5)^{0.13} \times (3^5)^{0.07}}{(7)^{0.25} \times (7^2)^{0.075} \times (7^3)^{0.2}}$$

$$= \frac{3^{0.65} \times 3^{0.35}}{7^{0.25} \times 7^{0.150} \times 7^{.06}}$$

$$= \frac{3^{(0.65+0.35)}}{7^{(0.25+0.150+0.6)}} = \frac{3^1}{7^1} = \frac{3}{7}$$

6. (D)



$\angle PBE = 180° - y$

$x° = 180° - y + \angle CEB$

$\angle CEB = x + y - \pi$

7. (B) $33(a + b) = 528$

$a + b = 16$

So, pairs are (1, 15), (3, 13), (5, 11), (9, 7).

8. (D) Initial bowling average = 12.4

After improving bowling average by 0.2, new bowling average = 12.4 – 0.2 = 12.2

Now, let x be the number of wickets taken before the last match

So, A.T.Q,

$$= \frac{12.4x + 26}{x + 4} = 12.2$$

or $12.4x + 26 = 12.2x + 48.8$

$\Rightarrow 0.2x = 22.8$

$$\Rightarrow x = \frac{22.8}{0.2} = 114$$

$\Rightarrow$ No. of wickets taken before the last match = 114

9. (A) Required distance = $\sqrt{(4-7)^2 + (-1-3)^2}$

$= \sqrt{9+16} = 5$ unit

10. (A) $\frac{x^2 + 2x + x + 2}{x^2 + 4x + 3x + 12} = \frac{x+3}{x+7}$

$$\Rightarrow \frac{x^2 + 3x + 2 + 3}{x^2 + 7x + 12} = \frac{x+3}{x+7}$$

$x^3 + 3x^2 + 2x + 7x^2 + 21x + 14 = x^3 + 7x^2 + 12x + 3x^2 + 21x + 36$

$x^3 + 10x^2 + 23x + 14 = x^3 + 7x^2 + 12x + 3x^2 + 21x + 36$

$$-\frac{22}{10} = x$$

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

11. (A) Ratio of first and second class fares = 3:1

and Ratio of no. of passengers = 1 : 50

$\Rightarrow$ Ratio of total amount from 1st & 2nd class passengers

= 3 × 1 : 1 × 50 = 3 : 50

So, Amount collected from 2nd class passengers = $\left(\frac{50}{52} \times 1325\right)$ = ₹1250

12. (C)

13. (A)

Age	$\sqrt{\text{Age}}$	height
9 yr.	$\sqrt{9} = 3$	4 ft.
(9+7) yr.=16 yr	$\sqrt{16} = 4$	$\frac{4}{3} \times 4$ ft

$$= 5\frac{1}{3} \text{ ft}$$

14. (B) $\frac{2x-6}{3x}=\frac{2}{3}\times\frac{2}{3}$

$18x - 54 = 12x$

$6x = 54$

$x = 9$

$2x = 9 \times 2 = 18$

15. (C) $x + y = 14$

$\underline{x - y = 10}$

$2x = 24$

$x = 12$

$y = 2$

$xy = 12 \times 2 = 24$

16. (D) Let the printed price of the book = ₹ x.

So, Selling price = 90% of x

$= ₹ \frac{9x}{10}$

Now, if the CP of the book = ₹ y. (let)

Then, A.T.Q,

$y \times \frac{112}{100} = \frac{9x}{10}$

or, $\frac{y}{x}=\frac{9}{10}\times\frac{100}{112}=\frac{45}{56}$

Required ratio = 45 : 56

17. (B) $1 = \frac{1\times R\times 8}{100}$

$R = 12\frac{1}{2}\%$

18. (D) $\frac{CP}{SP}=\frac{1300}{1500}\overset{\times\ 112}{\underset{100}{\curvearrowright}}=1680$

$= \frac{380}{1300} \times 100$

$= 29\frac{3}{13}\%$

19. (C) Required time = $\frac{180}{15}$ = 12 hrs

Required distance = 12 × (80+95)

= 2100 km

20. (A) 20% I + 10% II – 10% I – 20% II = 5

10% I – 10% II = 5

10% (I – II) = 5

100% (1 – II) = 50

21. (A) $\frac{x^{ba}}{x^{ca}}\times\frac{x^{cb}}{x^{ab}}\times\frac{x^{ac}}{x^{bc}}$

$\frac{x^{ba+cb+ac}}{x^{ca+ab+bc}} = x^o = 1$

22. (C) Distance between circumcentre and incentre = $\sqrt{R^2 - 2Rr}$

$R = \frac{5}{2}$, r = 1

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

$= \sqrt{\frac{25}{4}-\frac{10}{2}} = \frac{\sqrt{5}}{2}$ cm

23. (C) $l \to 5 : 3$

$5 \to 6 : 5$

$t \to \frac{5}{6}\ \frac{3}{5}$

t : 25 : 18

$S = \frac{t}{5}\ t = \frac{l}{5}$

t = 25 : 18

24. (A) LCM of 4, 6, 8 and 14 = 168

Required time = 12:00 + 168 sec

= 12 : 02 : 48

25. (*) A : B = 1000 : 960

$\underline{\text{B : C} = 1000 : 950}$

A : B : C = 10000 : 9600 : 9120

A : C = 500 : 456

= 44 m

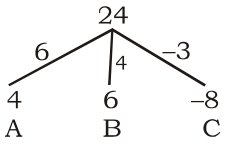
26. (C) $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta}$

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

$= \left\{\begin{matrix}1-2\sin^2\theta = 2\cos^2\theta - 1\\ = \cos^2\theta\end{matrix}\right\}$

$= \tan\theta$

27. (B)



Required time = $\frac{24}{10-3} = 3\frac{3}{7}$ hrs

28. (B) $2(\cos^2\theta - \sin^2\theta) = 1$

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

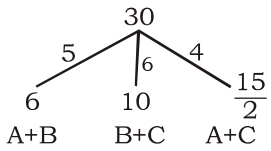
$\Rightarrow 2\sin^2\theta = 1 - \frac{1}{2}$

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

$\sin\theta = \frac{1}{2} = \sin 30^\circ$

$\theta = 30^\circ$

29. (D)



$2(A+B+C) = \frac{30}{12}$

$A + B + C = 5$ hrs

$C = \frac{30}{6-5} = 30$ hrs

$A = \frac{30}{6-3} = 10$ hrs

$B = \frac{30}{6-4} = 15$ hrs

30. (B) Ratio of speed = 3 : 5
Ratio of time = 5 : 3
P will run = 500 – 200 = 300 m,

$t = \frac{300}{3} = 100$ Sec

Q will run = 500 m,

$t = \frac{500}{5} = 100$ Sec

So, Both reach at the same time

31. (C) Required time = $\frac{3 \times 20}{1} = 60$ min

32. (D) $A = P\left(1+\frac{r}{100}\right)$

$\Rightarrow 68921 = 64000\left(1+\frac{5}{2\times 100}\right)^t$

$\Rightarrow \frac{68921}{64000} = \left(1+\frac{5}{200}\right)^t$

$\Rightarrow \left(\frac{41}{40}\right)^3 = \left(1+\frac{5}{200}\right)^t = \left(\frac{41}{40}\right)^t$

$t = 3$ half years $= 1\frac{1}{2}$ year

33. (D) Let time taken by A be t and speed of B is x.

$t = \frac{1000}{8\times\frac{5}{18}}$

$t + 15 = \frac{950}{x}$

$\frac{1000\times 18}{40} + 15 = \frac{950}{x}$

$x = 7.4$ km/hr (app.)

34. (C) Required Area = $\frac{\theta}{360^\circ}\pi r_1^2 - \frac{\theta}{360^\circ}\pi r_2^2$

$= \frac{45^\circ}{360^\circ}\pi\times 4^2 - \frac{45^\circ}{360^\circ}\pi\times 3^2$

$= \frac{45^\circ}{360^\circ}\times\pi(16-9)$

$= \frac{45^\circ}{360^\circ}\times\frac{22}{7}\times 7$

$= \frac{11}{4}$ m²

35. (A) Let total number of employees be 100%
Male = 40%, Female = 60%
Tall = 50%, Short = 50%
Male (short) = 4%
ATQ, 30% + 40 = 50%
40 = 20%
30% = 60

36. (B) $x = \sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}}}$

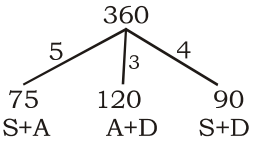
$x^2 = 7^{\frac{1}{2}} \times 7^{\frac{1}{2}\times\frac{1}{2}} \times 7^{\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}} \times 7^{\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}}$
$\times 7^{\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}} \times 7^{\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}}$

$= 7^{\frac{1}{2}} \times 7^{\frac{1}{4}} \times 7^{\frac{1}{8}} \times 7^{\frac{1}{16}} \times 7^{\frac{1}{32}} \times 7^{\frac{1}{64}}$

$= 7^{\frac{32+16+8+4+2+1}{64}}$

$= 7^{\frac{63}{64}}$

37. (C)



$2(S + A + D) = \frac{360}{12}$

$S + A + D = 60$ days

38. (D) H.C.F. of $\frac{30}{10}, \frac{12}{10}, \frac{6}{100}$

$= \frac{\text{H.C.F. of } 30,12 \text{ and } 6}{\text{L.C.M. of } 10,10,100} = \frac{6}{100} = 0.06$

39. (C) $x^2 - 3x + 1 = 0$
$x^2 + 1 = 3x$
Divide by x both side

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

$\frac{x^6 + x^4 + x^2 + 1}{x^3} \Rightarrow x^3 + x + \frac{1}{x} + \frac{1}{x^3}$

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

$\Rightarrow (27 - 9) + 3$

$= 21$

40. (A) $\text{cosec}^4\alpha = 17 + \cot^4\alpha$

$\Rightarrow \text{cosec}^4\alpha - \cot^4\alpha = 17$

$\Rightarrow (\text{cosec}^2\alpha - \cot^2\alpha)(\text{cosec}^2\alpha + \cot^2\alpha) = 17$

$\Rightarrow 1 \times \left(\frac{1+\cos^2\alpha}{\sin^2\alpha}\right) = 17$

$\Rightarrow 1 + 1 - \sin^2\alpha = 17\sin^2\alpha$

$\Rightarrow 2 = 18\sin^2\alpha$

$\Rightarrow \sin^2\alpha = \frac{2}{18} = \frac{1}{9}$

$\Rightarrow \sin\alpha = \frac{1}{3}$

41. (C) $x = 9999$

$$\frac{4x^3 - x}{(2x+1)(6x-3)} = \frac{x(4x^2-1)}{3(2x+1)(2x-1)}$$

$$= \frac{x(4x^2-1)}{3(4x^2-1)} = \frac{x}{3}$$

$$= \frac{9999}{3} = 3333$$

42. (B) $\frac{K}{6} \neq \frac{1}{2}$; $K \neq 3$

43. (A) According to question

If $x = 5$

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

$\Rightarrow \left(x - \frac{1}{x}\right)^2 + \left(5 - \frac{1}{5}\right)^2$

$= \left(\frac{24}{5}\right)^2 = \frac{576}{25}$

44. (C) $4B + 3P = 8B + 1P$

$2P = 4B \Rightarrow 2P + 3P = 5P$

$6B + 2P = 6 \times \frac{2}{4}P + 2P = 5P$

45. (A) $\frac{1\times(\sqrt{2}-1)}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots.$

$$\frac{1}{\sqrt{99}+\sqrt{100}}$$

$\sqrt{2} - 1 + \sqrt{3} - \sqrt{2} + \sqrt{4} - \sqrt{3} + \ldots.. \sqrt{100} - \sqrt{99}$

$= -1 + 10 = 9$

46. (C) Length of the largest rod

$= \sqrt{l^2 + b^2 + h^2}$

$= \sqrt{16^2 + 12^2 + \left(\frac{32}{3}\right)^2}$

$= 22\frac{2}{3}\text{m}$

47. (C) $\frac{4\frac{1}{7} - 2\frac{1}{4}}{3\frac{1}{2} + 1\frac{1}{7}} \div \frac{1}{2 + \frac{1}{2 + \frac{1}{5 - \frac{1}{5}}}}$

$$= \frac{\frac{29}{7} - \frac{9}{4}}{\frac{7}{2} + \frac{8}{7}} \div \frac{1}{2 + \frac{1}{2 + \frac{1\times5}{24}}}$$

$$= \frac{\frac{29\times4 - 9\times7}{28}}{\frac{7\times7 + 8\times2}{14}} \div \frac{1}{2 + \frac{1\times24}{48+5}}$$

$\Rightarrow \frac{\frac{53}{28}}{\frac{65}{14}} \div \frac{1\times53}{106+24} = \frac{53}{2\times65} \div \frac{53}{130} = 1$

48. (C) Total brass = 33 kg

$\text{copper} = \frac{33\times7}{11} = 21\text{ kg}$

$\text{zinc} = \frac{33\times4}{11} = 12\text{ kg}$

$\frac{\text{copper}}{\text{zinc}} = \frac{21}{12+6} = \frac{21}{18} = 7:6$

49. (A) If $\cos^2\theta + \cos^4\theta = 1$

find $\tan^2\theta + \tan^4\theta = 7$

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

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

Divide by both side $\cos^2\theta$

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

$\Rightarrow \cos^2\theta = \tan^2\theta$

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

50. (A) $4^{91}\left(1 + 4 + 4^2 + 4^3\right)$

$= 4^{91}(1 + 4 + 16 + 64)$

$= 4^{91}(85)$

$= 5 \times 17 \times 4^{91}$

Divisible by 17.

51. (A) $8^{\sin\theta} \cdot 16^{\cos\theta}$
$2^{3\sin\theta} \cdot 4^{\cos\theta}$
$\Rightarrow 2^{3\sin\theta} + 4\cos\theta$
($a\sin\theta + b\cos\theta$ mins $= -\sqrt{a^2+b^2}$)
$\Rightarrow 2^{-5}$

52. (B) Given, $x = 1+\sqrt{2}+\sqrt{3}$ .....(i)

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

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

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

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

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

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

$= 1+2\sqrt{3}$

53. (A) If $\sin\theta + \sin^2\theta = 1$
$\cos^4\theta + 3\cos^6\theta + 4\cos^8\theta + 3\cos^{10}\theta + \cos^{12}\theta = ?$
$(\cos^4\theta + 2\cos^6\theta + \cos^8\theta) + (\cos^6\theta + 3\cos^8\theta + 3\cos^{10}\theta + \cos 12\theta)$
$= (\cos^2\theta + 3\cos^6\theta)^2 + (\cos^2 + \cos^4\theta)^3$
$= 1 + 1 = 2$

54. (A) $x^2+y^2+z^2+2 = 2(y-x)$
$(x^2+2x+1)+(y^2-2y+1)+z^2 = 0$
$(x+1)^2 + (y-1)^2 + z^2 = 0$
$x = -1,\ y = 1,\ z = 0$
$\therefore\ x^3+y^3+z^3 = (-1)^3 + (1)^3 + 0^3$
$= -1+1+0 = 0$

55. (B) Divided = divisor × quotient + Remainder
Divisor = 16 × 25 = 5 × R

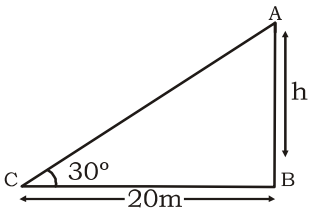
$$R = \frac{1}{5} \times 16 \times 25$$

Dividend

$$\left[(16\times 25)\times 16\right] + \frac{1}{5} \times 16 \times 25$$

$= [16 \times 25 \times 16] + 80$
$= 6480$

56.(B)



According to the question
Let the height of the telegraph pole = h

So, in ΔABC

$$\tan 30^\circ = \frac{h}{20}$$

$$h = \frac{20}{\sqrt{3}} = \frac{20}{3}\sqrt{3} = AB$$

$$\text{and } \cos 30^\circ = \frac{20}{AC}$$

$$AC = \frac{20\times 2}{\sqrt{3}} = \frac{40}{\sqrt{3}}$$

So, height of the pole = AB + AC

$$= \frac{20}{\sqrt{3}} + \frac{40}{\sqrt{3}} = \frac{60}{\sqrt{3}}$$

$$= \frac{60\sqrt{3}}{3} = 20\sqrt{3}$$

57. (A) $\sqrt[3]{4}$, $\sqrt[4]{6}$, $\sqrt[6]{15}$, $\sqrt[12]{245}$

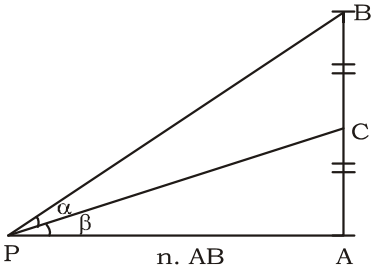
$\Rightarrow 4^{\frac{4}{12}}, 6^{\frac{1}{4}}, 15^{\frac{1}{6}}, 245^{\frac{1}{12}}$

take LCM of 3, 4,12 & 6

$\Rightarrow \sqrt[12]{4^4}$, $\sqrt[12]{6^3}$, $\sqrt[12]{15^2}$, $\sqrt[12]{245}$

Biggest = $\sqrt[3]{4}$

58. (A)



AP = n AB
Now:-

$$\tan\beta = \frac{\frac{AB}{2}}{AP} = \frac{\frac{AB}{2}}{n.AB} = \frac{1}{2n} \quad \text{... (i)}$$

Now:-

$$\Rightarrow \tan(\alpha+\beta) = \frac{AB}{AP} = \frac{AB}{n.AB} = \frac{1}{n}$$

$$\Rightarrow \frac{\tan\alpha+\tan\beta}{1-\tan\alpha.\tan\beta} = \frac{1}{n}$$

$$\Rightarrow \frac{\tan\alpha+\frac{1}{2n}}{1-\tan\alpha.\frac{1}{2n}} = \frac{1}{n}$$

$$\Rightarrow \frac{2n\tan\alpha+1}{2n-\tan\alpha} = \frac{1}{n}$$

$\Rightarrow \quad 2n^2 \tan\alpha + n = 2n - \tan\alpha$

$\Rightarrow \quad 2n^2 \tan\alpha + \tan\alpha = 2n - n$

$\Rightarrow \quad \tan\alpha\,[2n^2 + 1] = n$

$\therefore \quad \tan\alpha = \dfrac{n}{2n^2+1}$

59. (B) $\sqrt{1+x} = \sqrt{1+\dfrac{\sqrt{3}}{2}}$

$= \sqrt{\dfrac{2+\sqrt{3}}{2}}$

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

$= \dfrac{1}{2}(\sqrt{3}+1)$

$\dfrac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}} = \dfrac{\sqrt{3}+1+\sqrt{3}-1}{\sqrt{3}+1-\sqrt{3}+1} = \dfrac{2\sqrt{3}}{2}$

$= \sqrt{3}$

60. (D) $\angle DAE = \dfrac{180^\circ}{7} = 25^\circ$ (Approx.)

61. (B) $\sqrt[3]{2} - 1 = a\sqrt[3]{4} + b + \sqrt[3]{2} + C$

$a = 0$
$b = 1$
$c = -1$
$a + b + c = 0$
$c = -1$

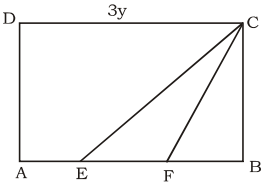
62. (D) 2.5 km/hr (+6) $\Rightarrow$ 15.0
3.5 km/hr (–6) $\Rightarrow$ 21.0
1 km/hr 36

Time = $\dfrac{36}{1}$ min

Distance = $2.5\left(\dfrac{36+6}{60}\right)$ km

$= 1\dfrac{3}{4}$ km

63. (B)



Let BC = x, FB = y = EF = AE
$\therefore$ CD = 3y
Now:-

$\text{ar}(\Delta CBF) = \dfrac{1}{2}xy$

$\text{or, ar}(\Delta CBE) = \dfrac{1}{2} x \times 2y = xy$

$\therefore \text{ar}(\Delta CEF) = xy - \dfrac{1}{2}xy$

$= \dfrac{1}{2}xy$

Now:-
Area of rectangle = 3xy

$\therefore \dfrac{\text{ar}(\Delta CEF)}{\text{ar}(\square ABCD)} = \dfrac{1\times xy}{2\times 3xy} = 1:6$

64. (A) $\dfrac{2+\sqrt{3}}{2-\sqrt{3}} + \dfrac{2-\sqrt{3}}{2+\sqrt{3}} + \dfrac{\sqrt{3}+1}{\sqrt{3}-1}$

$\Rightarrow \left(\dfrac{2+\sqrt{3}}{2-\sqrt{3}}\times\dfrac{2+\sqrt{3}}{2+\sqrt{3}}\right) + \left(\dfrac{2-\sqrt{3}}{2+\sqrt{3}}\times\dfrac{2-\sqrt{3}}{2-\sqrt{3}}\right)$

$+ \left(\dfrac{\sqrt{3}+1}{\sqrt{3}-1}\times\dfrac{\sqrt{3}+1}{\sqrt{3}+1}\right)$

$= \dfrac{\left(2+\sqrt{3}\right)^2}{4-3} + \dfrac{\left(2-\sqrt{3}\right)^2}{2-\sqrt{3}} - 4\sqrt{3}$

$+ \dfrac{\left(3+1+2+\sqrt{3}\right)}{2}$

$= 7 + 7 + 2 + \sqrt{3}$

$\Rightarrow 16 + \sqrt{3}$

65. (D) Suppose women take x hrs to complete the work.
Then child will complete in (x + 15) hrs.
According to question,

$\dfrac{18}{x+15}\text{work} + \left(\dfrac{6}{x}\right)\text{work} = \dfrac{3}{5}$

$\dfrac{18x+6(x+15)}{x(x+15)} = \dfrac{3}{5}$

$3x^2 + 45x = 90x + 30x + 450$
$x^2 - 30x + 5x + 180 = 0$
$x(x - 30) + 5(x - 30) = 0$
$(x + 5)(x - 30) = 0$
$x = 30$
1 work is completed by a women in 30 hrs.

$\therefore \text{Required days} = \dfrac{2}{5}\times 30 = 12\text{hrs}$

66. (A) Total surface area of Prism
= Perimeter at Base × height 2 × Area
$10 = 8a + 2a^2$
$a^2 + 49 - 5 = 0$
$(a + 5)(a - 1) = 0$
$a = 1, a = -5$
Volume of Prism = Area of Base × height
$= 1 \times 1 \times 2 = 2\text{cm}^3$

67. (B) $x + 809436 \times 809438$
= A square number
$\Rightarrow x + (809437 - 1)(809437 + 1)$
= square number
$\Rightarrow x + (809437)^2 - 1$ = A square number
It is possible, when $x = 1$

68. (*) Area of the curved surface = πrl

$l = \sqrt{r^2 + h^2} = \sqrt{(32)^2 + (60)^2} = 68$ m

Total cost of painting

$= 35 \times \frac{22}{7} \times 32 \times 68 \times \frac{1}{10000}$

= ₹ 23.94

69. (C) Volume of tetrahedron

$= \frac{\sqrt{2}}{12}(\text{side})^3 = \frac{\sqrt{3}}{12}(4)^3$

$= \frac{\sqrt{2} \times 4 \times 4 \times 4}{12} = \frac{16\sqrt{2}}{3}\ \text{cm}^3$

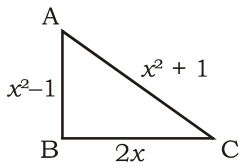
70. (C) $2 \times \frac{22}{7} \times r = \frac{60}{100} \times 2 \times \frac{22}{7} \times 10$

$r = \frac{3}{5} \times 10 = 6$ cm

$h = \sqrt{10^2 - 6^2} = 8$ cm

$r : h = 6 : 8 = 3 : 4$

71. (C)



Sides AB = $x^2 - 1$
BC = $2x$
AC = $x^2 + 1$
Using Pythagoras Theorem
$AC^2 = AB^2 + BC^2$
$(x^2 + 1)^2 = (x^2 - 1)^2 + (2x)^2$
$x^4 + 1 + 2x^2 = x^2 + 1 - 2r^2 = 4x^2$
$(x^2 + 1)^2 = (x^2 + 1)^2$ this is right angle Δ.

72. (D) Let the required score be x
According to the question,

$\frac{80 \times 90 + x}{80} = 100$

$\Rightarrow 7920 + x = 8000$
$x = 80$

73. (A) Let internal angle = x
Let external angle = y
$x - y = 108$ ...(i)
$x + y = 180$ ...(ii)
from equation (i) & (ii)
$x = 144$

$\frac{n - 2 \times 180^\circ}{n} = 144$

$n = 10$
side of polygon is 10.

74. (D) According to the question,
$70m + 91n = 80(m + n)$
$\Rightarrow 70m + 91n = 80m + 80n$
$\Rightarrow 10m = 11n$

$\therefore \frac{n}{m} = \frac{10}{11}$

75. (C) Required width = $\frac{132}{2 \times 22} \times 7 = 21$ m

76. (B) Ratio of total capital of A and B
= 20000 ×12 : 35000 × 12
= 240000 : 420000
Now C gives 220000 to both to make the capital equal.
∴ A's captial : B's capital
= 240000 : 420000
– 220000 : 220000
20000 : 200000
∴ Required ratio of divided amount = 1 : 10

77. (C)

$\Rightarrow 70\%$

60% = 144
100% = 240

78. (D) Here, $a = 10$ L, $n = 2$ and $x = 100$L

∴ Quantity of wine in end = $x\left(1 - \frac{a}{x}\right)^n$

$= 100\left(1 - \frac{10}{100}\right)^2 = 81$L

∴ Required ratio = 81: (100 – 81) = 81:19

79. (D) CP = $\frac{350}{100}$ = ₹ 3.5

SP = $\frac{48}{12}$ = ₹ 4

Profit% = $\frac{.5}{3.5} = 14\frac{2}{7}\%$

80. (A) Let the quantity of milk replaced be x.
Then,

$$\frac{40}{100}(1-x)+\frac{19}{100}\times x=\frac{26}{100}\times 1$$

$\Rightarrow 40-40x+19x=26$

$\Rightarrow 21x=14$

$\Rightarrow x=\frac{2}{3}$

81. (C) $A=\frac{22}{7}\times\frac{21}{2}\times\frac{21}{2}=346.50\ cm^2$

82. (B) Let the plane covers x km with 440 km/h and $(x-770)$ km at a speed of 660 km/h.
Hence, it covers a total distance of

$(2x-770)$ km at a speed of 500 km/h.

$$\text{Average speed}=\frac{\text{Total distance}}{\text{Total time}}$$

$$500=\frac{2x-770}{\frac{4}{440}+\frac{x-770}{660}}$$

$$\Rightarrow \frac{2x-770}{500}=\frac{x}{440}+\frac{x-770}{660}$$

$\Rightarrow x=1760$

$\therefore$ Total distance covered
$= 2x-770$
$= 2\times 1760-770$
$= 2750$ km

83. (A) $\theta=60^\circ$

84. (A) SI for 10 years $=\frac{1000\times 5\times 10}{100}=₹\ 500$

Now,
P = ₹1500
A = ₹ 2000
$\therefore$ SI = ₹ 500

$$500=\frac{1500\times 5\times T}{100}$$

$$T=\frac{500\times 100}{1500\times 5}=6\frac{2}{3}\text{ yrs.}$$

$\therefore$ Total Time $=10+6\frac{2}{3}$ yrs.

$=16\frac{2}{3}$ yrs.

85. (B) $D=78\times\frac{5}{18}\times 60$

$= 1300$ m
Length of tunnel $= 1300-800=500$ m

86. (A) Let the three parts be ₹ x, ₹ y and ₹ z.
According to question,

$$x+\frac{x\times 2\times 5}{100}=y+\frac{y\times 3\times 5}{100}$$

$$=z+\frac{z\times 4\times 5}{100}$$

$\Rightarrow 1.1x=1.15y=1.2z$

$$\Rightarrow \frac{x}{y}=\frac{1.15}{1.1}=\frac{23}{22}$$

$$\text{and } \frac{y}{z}=\frac{1.2}{1.15}=\frac{24}{23}$$

$\Rightarrow x:y:z=276:264:253$

$\Rightarrow x=\frac{276}{793}\times 1586$

$=$ ₹ 552
Three parts of ₹1586 are ₹552, ₹528, ₹506.

87. (A) $5\ M\times 6=10F\times 5$

$M:F=5:3$
$D(5F+3M)=5M\times 6$

$$D=\frac{5\times 5\times 6}{30}=5\text{ days}$$

88. (C) Time 10 AM $+\frac{30}{90}\times 6$

$=$ 10: 20 AM

89. (B) Area of $\Delta=\sqrt{s(s-a)(s-b)(s-c)}$

$$s=\frac{13+14+15}{2}=21$$

$\therefore$ Area of $\Delta=\sqrt{21\times 8\times 7\times 6}=84$

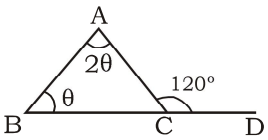
$$r=\frac{\Delta}{S}=\frac{84}{21}=4$$

Therefore, $(\Delta, r) = (84, 4)$

90. (B) Time $=\frac{120}{15}$ min

$= 80$ min

91. (B)



$\theta + 2\theta = 120°$

$\theta = 40°$

92. (B)

93. (C) Average $= \frac{100+125+200+225+275+275}{6}$

$= \frac{1200}{6} = 200$

94. (*) Percentage $= \frac{150}{275} \times 100$

$= 54.5\%$

95. (D) 1200 : 1025

48 : 41

96. (A) Growth rate per annum of expense for :

$2007 \rightarrow \frac{100}{300} \times 100 = \frac{100}{3}$

$2008 \rightarrow 0$

$2009 \rightarrow \frac{200}{400} \times 100 = 50$

97. (B) It was lowest in 2008 as 3 : 4.

98. (D) Required average

$= \frac{100 - 200 + 200 + 300}{4}$

= ₹ 100 crores

99. (B)

100. (C) Sales : Capital in :

2006 → 2 : 1

2007 → 5 : 2

2008 → 3 : 2

2009 → 5 : 3

2010 → 8 : 3

MATHS (TIER II) MOCK TEST-13 (ANSWER KEY)

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

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

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