SSC TIER II (MATHS) MOCK TEST - 40 (SOLUTION)

1. (C) P can complete the work in $10 \times 5 = 50$ days

Q can complete the work in

$\frac{20}{40} \times 100 = 50$ days

R can complete the work in

$= 16 \times 3 = 48$ days

$\therefore$ R will complete the work first

2. (D) In 7 days total work finished by A and B

$= \frac{7}{18}$

Remaining work $= \frac{11}{18}$

$\therefore$ Required number of days

$= 33 \times \frac{18}{11} = 54$ days

3. (D) A.T.Q,

officers 8000   employee 2700

4820

2120   3180

$\therefore$ Ratio = 212 : 318

$\therefore$ Required percentage

$= \frac{212}{212+318} \times 100 = \frac{212}{530} \times 100 = 40\%$

4. (A) Let speed of second person $= x$

A.T.Q,

$\frac{600}{x+4} = 40$

$\Rightarrow x = 11$ m/s

Required time $= \frac{600}{11-4}$

$= \frac{600}{7} = 85.71$ seconds

5. (A) $\sqrt{602+\sqrt{511+\sqrt{296+\sqrt{752+\sqrt{1024}}}}}$

$= \sqrt{602+\sqrt{511+\sqrt{296+\sqrt{752+32}}}}$

$= \sqrt{602+\sqrt{511+\sqrt{296+28}}}$

$= \sqrt{602+\sqrt{511+18}}$

$= \sqrt{602+23} = \sqrt{625} = 25$

6. (A) Given,

$8^m = 16777216$

$\Rightarrow 8^{m-3} = \frac{8^m}{8^3} = \frac{16777216}{8 \times 8 \times 8} = 32768$

7. (D) $\frac{3}{7} < \frac{14}{17} < \frac{11}{13} < \frac{23}{27}$

8. (B) For c to be maximum A and B should be minimum, i.e, zero.

So,

809 + 6 C 6 + 507 = 1972

$\Rightarrow$ 6 C 6 = 656

$\therefore$ C = 5

9. (A) $\frac{3}{7} < \frac{23}{40} < \frac{7}{12}$

$\therefore$ A is the correct answer.

10. (C) If A : B : C $= \frac{1}{4} : \frac{1}{5} : \frac{1}{6} = 15 : 12 : 10$

$\therefore$ C's share $= \frac{10}{37} \times 1665 =$ ₹450

Now,

If A : B : C = 4 : 5 : 6

$\therefore$ C's share $= \frac{6}{15} \times 1665 =$ ₹666

$\therefore$ Required amount = 666 – 450 = ₹216

11. (C) Let, there is only one mango and C.P. of mango = ₹x

A.T.Q,

$\frac{160x}{100} - \frac{130x}{100} = 6$

$\Rightarrow x =$ ₹20

$\therefore$ Required selling price

$= 20 \times \frac{130}{100} =$ ₹26

12. (C) Let, $CP_1 = 100$, $S.P._1 = 105$

Now, $CP_2 = 95$ and $S.P._2 = 95 \times \frac{110}{100}$

$= 104.5$

So, $S.P._1 - S.P._2 = 0.5$ units $\rightarrow 4$

$\therefore$ Required C.P. $= \frac{100}{0.5} \times 4 =$ ₹800

13. (A) Let total books = x
then,
total C.P. = $3x$

$\therefore$ Total S.P. = $\frac{x}{3} \times 4 + \frac{x}{2} \times 5 + \frac{x}{6} \times 3$

$= \frac{13x}{3}$

So,

profit percent = $\frac{\frac{13x}{3} - 3x}{3x} \times 100$

$= \frac{4x}{9x} \times 100 = 44\frac{4}{9}\%$

14. (D) Let the selling price for both traders is ₹100.
The cost price for trader who calculates profit on selling price = 80
cost price for IInd trader

$= \frac{100 \times 100}{120} = \frac{250}{3}$

Difference in profit

$= (100 - 80) - \left(100 - \frac{250}{3}\right)$

$= 20 - \frac{50}{3} = \frac{10}{3}$

Required selling price

$= \frac{100}{\left(\frac{10}{3}\right)} \times 105 = ₹3150$

15. (D) A.T.Q,

$\frac{1550 \times 8 \times 3}{100}$ $\frac{1550 \times 5 \times 3}{100}$

= 372 =232.5

300

67.5 72

$\therefore$ Required ratio = 72 : 67.5 = 16 : 15

16. (B) The total many he would have got after 5 years

$= \frac{18000 \times 5 \times 10}{100} = ₹9000$

But, he got the amount after 3 years in real = 9000 – 4980 = ₹4020
Let real rate of interest = R%
So,

$\frac{18000 \times 3 \times R}{100} = 4020$

$\Rightarrow R = \frac{402}{18 \times 3} = 7\frac{4}{9}\%$

17. (A) Let the sum = ₹100
Now, the total compound interest if compounded half yearly = 6 + 6 + 0.36
= 12.36%
And, that the total simple interest = 12%
The difference between C.I and S.I
= 12.36 – 12 = .36%

$\therefore$ Required sum = $\frac{100}{\cdot 36} \times 36 = ₹10000$

18. (C) Let, he borrows the money = ₹100
The interest he pay = 5%
Now,
the interest he receives
= 4 + 4 + .16 = 8.16%

$\therefore$ Required sum = $\frac{100}{8.16 - 5} \times 221.2$

= ₹7000

19. (B) Ratio of speed = 12 × 9 : 15 × 6 = 6 : 5

20. (C)

	M : W	
Vessel A	= 4 : 5 $\xrightarrow{\times 6}$	24 : 30
Vessel B	= 5 : 1 $\xrightarrow{\times 9}$	45 : 9
Final mixture	= 5 : 4 $\xrightarrow{\times 6}$	30 : 24

A B
24 45

30

15 6

-
$\therefore$ Required ratio = 15 : 6 = 5 : 2

21. (D) Let the capacity of vessels be 105l, 70l, 35l

	Milk	Water
vessel 1	$\frac{5}{7} \times 105 = 75$	30
vessel 2	$\frac{4}{5} \times 70 = 56$	14
vessel 3	$\frac{4}{5} \times 35 = 28$	7

Now,
total water in the final mixture

$= \frac{1}{3} \times 30 + \frac{1}{2} \times 14 + \frac{1}{7} \times 7 = 10 + 7 + 1 = 18l$

Total quantity of final mixture

$= \frac{105}{3} + \frac{70}{2} + \frac{35}{7} = 75\ l$

$\therefore$ Required percentage $= \frac{18}{75} \times 100 = 24\%$

22. (B) Let average age of new comes = x years
the increase in total age after 4 years
$= 11 \times 4 = 44$
A.T.Q,
$44 + 4x = 36 \times 4$
$\Rightarrow 4x = 144 - 44 = 100$
$\Rightarrow x = 25$ years

23. (A) Average of Ist five prime numbers
$= \frac{2+3+5+7+11}{5} = \frac{28}{5}$
Average of Ist ten prime number
$= \frac{2+3+5+7+11+13+17+19+23+29}{10}$
$= \frac{129}{10}$
$\therefore$ Required ratio $= \frac{28}{5} : \frac{129}{10} = 56 : 129$

24. (B) Ratio of girls and boys = 4 : 5
$\therefore$ Required average
$= \frac{75 \times 4 + 87 \times 5}{9} = 81.66$

25. (B) Let the workdone by A,B & C in day will be A, B & C respectively
A. T.Q,
$\frac{A}{B+C} = \frac{1_{\times 5}}{3_{\times 5}} = \frac{5}{15}$
$\frac{B}{A+C} = \frac{1_{\times 4}}{4_{\times 4}} = \frac{4}{16}$
Now,

Efficiency =	A :	B :	C
	5 :	4 :	7

So, the time taken by
$A = \frac{(5+4+7) \times 30}{5} = 96$ days

26. (B) Let the work done by A in one day = A
and, work done by B in one day = B
A.T.Q,
Total work = 36(A + B) = 30(A + B)+ 10A
$\Rightarrow 6B = 4A$
$\Rightarrow \frac{A}{B} = \frac{3}{2}$
$\therefore$ Required time $= \frac{(3+2) \times 36}{2} = 90$ days

27. (B) Given that
(1M+3W+4B) $\rightarrow$ 96 days — 5
(2M+8B) $\rightarrow$ 80 days — 6 — 480
(2M+3W) $\rightarrow$ 120 days — 4
$\therefore$ 2M + 8B = 6
$\Rightarrow$ 1M + 4B = 3
And, 3W = 5 – 3
$\Rightarrow W = \frac{2}{3}$
And, 2M = 4 – 2
$\Rightarrow$ M = 1
And also, 8 B = 6 – 2
$\Rightarrow B = \frac{1}{2}$
$\therefore$ Ratio the efficiency of M,W and B
$= 1 : \frac{2}{3} : \frac{1}{2}$
So, (5M +12B) can complete the work
$= \frac{480}{5+6} = 43\frac{7}{11}$ days

28. (B)
Leakage $\rightarrow$ – 20h — –5 — 100
Inlets & leakage $\rightarrow$ – 50h — –2
Now, the inlet pipe fills the tank
$= \frac{100}{3}$ hours
So,
the capacity of tank
$= \frac{100}{3} \times \frac{6}{2} \times 60 = 6000$ litres

29. (B) A beats C by 45 + 25 = 70 seconds
$\because$ C covers 280 meters in 70 seconds
$\therefore$ Speed of C = 4 meters/second
Now, the time taken by C in one km
$= \frac{1000}{4} = 250$ seconds
$\therefore$ time taken by A = 250 – 70
= 180 seconds = 3 minutes

30. (B) Let the original speed of a man = x km/h
We have the formula,
Distance $= \frac{S_1 \times S_2}{(S_1 - S_2)} \times t$
So, A.T.Q,
$\frac{x \times (x+3)}{3} \times \frac{40}{60} = \frac{x \times (x-2)}{2} \times \frac{40}{60}$
$\Rightarrow 2x + 6 = 3x - 6$
$\Rightarrow x = 12$ km/h

31. (A) A.T.Q,
Ratio of the distance travelled by P & Q
= 40 : 60 = 2 : 3
Now, $1 \longrightarrow 80$
So,
the total distance = 5 × 80 = 400 km

32. (B) Let speed of boys in still water = x
Let fixed time = t
Now,
the distance covered along the current
= $(5 + x)t$
And,
distance covered against the current
= $(x - 5)t$
A.T.Q,
$(5 + x)t = 2 [t (x - 5)]$
$\Rightarrow x = 15$ km/hr

33. (C) Let number = 100
if increased by x%, it becomes $(100 + x)$
Now,
the reduction when number becomes $(100 + x)$ to 100
$y = \dfrac{x}{100+x} \times 100$
Required ratio = $x : \dfrac{x \times 100}{100+x}$
= $(100 + x)$: 100

34. (C) Total increase from 2014 to 2016
$= 20 + 20 + \dfrac{20 \times 20}{100} = 44\%$
Total increase from 2014 to 2017
$= 44 + 25 + \dfrac{25 \times 44}{100} = 80\%$
A.T.Q,
$\because$ 80% = 7000
$\therefore 100\% = \dfrac{7000 \times 100}{80} = 1750 \times 5 = 8750$

35. (A) Let cost price one kite = x
from options
If 3 kites given free of cost,
then, total discount = $3x$
$\therefore$ Net discount percent
$= \dfrac{3x}{30x} \times 100 = 10\%$
Hence, (A) is the correct answer.

36. (B) $(\sin^2 x - \cos^2 x)(1 - \sin^2 x \cos^2 x)$
$= (\sin^2 x - \cos^2 x)[(\sin^2 x + \cos^2 x)^2 - \sin^2 x \cos^2 x]$
$(\because \sin^2 x + \cos^2 x = 1)$
$= (\sin^2 x - \cos^2 x)$
$[\sin^4 x + \cos^4 x + \sin^2 x \cos^2 x]$
$= \sin^6 x - \cos^6 x$
$[\because a^3 - b^3 = (a - b)(a^2 + b^2 + ab)]$

37. (D) tan15° = tan(45° – 30°)
$= \dfrac{\tan 45° - \tan 30°}{1 + \tan 45° \tan 30°} = 2 - \sqrt{3}$
And,
$\cot 15° = \dfrac{1}{2 - \sqrt{3}} = 2 + \sqrt{3}$
tan15°cot75° + cot15°tan75°
$= \left(2 - \sqrt{3}\right)^2 + \left(2 + \sqrt{3}\right)^2$
$= 4 + 3 - 4\sqrt{4} + 4 + 3 + 4\sqrt{4} = 14$

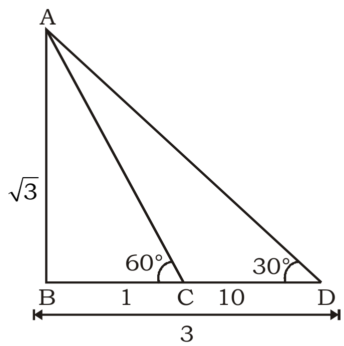
38. (B) As we know that,
$\sec^2\theta - \tan^2\theta = (\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$
Given,
$\sec\theta + \tan\theta = 3 + \sqrt{10}$ .... (i)
$\sec\theta - \tan\theta = \dfrac{1}{\sqrt{10} + 3} = \sqrt{10} - 3$ .... (ii)
On adding equation (i) and (ii). we get,
$\Rightarrow 2\sec\theta = 2\sqrt{10}$
$\Rightarrow \cos\theta = \dfrac{1}{\sqrt{10}}$ And,
$\sin\theta = \sqrt{1 - \left(\dfrac{1}{\sqrt{10}}\right)^2} = \dfrac{3}{\sqrt{10}}$
So,
$\sin\theta + \cos\theta = \dfrac{1}{\sqrt{10}} + \dfrac{3}{\sqrt{10}} = \dfrac{4}{\sqrt{10}} = \dfrac{2\sqrt{2}}{\sqrt{5}}$

39. (A) $a \sin^{12} A + b \sin^{10} A + c \sin^8 A + d \sin^6 A - 1 = 0$
$\Rightarrow a \sin^{12} A + b \sin^{10} A + c \sin^8 A + d \sin^6 A = (1)^3$
$\Rightarrow a \sin^{12} A + b\sin^{10} A + c \sin^8 A + d \sin^6 A = (\sin^2 A + \cos^2 A)^3$
But, we have
cos a + $\cos^2 A = 1$
$\Rightarrow \cos A = \sin^2 A$
$\Rightarrow \cos^2 A = \sin^4 A$
so, the expression becomes,
$\Rightarrow a \sin^{12} A + b\sin^{10} A + c \sin^8 A + d\sin^6 A = (\sin^2 A + \sin^4 A)^3$
$\Rightarrow a \sin^{12} A + b\sin^{10} A + c \sin^8 A + d \sin^6 A = \sin^{12} A + \sin^6 A + 3\sin^8 A + 3\sin^{10} A$

On comparing both sides. We get
a = 1, b= 3, c= 3 and d = 1
So,

$\frac{b}{a}+\frac{c}{d} = \frac{3}{1}+\frac{3}{1} = 6$

40. (C) Case-I
If they are on the same side of the balloon,

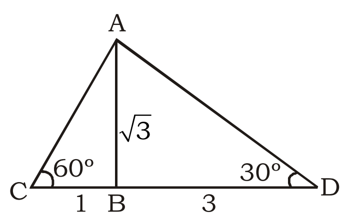


A.T.Q,
(3 – 1) units = 10

$\sqrt{3}$ units = $\frac{10\times\sqrt{3}}{2} = 5\sqrt{3}$

$\therefore$ Required height = $5\sqrt{3}$ km

Case-II
If they are on either side of the balloon,



A.T.Q,
(3 + 1) units = 10

$\therefore \sqrt{3}$ units = $\frac{10\times\sqrt{3}}{4} = \frac{5\sqrt{3}}{2}$

$\therefore$ Required height = $\frac{5\sqrt{3}}{2}$ km

Hence, (A) & (B) both are correct.

41. (C) $(7^6 - 1) = (7^3 + 1)(7^3 - 1)$
= 342 × 344
= 57 × 6 × 43 × 8
$\therefore$ $(7^6 - 1)$ is divisible by 43 & 57.

42. (C) Given equation,
$\Rightarrow x^2 - (y - 3)x - (y - 7) = 0$
Let the roots be A and B.
Sum of roots (A + B) = $(y - 3)$
Product of roots (A × B) = $-(y - 7)$
A.T.Q,
$A^2 + B^2 = 0$ (given)
$\Rightarrow (A + B)^2 - 2AB = 0$
$\Rightarrow (y - 3)^2 - 2[-(y - 7)] = 0$
$\Rightarrow y^2 - 4y - 5 = 0$
$\Rightarrow (y - 5)(y + 1) = 0$
$\Rightarrow y = 5$

43. (A) ATQ,
$x = 3y$.....(i)

and, $y = \frac{175z}{100} \Rightarrow 4y = 7z$......(ii)

From equation (i) and (ii)
$4x = 12y = 21z$
$\Rightarrow x : y : z = 21 : 7 : 4$
Let, x, y and z have 21A, 7A and 4A money respectively,
A.T.Q,

$\frac{21A + 7A + 4A}{3} = 128$

$\Rightarrow A = \frac{128\times 3}{32} = 12$

x has the money = 12 × 21 = Rs. 252

44. (C) Let y = 100
$\therefore$ $x = 80$

$\frac{y - x}{y} = \frac{100 - 80}{100} = \frac{1}{5}$

and, $\frac{x}{x - y} = \frac{80}{80 - 100} = \frac{80}{-20} = -4$

45. (B) Total females = $\frac{25000}{5}$ = 5000
Total males = 20000
Total educated person

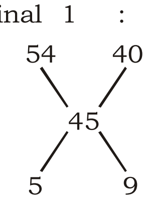
$= \frac{5000\times 60}{100} + \frac{20000\times 95}{100}$

= 3000 + 19000 = 22000

$\therefore$ Required percentage = $\frac{22000}{25000}\times 100$
= 88%

46. (B)

	Wine	:	Water		
	3	:	2	$\xrightarrow{\times 18}$	54 : 36
	4	:	5	$\xrightarrow{\times 10}$	40 : 50
Final	1	:	1	$\xrightarrow{\times 45}$	45 : 45



Ratio of both mixture = 5 : 9

$\therefore$ Required mixture

$= \frac{3}{5} \times 9 = \frac{27}{5} = 5\frac{2}{5}$ litre

47. (C)

	Milk	:	Water
Vessel -I	$\frac{4}{7}\times 3 = \frac{12}{7}$	:	$\frac{3}{7}\times 3 = \frac{9}{7}$
Vessel-II	$\frac{3}{5}\times 2 = \frac{6}{5}$	:	$\frac{2}{5}\times 2 = \frac{4}{5}$
Vessel-III	$\frac{5}{6}$	:	$\frac{1}{6}$

Required ratio

$= \left(\frac{12}{7}+\frac{6}{5}+\frac{5}{6}\right) : \left(\frac{9}{7}+\frac{4}{5}+\frac{1}{6}\right)$

$= \frac{360+252+175}{210} : \frac{270+168+35}{210}$

= 787 : 473

48. (A) Circumference of the wheel

$= 2 \times \frac{22}{7} \times 63 = 396$ cm

$\because$ Wheel rotate 400 times per minute.

$\therefore$ Distance travelled in one hour

= 396 × 400 × 60 cm

$\therefore$ Required speed

$= \frac{396 \times 400 \times 60}{100000} = 95.04$ km/hr.

49. (B) From 10 to 99 total keystrokes

= 90 × 2 = 180.

From 100 to 999 total keystrokes = 900 × 3 = 2700

and, there are 4 keystrokes to write 1000.

Total keystrokes = 180 + 2700 + 4 = 2884

50. (A) A.T.Q,

$(72 - 36) \propto \sqrt{16}$

$\Rightarrow 36 = K \times 4$

$\Rightarrow K = 9$

when the speed to be zero, let total compartments = x

So,

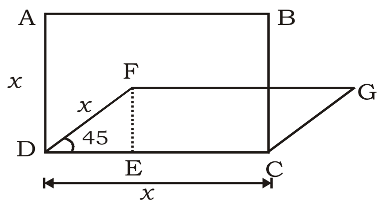
$72 - 0 = K \times \sqrt{x}$

$\Rightarrow 72 = 9 \times \sqrt{x}$

$\Rightarrow x = 64$

Hence, the maximum number of compartments can be carried = 63

51. (A)



Required ratio = $x^2 : x^2 \sin 45° = \sqrt{2} : 1$

52. (B) $\frac{37}{13} = 2+\cfrac{1}{x+\cfrac{1}{y+\cfrac{1}{z}}}$

$\Rightarrow \frac{11}{13} = \cfrac{1}{x+\cfrac{1}{y+\cfrac{1}{z}}}$

$\Rightarrow \frac{13}{11} = x+\cfrac{1}{y+\cfrac{1}{z}}$

$\Rightarrow 1+\frac{2}{11} = x+\cfrac{1}{y+\cfrac{1}{z}}$

$x = 1$,

And $\frac{2}{11} = \cfrac{1}{y+\cfrac{1}{z}}$

$\Rightarrow \frac{11}{2} = y+\frac{1}{z}$

$\Rightarrow 5+\frac{1}{2} = y+\frac{1}{z}$

On Comparing,

$y = 5, z = 2$

$\therefore y - x - z = 5 - 1 - 2 = 2$

53. (B) $x = \frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} \Rightarrow \frac{x}{\sqrt{2}} = \frac{\sqrt{3}}{\sqrt{3}+\sqrt{2}}$

Applying componendo & dividendo

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

$\Rightarrow \frac{x+\sqrt{2}}{x-\sqrt{2}} = \frac{2\sqrt{3}+\sqrt{2}}{-\sqrt{2}}$ ....i)

Similerly,

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

Applying componendo & dividendo

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

Adding equation (i) & (ii)

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

$$= -\left(\frac{6+\sqrt{6}+4+\sqrt{6}}{\sqrt{6}}\right) = -2\left(\frac{5+\sqrt{6}}{\sqrt{6}}\right)$$

54. (C) $\sqrt{x} = \frac{2.35}{235} = \frac{1}{100}$

$\Rightarrow x = \frac{1}{10000}$

Now,

$\sqrt{y} = \frac{1628}{1.628} = 1000$

$\Rightarrow$ y = 1000000

So, $xy = \frac{1000000}{10000} = 100$

55. (B) Let total students = A

Then, the total contribution

$= (A \times A + \frac{A \times A}{100}) = A^2 + \frac{A^2}{100}$

A.T.Q,

$A^2 + \frac{A^2}{100} = 22725$

On solving this equation with the help of the options. we get, A = 150

So, the number of students = 150

56. (B) Let first term = A

and, the common difference = D

A.T.Q.

A + 2D = – 6 ....(i)

A + 6D = 14 ....(ii)

from equation (i) & (ii)

D = 5 & A = –16

So, the sum of the first 15 terms

$= \frac{n}{2}[2A+(N-1)D] = \frac{15}{2}[-32+14\times5]$

$= \frac{15}{2}[38] = 285$

57. (C) Length of PQ = $\frac{32-16}{2}$ = 8 cm.

58. (B) The ratio of sides = $\frac{1}{2} : \frac{1}{5} : \frac{1}{6} = 15 : 6 : 5$

Let the sides of triangle are 15A, 6A & 5A

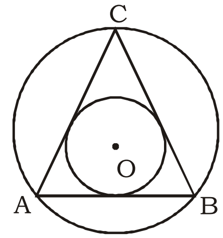
A.T.Q

15A + 6A + 5A = 208

$\Rightarrow$ A = 8

$\therefore$ Longest side = 15 × 8 = 120 cm

59. (B)



Let the side of this equilateral ΔABC is a .

A.T.Q,

In radius + Circum–radius = $\frac{\sqrt{3}(\sqrt{3}+\sqrt{2})}{4}$

$\Rightarrow \frac{a}{2\sqrt{3}} + \frac{a}{\sqrt{3}} = \frac{\sqrt{3}(\sqrt{3}+\sqrt{2})}{4}$

$\Rightarrow \frac{3a}{2\sqrt{3}} = \frac{\sqrt{3}(\sqrt{3}+\sqrt{2})}{4}$

$\Rightarrow a = \frac{\sqrt{3}+\sqrt{2}}{2}$

So, the height of ΔABC = $a \times \frac{\sqrt{3}}{2}$

$= \frac{\sqrt{3}+\sqrt{2}}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}(\sqrt{3}+\sqrt{2})}{4}$ cm

60. (B) Let radius of the circle = R

A.T.Q

$\frac{22}{7} \times R^2 = (1127.6164) \times \frac{22}{7}$

$\Rightarrow$ R = 33.58m

Circumference = $2 \times \frac{22}{7} \times 33.58$m

$\therefore$ Required time = $\frac{2\times22\times33.58\times7}{7\times12}$

= 123.12 seconds

61. (B) Let radius of sphere P = R_1

& radius of spheere Q = R_2

A.T.Q

$4\pi R_1^2 = \frac{900}{100}(4\pi R_2^2)$

$\Rightarrow R_1 = 3R_2$

The Volume of P

$= \frac{4}{3}\pi R_1^3 = \frac{4}{3}\pi(3R_2)^3 = 36\pi R_2^3$

And, the volume of Q = $\frac{4}{3}\pi R_2^3$

$\therefore$ Required percentage

$= \frac{104\times\pi R_2^3\times100}{3\times36\pi R_2^3} = \frac{2600}{27} = 96.3\%$

62. (D) The equations of the sides PQ, QR, RS & SP are

$x + 2y = 3$ ....(i)

$x = 1$ ......(ii)

$x - 3y = 4$ ....(iii)

$5x + y = -12$ ......(iv)

On solving equation (i) & (ii). We get

The co-ordinate of point Q = (1,1)

Now, Solving (ii) & (iii). We get

R = (1,–1)

Solving (iii) & (iv),we get

S = (–2,–2)

And solving equation (i) & (iv) we get

P = (–3,3)

Now, the slope of line PR (m_1)

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

And,

the slope of line QS (m_2) = $\frac{-2-1}{-2-1} = 1$

Now,

$m_1 \times m_2 = -1\times1 = -1$

So,

the angle between these equation = 90°

63. (C) Let radius of circle = R

A.T.Q

$\frac{22}{7} \times R^2 = 1386 \Rightarrow R = 21$ cm

Now, diameter of circle = side of square = side of triangle

$\therefore$ Perimeter of ΔBCE = 42 × 3 = 126 cm

area of ΔDCF $= \frac{\sqrt{3}}{4} \times 42 \times 42 = 441\sqrt{3}$ cm²

$\therefore$ required ratio = $126 : 441\sqrt{3}$

$= 6 : 21\sqrt{3} = 2 : 7\sqrt{3}$

64. (A) $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$

$= 4\sqrt{3}x^2 + 8x - 3x - 2\sqrt{3}$

$= 4x(\sqrt{3}x + 2) - \sqrt{3}(\sqrt{3}x + 2)$

$= (4x - \sqrt{3})(\sqrt{3}x + 2)$

So, $(4x - \sqrt{3})$ is a factor of this equation.

65. (B) $\frac{1}{p+1} + \frac{1}{q+1} + \frac{1}{r+1}$

$= \frac{p}{p^2+p} + \frac{q}{q^2+q} + \frac{r}{r^2+r}$

$= \frac{p}{q+r+p} + \frac{q}{p+q+r} + \frac{r}{q+p+r} = 1$

66. (B) $a^2 + b^2 = 7ab$

dividing both sides by ab,

$\Rightarrow \frac{a}{b} + \frac{b}{a} = 7$

squaring both sides,

$\Rightarrow \frac{a^2}{b^2} + \frac{b^2}{a^2} + 2 = 49 \Rightarrow \frac{a^2}{b^2} + \frac{b^2}{a^2} = 47$

67. (C) $\sqrt{1+\frac{72}{289}} = \sqrt{\frac{361}{289}} = \frac{19}{17}$

Now, $1 + \frac{x}{17} = \frac{19}{17} \Rightarrow \frac{x}{17} = \frac{2}{17}$

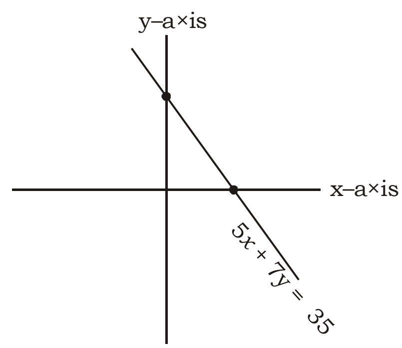
$\Rightarrow x = 2$

68. (C) $\frac{(a-b)^2}{3(b-c)(c-a)} + \frac{(b-c)^2}{3(c-a)(a-b)} + \frac{(c-a)^2}{3(a-b)(b-c)}$

$= \frac{(a-b)^3 + (b-c)^3 + (c-a)^3}{3(a-b)(b-c)(c-a)}$

$= \frac{3(a-b)+(b-c)+(c-a)}{3(a-b)(b-c)(c-a)} = 1$

69. (B)



$5x + 7y = 35$

$\Rightarrow \frac{x}{7} + \frac{y}{5} = 1$

This line passes through Ist, 2nd & 4th quadrant

70. (C) $\text{cosec}\theta + \cot\theta = \sqrt{3}$ ....(i)

as we know that $\text{cosec}^2\theta - \cot^2\theta = 1$

$\therefore$ (cesecθ – cotθ) (cosecθ + cotθ) = 1

$\Rightarrow \text{cosec}\theta - \cot\theta = \frac{1}{\sqrt{3}}$ ....(ii)

Adding eqution (i) & (ii),

$2\text{cosec}\theta = \sqrt{3} + \frac{1}{\sqrt{3}} = \frac{4}{\sqrt{3}}$

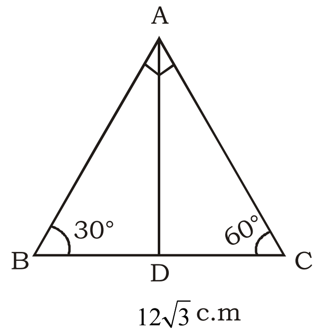
$\Rightarrow \text{cosec}\theta = \frac{2}{\sqrt{3}}$

$\Rightarrow \theta = 60°$

$\therefore \cos\frac{\theta}{2} = \cos30° = \frac{\sqrt{3}}{2}$

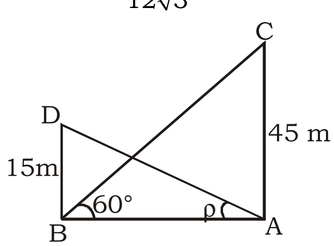
71. (B) $x\cos\theta - y\sin\theta = 3$
squaring both sides,
$x^2\cos^2\theta + y^2\sin^2\theta - 2xy\sin\theta\cos\theta = 9$ ……(i)
$x\sin\theta + y\cos = 5$
squaring both sides,
$\Rightarrow x^2\sin^2\theta + y^2\cos^2\theta + 2xy\sin\theta\cos\theta = 25$………(ii)
Adding equation (i) & (ii)
$x^2(\sin^2\theta + \cos^2\theta) + y^2(\sin^2\theta + \cos^2\theta) = 34$
$\Rightarrow x^2 + y^2 = 34$

72. (B)



ΔABC is a right angled triangle with right angle at A.
$\therefore \dfrac{AB}{BC} = \cos 30°$
$\Rightarrow AB = 12\sqrt{3} \times \dfrac{\sqrt{3}}{2} = 18\text{cm}$
$\because \dfrac{AC}{BC} = \sin 30°$
$\Rightarrow AC = \dfrac{1}{2} \times 12\sqrt{3} = 6\sqrt{3}\text{ cm}$
Area of triangle ABC
$= \dfrac{AB \times AC}{2} = \dfrac{AD \times BC}{2}$
$\Rightarrow AD = \dfrac{6\sqrt{3} \times 18}{12\sqrt{3}} = 9\text{cm}$

73. (A)

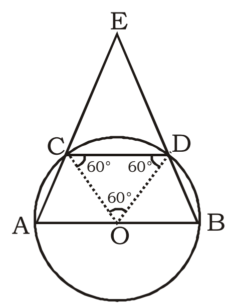


In triangle ABC,
$\tan 60° = \dfrac{AC}{AB} \Rightarrow AB = \dfrac{45}{\sqrt{3}}$
In ΔABD,
$\tan\theta = \dfrac{BD}{AB} = \dfrac{15}{45} \times \sqrt{3} = \dfrac{1}{\sqrt{3}}$

74. (D) Let the sides are n and 2n
A.T.Q,
$$\frac{\frac{(n-2)\times 180°}{n}}{\frac{(2n-2)}{2n}\times 180°} = \frac{2}{3}$$
$$\Rightarrow \frac{(n-2)}{(n-1)} = \frac{2}{3}$$
$\Rightarrow n = 4$
So, the number of sides are 4 and 8.

75. (A) Percentage error
$= \dfrac{30}{45 \times 60} \times 100 = \dfrac{10}{9} = 1\dfrac{1}{9}\%$

76. (B)



Let $\angle A = \theta$ and $\angle B = \alpha$
$\angle ACO = \angle A = \theta$ ($\because$ AO = OC)
And,
$\angle BDO = \angle B = \alpha$ ($\because$ OB = OD)
$\angle AOC = 180° - 2\theta$ and,
$\angle BOD = 180° - 2\alpha$
Now,
$180° - 2\theta + 60° + 180° - 2\alpha = 180°$
$\Rightarrow 2\theta + 2\alpha = 240$
$\Rightarrow \theta + \alpha = 120°$
$\therefore \angle E = 180° - 120° = 60°$

77. (C) Let the side of square = x
we have,
total surface area of prism
= Base Perimeter ×h + 2× base Area
$= 4x \times h + 2x^2$
A.T.Q,
$4x \times 15 + 2x^2 = 608$
$\Rightarrow 30x + x^2 = 304$
$\Rightarrow x(x + 30) = 8 \times 38$
$\Rightarrow x = 8$ cm
Now, the volume of prism
= Base area × height
$= 8^2 \times 15 = 960\text{ cm}^2$

78. (D) Total surface area of brick
$= 2(lb + bh + hl)$
$= 2(22.5 \times 10 + 22.5 \times 7.5 + 10 \times 7.5 \times 10)$
$= 937.5 \text{ cm}^2$
$\therefore$ Total number of bricks
$= \dfrac{18.75 \times 10000}{937.5} = 200$

79. (D) Volume of cone
$= \left(\dfrac{1}{3} \times \text{area of base} \times \text{height}\right)$
$\because$ The volume of cone is directly proportional to the area of base. So,
Volume also increases by 87%

80. (C) Let and increase in height = h
So,
$\left[\dfrac{80}{100} \times (1000 \times 1000) \times \dfrac{5}{100}\right]$
$= (50 \times 20 \times h)$
$\Rightarrow h = \dfrac{400}{10} = 40$ m

81. (B) Let there are x wides.
$\therefore$ Total byes $= x + 12$
And run scored by both openers $= 32x$
$\Rightarrow x + x + 12 + 32x = 250$
$\Rightarrow 34x = 238$
$\Rightarrow x = 7$
$\therefore$ Total runs scored by both openers
$= 32 \times 7 = 224$
Run scored by Sunil
$= \dfrac{5}{8} \times 224 = 28 \times 5 = 140$

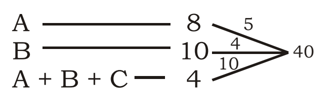
82. (B) Because it takes 4 minutes to evacuate the crew and passengers, so the ship can travel for maximum 16 minutes
In 16 minutes, ship covered
$= 15 \times \dfrac{16}{60} = 4$ km
$\therefore$ Rescue vessel has to travel the distance = (12 – 4) = 8 kms
and, the rescue vessel has 16 mintues.
$\therefore$ Required speed
$= \dfrac{8}{16} \times 60 = 30$ km/hr

83. (B) Let distance covered on bicyle = x km
A.T.Q,
$\dfrac{x}{17} + \dfrac{(90 - x)}{8} = 9$
from options
$x = 34$ kms

84. (C) Let the total votes = 100
A.T.Q,
A + B = 100
A – B = 16
$\therefore$ A = 58 and B = 42
But,
$42 \rightarrow 168000$
$\therefore$ Required number of votes
$= \dfrac{168000}{42} \times 16 = 64000$

85. (A) According to A $\Rightarrow 75 <$ weight < 82
According to A's brother B
$= 70 <$ weight < 80
According to A's sister C
$=$ weight ≤ 78
So,
weight could be 76 kg, 77 kg, 78 kg
$\therefore$ Average
$= \dfrac{76 + 77 + 78}{3} = 77$ kg

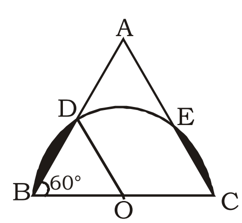
86. (A) A.T.Q,



C can do (10 – 5 – 4) = 1 work per day
$\therefore$ A's share
$= \dfrac{1700}{5 + 4 + 1} \times 5 = ₹850$

87. (B) Let the length, breath and height be $6x$, $4x$ and $2x$ respectively.
Total surface area $= 2(6x \times 4x + 4x \times 2x + 6x \times 2x) = 88x^2$
New measurments are ($12x$, $2x$ & x)
New total surface area
$= 2(12x \times 2x + 12x \times x + 2x \times x) = 76x^2$
$\therefore$ Percentage decrease
$= \dfrac{88x^2 - 76x^2}{88x^2} \times 100$
$= \dfrac{1200}{88} = 13.64\%$

88. (B)



Given, ABC is an equilateral triangle
$\therefore \angle ABC = 60°$

Let, O is the centre of circle, i.e. mid point of BC.

$\because$ OD = OB = radius

$\therefore$ $\angle ABC = \angle BDO = 60°$

$\therefore$ BDO will be an equilateral triangle.

$\therefore$ Area of ΔBDO

$= \frac{\sqrt{3} \times 7 \times 7}{4}$ cm^2

Area of the sector BDOB

$= \pi \times 7 \times 7 \times \frac{60°}{360°} = \frac{49}{6}\pi$ cm^2

$\therefore$ Required area

$= 2 \times \left[\frac{49\pi}{6} - \frac{49\sqrt{3}}{4}\right]$

$= 49\left[\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right]$ cm^2.

89. (B) Minimum value of 12 sin$x$ + 16 cos$x$

$= -\left(\sqrt{12^2 + 16^2}\right) = -20$

So, the equation will be greater than zero or equal to zero if A = 20.

90. (B) Simple interest per year = ₹450

Let the rate of interest be R%.

$450 \times \frac{R}{100} = 81$

$\Rightarrow R = \frac{81 \times 10}{45} = 18\%$

91. (B) Total cost for all the books

$= \frac{36000}{24} \times 100$

= ₹150000.

Total cost for single book

$= \frac{400}{16} \times 100$

= ₹2500.

$\therefore$ Total books $= \frac{150000}{2500} = 60$.

92. (C) Required angle $= \frac{36}{100} \times 360 = 129.6°$

93. (C) Total cost $= \frac{480}{8} \times 100$ = ₹6000

$\therefore$ Required S.P.

$= 6000 \times \frac{120}{100} \times \frac{85}{100}$ = ₹6120.

94. (A) Cost price of all the books

$= \frac{144000 \times 100}{120}$ = ₹120000.

Paper cost

$= \frac{120000}{100} \times 36$

= ₹43,200.

95. (D) Required percentage

$= \frac{32 - 24}{32} \times 100$

= 25%

96. (C) Required difference

= 500 + 1000 + 750

= 2250.

97. (D) Average number of boys

$= \frac{3500 + 4500 + 4750 + 2250 + 3250}{5}$

$= \frac{18250}{5} = 3650$

Average number of girls

$= \frac{3000 + 3500 + 4000 + 1500 + 3750}{5}$

$= \frac{15750}{5} = 3150$

Required difference

= 3650 – 3150 = 500.

98. (A) Required ratio

$= \frac{3000 + 3500 + 1500}{4500}$

$= \frac{8000}{4500} = 16 : 9$.

99. (B) Required percentage

$= \frac{15750}{4000} \times 100$

= 393.75%

100. (A) Required percentage

$= \frac{2250 - 1500}{1500} \times 100 = 50\%$

KD Campus Pvt. Ltd

2007, OUTRAM LINES, 1ST FLOOR, OPPOSITE MUKHERJEE NAGAR POLICE STATION, DELHI-110009

SSC TIER II (MATHS) MOCK TEST - 40 (ANSWER KEY)

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

Rough Space

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, also share your suggestions and experience of Sunday Mock

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