SSC TIER II (MATHS) MOCK TEST - 35 (SOLUTION)

1. (C) Let the numbers be $85x$ and $85y$
Then, LCM of the numbers = $85xy$
A.T.Q,
$85xy = 2550$
$\Rightarrow xy = 30$
Now,
Required pairs = (1, 30), (2, 15), (3, 10) and (5, 6)
$\therefore$ Number of pairs = 4

2. (B) Let the fraction be $\frac{x}{y}$
A.T.Q,
$\frac{x-4}{y+3} = \frac{4}{9}$
$\Rightarrow 9x - 4y = 48$ ..... (i)
Now,
$\frac{x-6}{y-6} = \frac{5}{9}$
$\Rightarrow 9x - 5y = 24$..... (ii)
On solving equation (i) and (ii), we get
$x = 16$ and $y = 24$
$\therefore$ Required fraction = $\frac{16}{24}$

3. (B) $(4537)^{234} = [(4537)^4]^{58} \times (4537)^2$
Now,
Last digit of the number
= last digit of $(7^4)^{58} \times 7^2 = 1 \times 9 = 9$

4. (D) LCM of 6, 7, 8 and 9 = 504
Now,
$504 = 2 \times 2 \times 2 \times 3 \times 3 \times 7$
Then,
the smallest cubic number
$= 504 \times 3 \times 7 \times 7 = 74088$

5. (A) Let the two numbers be $53x$ and $53y$.
A.T.Q,
LCM of the numbers = 6519
$\Rightarrow 53xy = 6519$
$\Rightarrow xy = 123$
Now, possible largest numbers are
$= 53 \times 123 = 6519$ or $53 \times 41 = 2173$
$\therefore$ Required number = 2173

6. (C)

	zinc	copper			
I	4	5	= 9		×17 × 7
II	3	4	= 7		×9 × 17
III	11	6	= 17		× 9 × 7

After making all the quantities equal, now ratio of zinc and copper is-

	zinc	copper
I	476	595
II	459	612
III	693	378
	1628	1585

$\therefore$ Required ratio = 1628 : 1585

7. (B) $\left(\frac{4}{9}\right)^{-\frac{3}{2}} \times \left(\frac{1}{2}\right)^{-5} - 3 \times (27)^{\frac{2}{3}} - \left(\frac{1}{4}\right)^{-2} \times 5^{\circ} \times \left(\frac{16}{9}\right)^{\frac{-1}{2}}$
$= \left(\frac{3}{2}\right)^3 \times 2^5 - 3 \times 3^2 - 4^2 \times 1 \times \frac{3}{4}$
$= 108 - 27 - 12 = 69$

8. (C) $\frac{105}{43}$

9. (D) A.T.Q,
Sum of the roots $(\alpha + \beta)$
$= 5 + \sqrt{24} + 5 - \sqrt{24} = 10$
and, Product of the roots $(\alpha\beta)$
$= \left(5 + \sqrt{24}\right) \times \left(5 - \sqrt{24}\right) = 1$
Now,
Required equation $\Rightarrow x^2 - (\alpha + \beta)x + \alpha = 0$
$\Rightarrow x^2 - 10x + 1 = 0$

10. (A) A.T.Q,
$10^3 + 11^3 + 12^3 + \ldots\ldots\ldots\ldots + 25^3$
= (sum of the cube of first 25 natural numbers – (sum of the cube of first 9 natural numbers
$= \left(\frac{25 \times 26}{2}\right)^2 - \left(\frac{9 \times 10}{2}\right)^2$
$= 105625 - 2025 = 103600$

11. (C)

Alchol	Water	
5	9	×1
2	5	×2

Now, New ratio is-

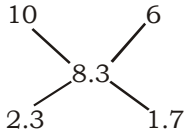
Alchol	Water
1(5	9
4	10

Here, mixture to be taken out = $\frac{1}{5}$
Now, $\frac{1}{5}$ units = 5 litre
Then, total quantity = 1 unit
$= 5 \times 5 = 25$ litre

12. (A) A.T.Q,
Net rate of interst

$= \frac{46640 - 40000}{40000 \times 2} \times 100 = 8.3\%$

Now, apply alligation



Ratio = 23 : 17
∴ Required amount = ₹23000 and ₹17000

13. (B) Let CP of the article be ₹100x
Then,

SP of the article = $100x \times \frac{125}{100} = 125x$

Now,
A.T.Q,

$(100x - 50) \times \frac{350}{300} = 125x - 100$

$\Rightarrow (100x - 50) \times 7 = (125x - 100) \times 6$
On solving, we get
$x = 5$
Then, CP of the article = 100 × 5 = ₹500

14. (D) $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \ldots\ldots\ldots + \frac{1}{240}$

$= \left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \ldots\ldots \left(\frac{1}{15} - \frac{1}{16}\right)$

$= 1 - \frac{1}{16} = \frac{15}{16}$

15. (B) Let A can complete the work in x days
Then, B will complete the work in $(x + 2)$ days
and,
C will complete the work in $(x + 5)$ days.
A.T.Q,

$\frac{1}{x} + \frac{1}{x+2} + \frac{1}{x+5} = \frac{1}{4}$

Using options, we get $x = 10$
Then, time taken by B to complete the work = $x + 2 = 12$ days

16. (D) A.T.Q,

A → 8
B → 10 > 40 < 5, 4

Time taken by A and B to fill the tank

$= \frac{40}{9}$ hours

Here, total extra time taken

$= 2\frac{2}{9} = \frac{20}{9}$ hours

i.e., $\frac{1}{2}$ cistern (20 litre) is emptied by pipe C in $\frac{40}{9}$ hours.
Then, total time taken by pipe C to empty the tank = $\frac{40}{9} \times 2 = \frac{80}{9} = 8\frac{8}{9}$ hours

17. (B) Let the speed of the boat be x km/hr and, the speed of the stream be y km/hr
A.T.Q,

$\frac{27}{x+y} + \frac{36}{x-y} = 9$ ..... (i)

and, $\frac{36}{x+y} + \frac{24}{x-y} = 8$ ..... (ii)

On solving, we get
$x + y = 9$
$x - y = 6$
Then,

Speed of stream (y) = $\frac{9-6}{2} = 1.5$ km/hr

18. (A) We know that,

Amount = $P\left[1 + \frac{r}{100}\right]^n$

A.T.Q,

$64000\left[1 + \frac{r}{100}\right]^3 = 68921$

$\Rightarrow \left(1 + \frac{r}{100}\right)^3 = \left(\frac{41}{40}\right)^3$

$\Rightarrow 1 + \frac{r}{100} = \frac{41}{40}$

$\Rightarrow r = 2.5\%$
∴ Rate of interest = 2.5%

19. (C) A.T.Q,
1M = 2C
and,
$(4M + 5W + 6C) \times 15 = (2M + 3W + 2C) \times 31$
$\Rightarrow (7M + 5W) \times 15 = (3M + 3W) \times 31$
On solving, we get
4M = 6W
Then, the ratio of capacity of man, woman and child = 6 : 4 : 3
Let 1 man, 1 woman and 1 child can complete the work in x days.

Then,

$(6 \times 4 + 4 \times 5 + 6 \times 3) \times 15$

$= (6 + 4 + 3) \times x$

$\Rightarrow 62 \times 15 = 13x$

$\Rightarrow x = \dfrac{930}{13} = 71\dfrac{7}{13}$ days

$\therefore$ Required number of days $= 71\dfrac{7}{13}$ days

20. (A) A.T.Q,

$$\frac{(m+n)x+(a-b)}{(m-n)x+(a+b)} = \frac{(m+n)x+(c-d)}{(m-n)x+(c+d)}$$

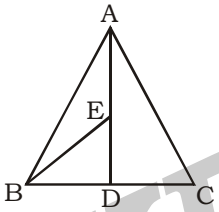
$\Rightarrow (m^2 - n^2)x + (m + n)(c + d)x + (a - b)(m - n)x + (a - b)(c + d)$

$= (m^2 - n^2)x + (m - n)(c - d)x + (m + n)(a + b)x + (a + b)(c - d)$

$\Rightarrow 2mdx + 2ncx + 2ad = 2anx + 2bmx + 2bc$

$$\Rightarrow x = \frac{ad - bc}{m(b-d) + n(a-c)}$$

21. (A) A.T.Q,



$$\frac{ar(\Delta ABE)}{ar(\Delta ABC)} = \frac{1}{8}$$

We know that,

Median divides the triangle into two triangles of equal areas.

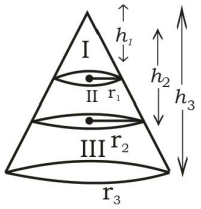
Then,

$$\frac{ar(\Delta ABE)}{ar(\Delta ABD)} = \frac{1}{4}$$

Therefore, $\dfrac{AE}{AD} = \dfrac{1}{4}$

$\therefore$ AE = ED = 1 : 3

22. (D) A.T.Q,



$h_1 : h_2 : h_3 = 1 : 2 : 3$

We know that,

$$\frac{r_1}{h_1} = \frac{r_2}{h_2} = \frac{r_3}{h_3}$$

Then, $r_1 : r_2 : r_3 = 1 : 2 : 3$

$\therefore$ Ratio of volumes of I, II and III

= 1 : 7 : 19

Now, volume of the bigger cone (I + II+ III)

$= \dfrac{1}{3}\pi r_3^2 h_3$

$\Rightarrow$ (1 + 7 + 19) units

$= \dfrac{1}{3} \times \dfrac{22}{7} \times 18 \times 18 \times 63 = 21384$ cm^3

$\Rightarrow$ 27 units =21384 cm^3

Then, area of the larger frustum

$= 19$ units $= \dfrac{21384}{27} \times 19 = 15048$ cm^3

23. (C) A.T.Q,

Sum of the roots $(\tan\alpha + \tan\beta) = \dfrac{-b}{a}$

and,

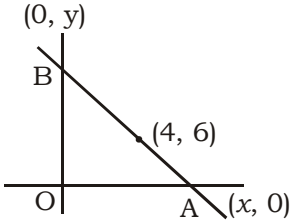
product of the roots $(\tan\alpha \tan\beta) = \dfrac{c}{a}$

Now, $\tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}$

Putting the respective values, we get

$$\tan(\alpha+\beta) = \frac{\frac{-b}{a}}{1-\frac{c}{a}} = \frac{b}{c-a}$$

24. (B) Let the coordinates of A and B be (x, 0) and (0, y) respectively.



Now, using mid point formula, we get,

$\dfrac{x+0}{2} = 4 \Rightarrow x = 8$

and, $\dfrac{y+0}{2} = 6 \Rightarrow y = 12$

Then, area of $\Delta OAB = \dfrac{1}{2} \times x \times y$

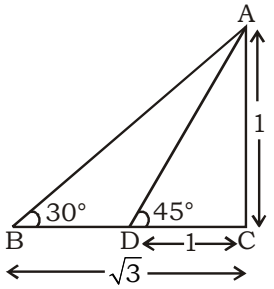
$= \dfrac{1}{2} \times 8 \times 12 = 48$ sq. units

25. (A) $\dfrac{(\cos 18^\circ - \cos 54^\circ)(\sin 84^\circ + \sin 36^\circ)}{(\cos 24^\circ - \cos 96^\circ)(\sin 42^\circ - \sin 6^\circ)}$

$= \dfrac{(2\sin 36^\circ \sin 18^\circ)(2\sin 60^\circ \cos 24^\circ)}{(2\sin 60^\circ \sin 36^\circ)(2\cos 24^\circ \sin 18^\circ)}$

$= 1$

26. (A) A.T.Q,



BD = 20 m

Now,

$\left(\sqrt{3}-1\right)$ units = 20 m

Then, height of the lamp post

1 unit = $\dfrac{20}{\sqrt{3}-1}$ m = $10\left(\sqrt{3}+1\right)$ m

$\therefore$ height of the lamp post = $10\left(\sqrt{3}+1\right)$ m

27. (B) We know that,

If $a\sin\theta + b\cos\theta = c$

Let $b\sin\theta - a\cos\theta = x$

Then, $a^2 + b^2 = c^2 + x^2$

$\Rightarrow x = \sqrt{a^2 + b^2 - c^2}$

$\therefore$ $b\sin\theta - a\cos\theta = \sqrt{a^2 + b^2 - c^2}$

28. (A) A.T.Q,

$\text{cosec}\,\theta + \cot\theta = P$ ..... (i)

$\text{cosec}\,\theta - \cot\theta = \dfrac{1}{P}$ ..... (ii)

Then,

Subtracting equation (ii) and from (i), we get

$2\cot\theta = P - \dfrac{1}{P}$

$\Rightarrow \tan\theta = \dfrac{2P}{P^2 - 1}$

Now,

$\sec\theta = \sqrt{1 + \tan^2\theta}$

$= \sqrt{1 + \left(\dfrac{2P}{P^2-1}\right)^2} = \dfrac{P^2+1}{P^2-1}$

29. (B) A.T.Q,

$\tan(A + B) = \dfrac{\tan A + \tan B}{1 - \tan.\tan B}$

$= \dfrac{a + b + a - b}{1 - (a+b)(a-b)}$

$= \dfrac{2a}{1 - (a^2 - b^2)}$ ..... (i)

and, $\tan(A - B) = \dfrac{\tan A - \tan B}{1 + \tan A.\tan B}$

$= \dfrac{(a+b)-(a-b)}{1+(a+b)(a-b)} = \dfrac{2b}{1+(a^2-b^2)}$ .... (ii)

Multiply equation (i) and (ii), we get

$\tan(A + B).\ \tan(A - B)$

$= \dfrac{2a}{1-(a^2-b^2)} \times \dfrac{2b}{1+(a^2-b^2)}$

$= \dfrac{4ab}{1-(a^2-b^2)^2}$

30. (C) Length of the longest rod = $\sqrt{l^2 + b^2 + h^2}$

$= \sqrt{3^2 + 4^2 + 5^2} = 5\sqrt{2}$ cm

31. (C) Total age of couple at the time of marriage = 23 × 2 = 46 years

and, total age of family at the time birth of first child = 16 × 3 = 48 years

and, total age of family at the time of birth of second child = 15 × 4 = 60 years

Here, age of the first child = $\dfrac{60-48}{3}$

= 4 years

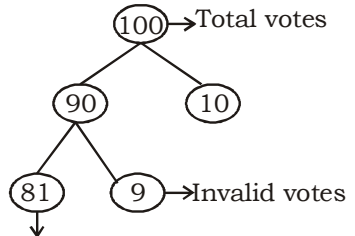
Now,

total age of family = 20 × 4 = 80 years

then, age of the first child = 4 + $\dfrac{80-60}{4}$

= 4 + 5 = 9 years

32. (C)



Now, difference between the votes of winning candidate and losing candidate

$= 81\times\frac{60}{100} - 81\times\frac{40}{100} = \frac{81}{5}$ units

A.T.Q,

$\frac{81}{5}$ units = 3240

Then, total number of votes = 100 units

$= \frac{3240\times 5}{81}\times 100 = 20000$

33. (D) A.T.Q,
Profit gained by selling 20% above CP = 20%
and, profit gained by selling 20% less quantity = $\frac{20}{80}\times 100 = 25\%$

Then, net profit = $20 + 25 + \frac{20\times 25}{100}$

= 50%

34. (B) A.T,Q

CP of 5 dozen bananas = $\frac{6}{5}\times 60 = ₹72$

and, remaining bananas = 60 – 6 = 54

Now, SP of 54 bananas = $72\times\frac{125}{100} = ₹90$

Then, SP of one dozen bananas

$= \frac{90}{54}\times 12 = ₹20$

35. (B) A.T.Q,

Ram → 12, Rahim → 15 ⟩ 60 ⟨ 5, 4

Work done by Rahim in 10 days
= 4 × 10 = 40 unit
Then, time taken by Ram to complete the remaining work = $\frac{60-40}{5}$ = 4 days
Now, required number of days
= 10 – 4 = 6 days

36. (C) Required remainder will be the remainder obtained by dividing 97 by 37.
Now,
97 = 37 × 2 + 23
∴ Required remainder = 23

37. (B) A.TQ,

	Old	New
r	100	120
r	100	120
h	100	80

Volume = 100 × 100 × 100 : 120 × 120 : 80
= 125 : 144
Then, percentage change in volume
$= \frac{144-125}{125}\times 100\% = 15.2\%$

38. (A) A.T.Q,
Area of the church to be painted
= Area of four walls + C.S.A of hemisphere + (area of roof – area of circular part of hemisphere)
$= 4a^2 + 2\pi r^2 + a^2 - \pi r^2$
$= 5a^2 + \pi r^2$
Here, a = 28 cm
and, radius of hemisphere = $\frac{a}{2}$ = 14 cm
Then, required area

$= 5\times 28\times 28 + \frac{22}{7}\times 14\times 14 = 4536\ m^2$

Now,
cost of white wash = 15 × 4536 = ₹68040

39. (B) A.T.Q,

A	B	C
4000 × 3	6000 × 6	5000 × 8
+6000 × 9	+4000× 6	+15000 × 4
66000	56000	100000

The, Ratio of profit of A, B and C
= 33 : 28 : 50
And,
Total profit = ₹6750
and, the amount which C gets due to his continutiy = 100 × 12 = ₹1200
Now, profit to be shared among
A, B and C = 6750 – 1200 = ₹5550
Here,
(33 + 28 + 50) units = ₹5550
⇒ 111 units = ₹5550
⇒ 1 unit = ₹50
Then, share of B = 28 units
= 28 × 50 = ₹1400

40. (B) Let the investments of the person be P_1, P_2 and P_3
A.T.Q,

$$P_1\left[\frac{r_1t_1}{100}+1\right] = P_2\left[\frac{r_2t_2}{100}+1\right] = P_3\left[\frac{r_3t_3}{100}+1\right]$$

$$\Rightarrow P_1\left[\frac{6\times 5}{100}+1\right] = P_2\left[\frac{8\times 5}{100}+1\right] = P_3\left[\frac{10\times 6}{100}+1\right]$$

$\Rightarrow 13P_1 = 14P_2 = 16P_3$
Then,
$P_1 : P_2 : P_3$ = 14 × 16 : 13 × 16 : 13 × 14
= 112 : 104 : 91
∴ Required ratio = 112 : 104 : 91

41. (A) A.T.Q,

CP	MP	SP	
4	5		×3
6		7	×2

Now, Ratio of CP, MP and SP
= 12 : 15 : 14
Then, discount percent

$$= \frac{15-14}{15}\times 100\%$$

$$= 6\frac{2}{3}\%$$

42. (B) Let the speeds of the trains of be x m/s and ym/s.
Then, relative speed of the trains when they move in opposite direction $(x + y)$

$$= \frac{250+350}{12} = 50 \text{ m/s}$$

and, relative speed of the trains when they move in same direction $(x - y)$

$$= \frac{250+350}{30} = 20 \text{ m/s}$$

Now, speed of the faster train

$$= \frac{(x+y)+(x-y)}{2} = \frac{50+20}{2} = 35 \text{ m/s}$$

43. (C) Let total number of overs be x.
A.T.Q,
$6(x - 3) + 42 = 6.5x$
$\Rightarrow 6x - 18 + 42 = 6.5x$
$\Rightarrow 0.5x = 24$
$\Rightarrow x = 48$
$\therefore$ Total number of overs = 48

44. (B) A.T.Q,

$$P\left[1+\frac{r}{100}\right]^3 = 10000 \text{ ..... (i)}$$

and, $$P\left[1+\frac{r}{100}\right]^5 = 11025 \text{ ..... (ii)}$$

Dividing equation (ii) by (i), we get

$$\left(1+\frac{r}{100}\right)^2 = \frac{11025}{10000}$$

$$\Rightarrow \left(1+\frac{r}{100}\right)^2 = \frac{441}{400} = \left(\frac{21}{20}\right)^2$$

$$\Rightarrow 1+\frac{r}{100} = \frac{21}{20}$$

On solving, we get
r = 5%
$\therefore$ Required rate of interest = 5%

45. (B) Now,

A $\longrightarrow$ 12 $\rangle$ 5
B $\longrightarrow$ 15 $\rangle$ 60 $\langle$ 4
C $\longrightarrow$ 20 $\rangle$ 3

Let amount of money which C gets = x
Then, amount of money which B gets
= $x + 4500$
and, amount of money which A gets
= $15000 - (x + x + 4500) = 10500 - 2x$
Now,

$$\frac{10500-2x}{x+4500} = \frac{5}{4}$$

On solving, we get
$x = 1500$
Then, ratio of amount of A, B and C
= $(10500 - 2 \times 1500) : (1500 + 4500) : 1500 = 5 : 4 : 1$
Now, (5 + 4 + 1) units = 60
10 units = 60
Then, amount of work done by A

$$= \frac{60}{10} \times 5 = 30$$

$\therefore$ Time taken by A to complete the work

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

46. (D) A.T.Q,

$$\frac{P \times r_1 \times 8}{100} = (3-1)P$$

$$\Rightarrow r_1 = 25\%$$

and, $$\frac{P \times r_2 \times 10}{100} = (5-1)P$$

$$\Rightarrow r_2 = 40\%$$

Then, required difference
= 40% – 25% = 15%

47. (B) Let the speed of the cyclist be x km/h.
A.T.Q,

$$\frac{20}{x-2} - \frac{20}{x} = \frac{30}{60}$$

$$\Rightarrow \frac{1}{x-2} - \frac{1}{x} = \frac{1}{40}$$

On solving, we get x =10
$\therefore$ speed of the cylist =10 km/h

48. (D) A.T.Q,

	A	B	
Income	8	11	×2
Expenditure	5	7	×3

Then, new ratio becomes

	A	B	
Income	16	22	) 1 unit
Expenditure	15	21	

Now,
1 unit = ₹2500
Then, difference between their monthy income = (22 – 16) units = 6 units
= 6 × 2500 = ₹15000

49. (B) Let the population of the village be x.
Then,

$$x \times \frac{320}{300} \times \frac{365}{400} = 4380$$

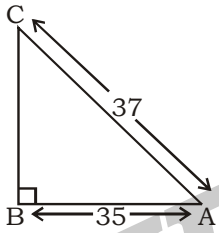
On solving, we get
$x = 4500$

50. (D) A.T.Q,

employee	9	:	5
salary	10	:	27

Total salary = 90 : 135 = 2 : 3
Required change = 2 : 3

51. (C) Using pythagoras, we get



$BC = \sqrt{37^2 - 35^2} = 12$ cm
Now, circumradius of the triangle

$$= \frac{37}{2} = 18.5 \text{ cm}$$

and, inradius of the triangle

$$= \frac{AB + BC - AC}{2}$$

$$= \frac{35 + 12 - 37}{2} = 5 \text{ cm}$$

Then, required difference
= 18.5 – 5 = 13.5 cm

52. (C) A.T.Q,
Distance travelled by B in 10 seconds = 200 m
Then, speed of B $= \frac{200}{10} = 20$ m/s
and, time taken by B to cover 800 m

$$= \frac{800}{20} = 40 \text{ sec}$$

Now, time taken by A to cover 1000 m = 40 sec
and, time taken by B to cover 1000 m

$$= \frac{600}{20} + \frac{400}{10} = 70 \text{ seconds}$$

Then, required difference
= 70 – 40 = 30 seconds

53. (B) A.T.Q,

$$x = \frac{\sqrt{9} + \sqrt{7}}{\sqrt{9} - \sqrt{7}}$$

$$\Rightarrow x = \frac{\left(\sqrt{9} + \sqrt{7}\right)\left(\sqrt{9} + \sqrt{7}\right)}{\left(\sqrt{9} - \sqrt{7}\right)\left(\sqrt{9} + \sqrt{7}\right)}$$

$$\Rightarrow x = 8 + \sqrt{63}$$

and, $\frac{1}{x} = \frac{1}{8 + \sqrt{63}} = 8 - \sqrt{63}$

Then, $x + \frac{1}{x} = 8 + \sqrt{63} + 8 - \sqrt{63} = 16$

Now, $\frac{x^2 - 6x + 1}{2x} = \frac{x - 6 + \frac{1}{x}}{2}$

$$= \frac{16 - 6}{2} = 5$$

54. (C) Here,
$3^{50} = (3^5)^{10} = 243^{10}$,
$4^{40} = (4^4)^{10} = 256^{10}$,
$5^{30} = (5^3)^{10} = 125^{10}$,
and,
$6^{20} = (6^4)^{10} = 36^{10}$,
$\therefore$ Greatest number = $256^{10} = 4^{40}$

55. (C) A.T.Q,

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

$$\Rightarrow a - 3 = \frac{1}{a}$$

$$\Rightarrow a - \frac{1}{a} = 3$$

Takeing cube both sides, we get

$$a^3 - \frac{1}{a^3} - 3\left(a - \frac{1}{a}\right) = 3^3$$

$$\Rightarrow a^3 - \frac{1}{a^3} = 27 + 3 \times 3 = 36$$

56. (C) A.T.Q,

$$15\cos\theta + 8\sin\theta = 17$$

$$\Rightarrow \frac{15}{17}\cos\theta + \frac{8}{17}\sin\theta = 1$$

We know that,
$\cos^2\theta + \sin^2\theta = 1$
Then,

$$\cos\theta = \frac{15}{17} \text{ and } \sin\theta = \frac{8}{17}$$

57. (B) Slant height of the pyramid

$= \sqrt{10^2 + 7.5^2} = 12.5$ m

Now, total surface area of the pyramid
= area of base + 4× area of slant surface

$= 20 \times 20 + 4 \times \left(\frac{1}{2} \times 20 \times 12.5\right) = 900 \text{ m}^2$

58. (A) A.T.Q,

$x = \sqrt{\frac{3+\sqrt{5}}{3-\sqrt{5}}}$

$\Rightarrow x = \frac{3+\sqrt{5}}{2}$ ..... (i)

Now,

$\frac{1}{x} = \frac{2}{3+\sqrt{5}} = \frac{3-\sqrt{5}}{2}$ ..... (ii)

Adding equation (i) and (ii), we get

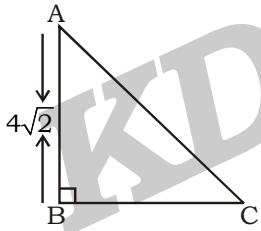
$x + \frac{1}{x} = \frac{3+\sqrt{5}}{2} + \frac{3-\sqrt{5}}{2}$

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

$\Rightarrow x^2 + 1 = 3x$

$\Rightarrow x^2 - 3x + 1 = 0$

59. (D) Let AC = x unit



Then, BC = $x - 2$ unit

Using pythagoras, we get

$x^2 - (x-2)^2 = \left(4\sqrt{2}\right)^2$

$\Rightarrow (x - x + 2)(x + x - 2) = 32$

$\Rightarrow x = 9$

Now,

$\sec A + \tan A = \frac{AC}{AB} + \frac{BC}{AB} = \frac{9+7}{4\sqrt{2}} = 2\sqrt{2}$

60. (A) A.T.Q,

$\frac{\text{C.S.A}}{\text{T.S.A}} = \frac{3}{4}$

$\Rightarrow \frac{2\pi rh}{2\pi r(h+r)} = \frac{3}{4}$

$\Rightarrow h = 3r$

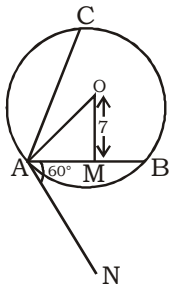
Now, T.S.A of the cylinder = 1232 cm^2

$\Rightarrow 2\pi r(h + r) = 1232$

On putting h = 3r and solving, we get

r = 7 cm

61. (A) A.T.Q,



We know that,
Radius of the circle
makes right angle with tangent.

Then, $\angle OAB = 90° - 60° = 30°$

Now, OA = $\frac{OM}{\sin 30°} = 14$ cm

Then, area of the circle = πr^2

$= \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$

62. (C) Let sides of the polygons be $4x$ and $5x$ respectively.

Then,

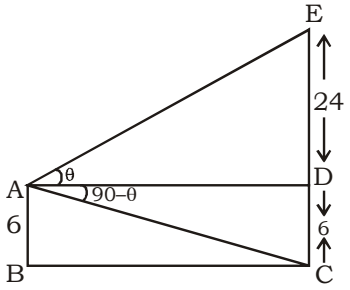
$\frac{\frac{(4x-2)180°}{4x}}{\frac{(5x-2)180°}{5x}} = \frac{75}{76}$

On solving, wet get

$x = 8$

Then, number of sides in first polygon
= $4x = 4 \times 8 = 32$

63. (B) A.T.Q



In ΔADE,

$\tan\theta = \frac{24}{AD}$ ..... (i)

and, in ΔADC

$\tan(90° - \theta) = \frac{6}{AD}$

$\Rightarrow \cot\theta = \frac{6}{AD}$ ..... (ii)

Multiply equation (i) and (ii), we get

$$\tan\theta \times \cot\theta = \frac{24}{AD} \times \frac{6}{AD}$$

$\Rightarrow AD^2 = 144$

$\Rightarrow AD = 12$

$\therefore$ Distance between the person and the building = 12 feet

64. (A) A.T.Q,

$$x = \sqrt[3]{a+\sqrt{a^2+b^3}} + \sqrt[3]{a-\sqrt{a^2+b^3}}$$

On cubing both sides, we get

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

$\Rightarrow x^3 = 2a - 3bx$

$\Rightarrow x^3 + 3bx = 2a$

65. (B) A.T.Q,

Area of the triangular field

$$= \frac{1}{2} \times 80 \times 60 = 2400 \text{ m}^2$$

and, area of the field which is grazed by horses $= \pi r^2 \times \frac{180°}{360°}$

$$= \frac{22}{7} \times 14 \times 14 \times \frac{1}{2} = 308 \text{ m}^2$$

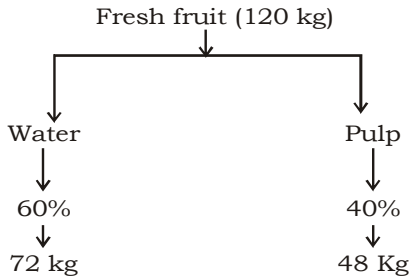
Then, the area which is left ungrazed

$= 2400 - 308 = 2092 \text{ m}^2$

66. (B) Here, D, E and F are the midpoints of side AC, AB and BC respectively.

$\therefore$ BD is the median of ΔABC.

67. (D) A.T.Q,



Now, 80% pulp of dry fruit = 48 kg.

Then, total quantity of dry fruits = 100%

$$= \frac{48}{80} \times 100 = 60 \text{ kg}$$

68. (A) A.T.Q,

$$\frac{1}{x} : \frac{1}{y} : \frac{1}{z} = 3 : 4 : 5$$

$$x : y : z = \frac{1}{3} : \frac{1}{4} : \frac{1}{5}$$

Now, multiply all the ratios by the LCM of 3, 4 and 5

Then,

$$x : y : z = \frac{1}{3} \times 60 : \frac{1}{4} \times 60 : \frac{1}{5} \times 60$$

$= 20 : 15 : 12$

69. (D) A.T.Q,

$$p^2 - q^2 = (\tan\theta + \sin\theta)^2 - (\tan\theta - \sin\theta)^2$$

$= 4\tan\theta \sin\theta$ ..... (i)

and,

$$pq = (\tan\theta + \sin\theta)(\tan\theta - \sin\theta)$$

$$= \tan^2\theta - \sin^2\theta$$

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

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

$$= \tan^2\theta \sin^2\theta$$

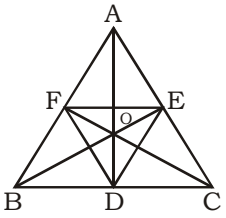
Then, $\sqrt{pq} = \tan\theta . \sin\theta$ ..... (ii)

Divide equation (i) by equation (ii), we get

$$\frac{p^2 - q^2}{\sqrt{pq}} = 4$$

$\Rightarrow p^2 - q^2 = 4\sqrt{pq}$

70. (B) A.T.Q,



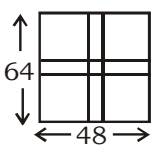
area of $\Delta OED = \frac{1}{3} \times$ area of ΔDEF

and, area of $\Delta DEF = \frac{1}{4} \times$ area of ΔABC

Then, area of $\Delta OED = \frac{1}{12} \times$ area of ΔABC

$$= \frac{1}{12} \times 48 = 4 \text{cm}^2$$

71. (C) Let the width of the road be x m.



Then, area of the road

$= 64 \times x + 48 \times x - x^2 = 112x - x^2$

Now, $112x - x^2 = \frac{8560}{16}$

$\Rightarrow 112x - x^2 = 535$

On solving, we get

$x = 5$ m

$\therefore$ width of the road = 5 m

72. (B) A.T.Q,

Distance travelled by A, B and C is 1000 m, 970 m and 873 m respectively.

Now, when B travels a distance of 1000 m, then distance travelled by C

$= \frac{1000}{970} \times 873 = 900$ m

Then, start given by B to C = 1000 – 900 = 100 m

73. (C) A.T.Q,

$x = \sqrt{3} + \sqrt{4} + \sqrt{5}$

$\Rightarrow x - 2 = \sqrt{3} + \sqrt{5}$

Squaring both sides, we get

$x^2 + 4 - 4x = 3 + 5 + 2\sqrt{15}$

$\Rightarrow x^2 - 4 - 4x = 2\sqrt{15}$

Again squaring both sides, we get

$x^4 + 16x^2 + 16 - 8x^3 + 32x - 8x^2 = 60$

$\Rightarrow x^4 - 8x^3 + 8x^2 + 32x = 44$

Multiply both sides by 3

$3x^4 - 24x^3 + 24x^2 + 96x = 132$

Now,

$3x^4 - 24x^3 + 28x^2 + 80x - 148$

$= 132 + 4x^2 - 16x - 148$

$= 132 + 4[4 + 2\sqrt{15}] - 148 = 8\sqrt{15}$

74. (C) A.T.Q,

$(1 + \sec 40° + \cot 50°)(1 - \operatorname{cosec} 40° + \tan 50°)$

$= (1 + \sec 40° + \tan 40°)(1 - \operatorname{cosec} 40° + \cot 40°)$

$= \left(1 + \frac{1}{\cos 40°} + \frac{\sin 40°}{\cos 40°}\right)\left(1 - \frac{1}{\sin 40°} + \frac{\cos 40°}{\sin 40°}\right)$

$= \frac{(1 + \cos 40° + \sin 40°)(\sin 40° - 1 + \cos 40°)}{\cos 40° . \sin 40°}$

$= \frac{(\cos 40° + \sin 40°)^2 - 1}{\cos 40° . \sin 40°}$

$= \frac{1 + 2\cos 40° \sin 40° - 1}{\cos 40° \sin 40°} = 2$

$\therefore$ Required value = 2

75. (C) We know that

$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$

Putting the value of tanA, we get

$\tan 2A = \frac{2\left(\frac{1 - \cos B}{\sin B}\right)}{1 - \left(\frac{1 - \cos B}{\sin B}\right)^2}$

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

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

$= \frac{2(1 - \cos B)\sin B}{2\cos B(1 - \cos B)} = \tan B$

76. (B) A.T.Q,

C(0, 4)

A(3, 5) B(–6, b)

Point C divides the line AB in the ratio of 1 : 2

Now,

$4 = \frac{1 \times b + 2 \times 5}{1 + 2}$

$\Rightarrow b + 10 = 12$

$\Rightarrow b = 2$

77. (C) A.T.Q,

$\sin A . \sin B . \sin C = \frac{2 - \sqrt{2}}{4}$ ..... (i)

and, $\cos A . \cos B . \cos C = \frac{\sqrt{2} + 1}{4}$ .....(ii)

Divide equation (i) by (ii), we get

$\tan A . \tan B . \tan C = \frac{\frac{(2 - \sqrt{2})}{4}}{\frac{\sqrt{2} + 1}{4}} = \frac{\sqrt{2}(\sqrt{2} - 1)}{(\sqrt{2} + 1)}$

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

Now, In ΔABC

$\tan(A + B) = -\tan C$

$\Rightarrow \frac{\tan A + \tan B}{1 - \tan A . \tan B} = -\tan C$

$\Rightarrow \tan A + \tan B = -\tan C + \tan A . \tan B . \tan C$

$\Rightarrow \tan A + \tan B + \tan C = \tan A . \tan B . \tan C$

$= 3\sqrt{2} - 4$

78. (C) A.T.Q,

$1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \ldots\ldots\ldots \infty = x$

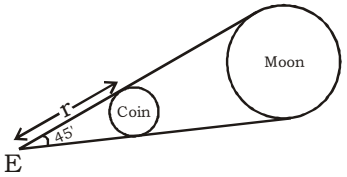
$\Rightarrow \left(1 + \frac{1}{3^2} + \frac{1}{5^2} + \ldots\ldots\infty\right) + \left(\frac{1}{2^2} + \frac{1}{4^2} + \frac{1}{6^2} \ldots\ldots\infty\right) = x$

$\Rightarrow \left(1 + \frac{1}{3^2} + \frac{1}{5^2} + \ldots..\infty\right) + \frac{1}{2^2}\left(1 + \frac{1}{2^2} + \frac{1}{3^2} + \ldots..\infty\right) = x$

$$\Rightarrow \left(1+\frac{1}{3^2}+\frac{1}{5^2}+.....\infty\right)+\frac{x}{4}=x$$

$$\Rightarrow \left(1+\frac{1}{3^2}+\frac{1}{5^2}+.....\infty\right)=\frac{3x}{4}$$

79. (D) We know that



$$\text{radius (r)} = \frac{\text{length of are}\,(l)}{\text{angle in radian}\,(\theta)}$$

A.T.Q,

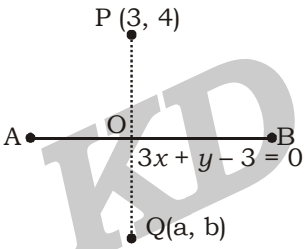
l = 11 cm

and, $\theta = 45 \times \frac{1}{60}\times\frac{\pi}{180} = \left(\frac{11}{840}\right)^c$

Now, $r = \frac{11}{\frac{11}{840}} \Rightarrow r = 840$ cm

∴ Required distance = 840 cm

80. (A) A.T.Q,



Equation of line AB is $3x + y - 3 = 0$.....(i)

Then, slope of line AB = – 3

and, slope of line PQ = $\frac{1}{3}$

($\because$ PQ $\perp$ AB)

Now, equation of line PQ is

$$\frac{y-4}{x-3}=\frac{1}{3}$$

$\Rightarrow 3y - 12 = x - 3$

$\Rightarrow x - 3y + 9 = 0$ ..... (ii)

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

$x = 0$ and $y = 3$

We know that

O(0, 3) is the mid point of PQ

Then, $0 = \frac{a+3}{2} \Rightarrow -3$

and, $3 = \frac{b+4}{2} \Rightarrow b = 2$

∴ Required point = (–3, 2)

81. (B) Let time taken for the rise in water level = t hours

A.T.Q,

$\pi r^2 \times v \times t = l \times b \times h$

$$\Rightarrow \frac{22}{7}\times\frac{21}{200}\times\frac{21}{200}\times 8000\times t = 66\times 48\times\frac{7}{100}$$

On solving, we get

t = 0.8 hours

∴ Required time = 0.8 × 60 = 48 minutes

82. (C) A.T.Q,

$$P\left[1+\frac{r}{100}\right]^3 = 2^3P \text{ ..... (i)}$$

Now,

For the amount to be 16 times

$$P\left(1+\frac{r}{100}\right)^n = 2^4P\text{..... (ii)}$$

From (i) and (ii), we get

$n = 4$

∴ Required time = 4 years

83. (B) Let the annual payment be ₹x.

Then,

$$14040 = x+\left(x+\frac{x\times r}{100}\right)+\left(x+\frac{x\times 2\times r}{100}\right)+...$$

$$\Rightarrow 14040 = 5x + \frac{x}{100}\times 4(1+2+3+4)$$

$$\Rightarrow 14040 = \frac{27x}{5}$$

$\Rightarrow x = 2600$

∴ Required annual payment = ₹2600

84. (D) A.T.Q,

Distance travelled by bus in 3 minutes

Distance travelled by man in 12 minutes

Then, ratio of their speeds = 4 : 1

∴ Speed of man = $\frac{40}{4}\times 1$ = 10 km/h

85. (A) A.T.Q,

Numbers divisible by 10 = 100,

Numbers divisible by 15 = 66,

Numbers divisible by 25 = 40

Now,

Number divisible by LCM of 10 and 15 = 33

Number divisible by LCM of 15 and 25 = 13,

Number divisible by LCM of 25 and 10 = 20,

And,

Numbers divisible by LCM of 10, 15 and 25 = 6

Then,

Required numbers
= (100 + 33 + 40) – (33 + 13 + 20) + 6 = 146
Now, numbers which are not divisible by all these numbers = 1000 – 146 = 854

86. (A) Given sequence is in the form of $n^2 - 1$
Then, 11th term of the sequence
$= 11^2 - 1 = 120$

87. (B) A.T.Q,

$$\frac{\sqrt{a+x}+\sqrt{a-x}}{\sqrt{a+x}-\sqrt{a-x}} = b$$

Rationalizing the denominator, we get

$$\frac{a+x+a-x+2\sqrt{a^2-x^2}}{(a+x)-(a-x)} = b$$

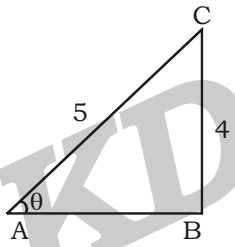
$$\Rightarrow 2a + 2\sqrt{a^2-x^2} = 2bx$$

$$\Rightarrow \sqrt{a^2-x^2} = bx - a$$

Squaring both sides, we get
$a^2 - x^2 = b^2x^2 + a^2 - 2abx$
$\Rightarrow 2abx = (b^2 + 1)x^2$

$$\Rightarrow x = \frac{2ab}{b^2+1}$$

88. (c) A.T.Q,



$4\sin\theta + 5\cos^2\theta = 5$
$\Rightarrow \sin\theta + 5 - 5\sin^2\theta = 5$

$$\Rightarrow \sin\theta = \frac{4}{5}$$

Using pythagoras, we get

$$\cos\theta = \frac{3}{5}$$

Then, $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{4}{3}$

89. (B) Let the price of the article be ₹100
Then,

$$\text{CP of the article} = 100 \times \frac{80}{100} = ₹80$$

and,

$$\text{SP of the article} = 150 \times \frac{70}{100} = ₹105$$

$$\text{Then, profit percentage} = \frac{105-80}{80} \times 100$$

$$= 31\frac{1}{4}\%$$

90. (B) A.T.Q,
Initially, ratio of X, Y and Z in the mixture
= 6 : 4 : 5 ⇒ 24 : 16 : 20
Now,
Ratio of X, Y, Z when 50% mixture is taken out and replaced by liquid X
= 12 + 30 : 8 : 10 = 42 : 8 : 10
and, Ratio of X, Y and Z when 50% mixture is taken out and replaced by liquid Y = 21 : 4 + 30 : 5
= 21 : 34 : 5
Then, percentage of Y in the final mixture

$$= \frac{5}{21+34+5} \times 100\% = 8\frac{1}{3}\%$$

91. (C) Let the age of B is x years

Then, age of A = $\frac{3x}{4}$ years

and, age of C = $\frac{3x}{4} + 6$

Now,

$$\frac{x+11}{\frac{3x}{4}+6} = \frac{3}{2}$$

On solving, we get
$x = 16$
∴ Present age of B = 16 years

92. (A) A.T.Q,
Ratio of males and females = 15 : 13
Now, (15 + 13) units = 1,26,000
⇒ 1 unit = 4500
Then, number of males in the town
= 15 units = 4500 × 15 = 67500
and, number of females = 13 units
⇒ 13 × 4500 = 58500
Now, number of illiterate persons in the town

$$= 67500 \times \frac{24}{100} + 58500 \times \frac{36}{100}$$

= 16200 + 21060 = 37260

93. (D) Let the distance between A and B be D.
Then,

$$\frac{D}{8.5-4.5} + \frac{D}{8.5+4.5} = 17$$

$$\frac{D}{4} + \frac{D}{13} = 17$$

On solving, we get
D = 52 km
∴ Distance between A and B = 52 km

94. (A) Let the shares of the three persons be $5x + 37$, $9x + 58$ and $11x + 45$ respectively.
A.T.Q,
$5x + 37 + 9x + 58 + 11x + 45 = 5765$
$\Rightarrow 25x + 140 = 5765$
$\Rightarrow x = 225$
Then, share of the third person
$= 11x + 45 = 2520$

95. (B) We know that, sum of an infinite AGP
$= \frac{a}{1-r} + \frac{dr}{(1-r)^2}$
Then, $S = \frac{1}{1-\frac{9}{10}} + \frac{1\times\frac{9}{10}}{\left(1-\frac{9}{10}\right)^2}$
$= 10 + 90 = 100$

96. (C) Total candidates appeared in states B and C together $= 45000 \times \frac{19}{100} = 8550$
and, total candidates qualified from states B and C
$= 9000 \times \frac{23}{100} = 2070$
Then, required perentage
$= \frac{2070}{8550} \times 100 = 24.21\%$

97. (B) Difference between the number of candidates qualified from C and F
$= 9000 \times \frac{11-7}{100} = 9000 \times \frac{4}{100} = 360$

98. (D) Required ratio = (15 + 8) : (17 + 22)
= 23 : 39

99. (D)

State	Appeared	Qualified	percentage
A	6750	1620	24%
B	4950	1440	29.09%
C	3600	630	17.5%
D	7650	1890	24.7%
E	4050	1260	31.1%
F	8100	990	12.22%
G	9900	1170	11.81%

$\therefore$ State G has minimum percentage of qulified candidates.

100. (B) Total number of candidates failed in states
B = 4950 – 1440 = 3510
D = 7650 – 1890 = 5760
C = 3600 – 630 = 2970
F = 8100 – 990 = 7110
Then, Required ratio
= (3510 + 5760) : (2970 + 7110)
= 9270 : 10080 = 103 : 112

SSC TIER II (MATHS) MOCK TEST - 35 (ANSWER

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

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