SSC MAINS (MATHS)-6 (SOLUTION)

1. (A) $987 = 3 \times 7 \times 47$
So, the required number must be divisible by each.
Hence, answer is 553681

2. (D) LCM of 252, 308 & 198 is 2772.
So, A, B and C will again meet at the starting point after 46 minutes 12 seconds.

3. (D) $6 \times 999 + \left[\frac{1+2+3+4+5+6}{7}\right]$

$= 6 \times 999 + \frac{21}{7} = 5997$

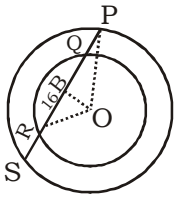
4. (B) Let required number of bottles be x.

$\frac{4}{5}x - \frac{3}{4}x = (6-4)$

$\frac{x}{20} = 2$

$x = 40$

5. (D)



In ΔOBR, $OB = \sqrt{17^2 - 8^2}$

$= \sqrt{225}$

$= 15$ cm

In Δ OBP,

$BP = \sqrt{25^2 - 15^2}$

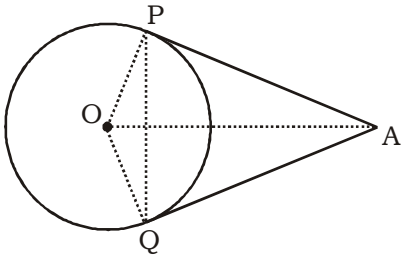
$= \sqrt{625 - 225}$

$= \sqrt{400}$

$= 20$ cm

Line PS = PB + BS = 20 + 20 = 40 cm

6. (B)



$\angle PAQ = 48°$ [Given]

ΔAPQ is an isoseles triangle.

So, $\angle APQ$ & $\angle AQP$ are equal.

$\angle APQ = \frac{180° - 48°}{2}$

$= \frac{132}{2}$

$= 66°$

7. (C) Let the number be x.

ATQ,

$x^2 - 25 = (x-25)^2$

$x^2 - 25 = x^2 + 625 - 50x$

$50x = 625 + 25$

$50x = 650$

$x = \frac{650}{50} = 13$

8. (C) Mr. X

Cost price = 100% – 10% = 90%

After sales tax = $90 \times \frac{108.5}{100}$ %

= 97.65%

Mr. Y

Cost price = 100% + 8.5%

= 108.5%

After sales tax = $108.5\% \times \frac{90}{100}$

= 97.65%

9. (B) $A = S\left(1 + \frac{2r}{100}\right)^3$

$= S\left(1 + \frac{r}{50}\right)^3$

10. (A) Story books : other books $\Rightarrow$ 7 : 2 $\Rightarrow$ 9

$7 \xrightarrow{\times 216} 1512$

$9 \xrightarrow{\times 216} 1944$

other book = 2×216

= 432

ATQ, $4 \xrightarrow{\times 108} 432$

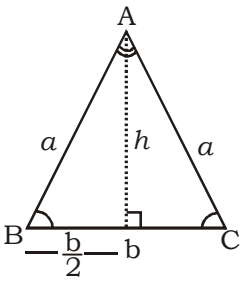
Total books = $(15 + 4) \times 108$

= 2052

Required books = 2052 – 1944

= 108

11. (B)



$h = \sqrt{(a)^2 - \left(\frac{b}{2}\right)^2}$

$h = \sqrt{a^2 - \frac{b^2}{2}}$

$\Rightarrow$ Leight = $\sqrt{\frac{4a^2 - b^2}{4}}$

Area of triangle = $\frac{1}{2}$ × base × height

$= \frac{1}{2} \times b \times \sqrt{\frac{4a^2 - b^2}{4}}$

$= \frac{b}{2} \times \frac{1}{2} \sqrt{4a^2 - b^2}$

$= \frac{b}{4} \sqrt{4a^2 - b^2}$

12. (B) Total value = 6 x
ATQ,
$3y + 3z = 6x$
$3(y + z) = 6x$
$y + z = 2x$

13. (C) Right circular cylinders
$r_1 : r_2 = 2 : 3$
$h_1 : h_2 = 5 : 3$
Valume of right circular cylinder = $\pi r^2 h$
$\Rightarrow V \propto r^2 h$ ($\because z$ is constant)
$\therefore V_1 : V_2 = 2^2 \times 5 : 3^2 \times 3$
$= 20 : 27$

14. (D) $5 [0.1 + 0.11 + 0.111 + ...+ n]$

$\Rightarrow \frac{5}{9} [0.9 + 0.99 + 0.999 + ...+ n]$

$\Rightarrow \frac{5}{9} [\{1 - 0.1\} + \{1 - (0.1)^2\} + \{1 - (0.1)^3\} + ...+ n]$

$\Rightarrow \frac{5}{9} [n - \{0.1 + (0.1)^2 + (0.1)^3 + ...+ n\}]$

$\Rightarrow \frac{5}{9} \left[n - \frac{0.1(1 - 0.1^n)}{1 - 0.1}\right]$

$\Rightarrow \frac{5}{9} \left[n - \frac{1}{9}\{1 - 0.1^n\}\right]$

$\Rightarrow \frac{5}{9} \left[n - \frac{1}{9}\left\{1 - \frac{1}{10^n}\right\}\right]$

15. (C) Payment of 12 months = ₹ 9000 + 1 Turban

$\Rightarrow$ Payment of 9 months = $\frac{9}{12}$
(₹ 9000 + 1 Turbon) ..... (i)
Received payment = ₹ 6500+1 Turban... (ii)
From equation (i) & (ii)

$\frac{3}{4}$ (₹ 9000 + 1 Turbon) = ₹ 6500 + 1Turban
$\Rightarrow$ 27000 + 3 Turbon = 26000 + 4 Turban
$\Rightarrow$ (4 – 3) Turban = (27 – 26) 1000
$\Rightarrow$ 1 Turban = ₹1000

16. (D) Let the number be x

$\frac{x + a}{y + a} = \frac{p}{q}$ (where P $\neq$ q)
$qx + aq = py + ap$
$a(q - p) = py - ap$

$a = \frac{py - qx}{q - p}$

17. (C) Let total number of other workers be a, then agricultural worker be $11a$.
ATQ,

$\frac{11a \times s + a \times T}{12a} = \frac{a(11S + T)}{12a}$

$= \frac{11S + T}{12}$

18. (A) Let the number of subject be x.
ATQ, $(80+2)x - (80 - 3)x = 25$
$x = 5$
Total marks aimed = 80 × 5 = 400

19. (B)

	50 Paise	:	25 Paise	:	10 Paise
Number	2	:	3	:	5
Value	1	:	0.75	:	0.50

Total value = (1 + 0.75 + 0.50) = 2.25 unit
2.25 units = 90

$\Rightarrow$ 1 unit = $\frac{90}{2525}$ × 100 = 40 coins

$\therefore$ Number of 25 paise coins = 3 units
= 3 × 40
= 120 coins

20. (C) $P = \frac{4xy}{x + y}$

$\Rightarrow P = \frac{2x \times 2y}{x + y}$

$\Rightarrow \frac{P}{2x} = \frac{2y}{x + y}$

Applying componendo & dividendo

$\frac{P + 2x}{P - 2x} = \frac{2y + x + y}{2y - x - y}$

$\Rightarrow \frac{P + 2x}{P - 2x} = \frac{3y + x}{y - x}$ ..... (i)

Similarly,

$P = \frac{4xy}{x + y}$

$\Rightarrow \frac{P}{2y} = \frac{2x}{x + y}$

$\Rightarrow \frac{P + 2y}{P - 2y} = \frac{2x + x + y}{2x - x - y}$

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

Now, putting the value from equation (i) & (ii)

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

$= \frac{3y + x}{y - x} - \frac{3x + y}{y - x}$

$= \frac{3y + x - 3x - y}{y - x}$

$= \frac{-2x + 2y}{y - x} = \frac{2(y - x)}{(y - x)}$

$= 2$

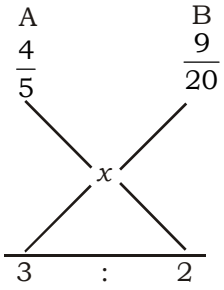
21. (D)

Mixture A Milk : Water } Mixed in ratio
Mixture B 9 : 11 } 3 : 2

Milk in mixture A = $\frac{4}{5} = \frac{4}{5 \to (4+1)}$

Milk in mixture B = $\frac{9}{20}$

By alligation,



$\therefore \frac{\frac{4}{5} - x}{x - \frac{9}{20}} = \frac{2}{3}$

$\Rightarrow 3 \times \left(\frac{4}{5} - x\right) = 2 \times \left(x - \frac{9}{20}\right)$

$\Rightarrow \frac{12}{5} - 3x = 2x - \frac{9}{10}$

$\Rightarrow 5x = \frac{12}{5} + \frac{9}{10}$

$\Rightarrow 5x = \frac{24+9}{10}$

$\Rightarrow x = \frac{33}{50} \Rightarrow$ Milk in new mixture

$\therefore$ water = (50 – 33) = 17

$\therefore$ Ratio of milk : water in new mixture = 33 : 17

22. (D) Let the total number of votes = 100
Number of votes that cast their vote = (100 –8)
= 92
Number of votes that went to winner = 48
$\therefore$ Number of votes that went to looser = (92 – 48) = 44
ATQ,
(48 – 44) unit = 1100 votes
$\Rightarrow$ 4 unit = 1100
1 unit = $\frac{1100}{4}$ votes

$\therefore$ Total number of votes = $\frac{1100}{4} \times 100$
= 100 unit
= 27500

23. (B) Total number of students = 100%
Percent of Girls = 70%
$\therefore$ Percent of Boys = 30% (100 – 70)
30% = 510 Boys
$\Rightarrow$ 1% = 17 Boys
Total number of students = 100%
= 100 × 17
= 1700

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

$\Rightarrow \frac{mx+nx-a+b}{mx-nx-a-b} = \frac{mx+nx+a+c}{mx-nx+a-c}$

$\Rightarrow \frac{(mx-a)+(nx+b)}{(mx-a)-(nx+b)} = \frac{(mx+a)+(nx+c)}{(mx+a)-(nx+c)}$

$\Rightarrow \frac{mx-a}{nx+b} = \frac{mx+a}{nx+c}$ [by componendo and dividendo]

$\Rightarrow (mx - a)(nx + c) = (mx + a)(nx + b)$

$\Rightarrow mnx^2 + cmx - anx - ac = mnx^2 + mbx + anx + ab$

$\Rightarrow cmx - anx - mbx - anx = ab + ac$

$\Rightarrow x\ (cm - 2an - mb) = a\,(b + c)$

$\Rightarrow x = \frac{a(b+c)}{cm - 2an - bm}$

25. (C) $\frac{5x-7y+10}{1} = \frac{3x+2y+1}{8} = \frac{11x+4y-10}{9}$

$\Rightarrow 8\,(5x - 7y + 10) = 1(3x + 2y + 1)$

$\Rightarrow 37x - 58y = -79$ ..... (i)

$9\,(5x - 7y + 10) = 11x + 4y - 10$

$\Rightarrow 34x - 67y = -100$ ..... (ii)

from equation (i) and (ii)

$x = 1, y = 2$

$x + y = 1 + 2$

$= 3$

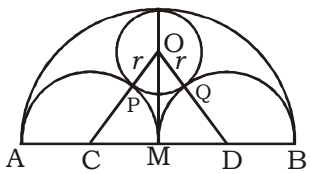
26. (C) Let B's money used for x months

ATQ, $\frac{\frac{1}{4} \times 15}{\frac{3}{4} \times x} = \frac{1}{2}$

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

$\Rightarrow x = 10$ months

27. (*)



AB = 2a $\Rightarrow$ AM = a

and AC = CM = MD = BD = $\frac{a}{2}$

Now OC = OP + PC = OP + CM

$= r + \frac{a}{2}$

$\therefore$ ΔOCD is an isoceles triangle and M is mid point of CD.

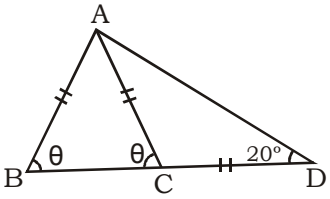
$\angle OMC = 90°$

In ΔOMC, $OC^2 = OM^2 + CM^2$

$$\left(r + \frac{a}{2}\right)^2 = (a - r)^2 + \left(\frac{a}{2}\right)^2$$

$$r = \frac{a}{3}$$

28. (A)



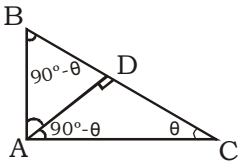
$\angle CAD = 20° = \angle ADC$

then, $\theta = 20° + 20°$

[exterior angle property of triangle]

$= 40°$

29. (A)



$\Delta ABC \sim \Delta BDA$

$$\therefore \frac{BA}{BD} = \frac{BC}{BA}$$

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

$= 4AB^2 + AB^2$

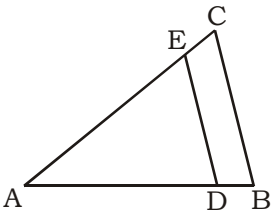
$= 5\ AB^2$

$$\therefore \text{ From (i) } BC = \frac{BA^2}{BD}$$

$$\Rightarrow BC = \frac{BC^2}{5BD}$$

$$\text{or, } BD = \frac{BC}{5} \left[\because AB^2 = \frac{BC^2}{5}\right]$$

30. (B)



$\Rightarrow \angle B = \angle D$ & $\angle E = \angle C$

$\therefore \Delta ADE \sim \Delta ABC$

$$\therefore \frac{AD}{BD} = \frac{AE}{EC}$$

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

$\Rightarrow x(x-1) = (x-2)(x+2)$

$\Rightarrow x^2 - x = x^2 - 4$

$\Rightarrow x = 4$

31. (C) In ΔBRC and ΔPAB

$\angle RCB = \angle PAB$

$\angle RBC = \angle PBA$

$\therefore \Delta BRC \sim \Delta PAB$

$$\therefore \frac{RC}{PA} = \frac{BC}{AB}$$

$$\Rightarrow \frac{y}{x} = \frac{BC}{AB}$$

Similarly in ΔARC and ΔABQ

$\Delta ARC \sim \Delta ABQ$

$$\therefore \frac{RC}{QB} = \frac{AC}{AB}$$

$$\Rightarrow \frac{y}{z} = \frac{AB - BC}{AB}$$

$$\Rightarrow \frac{y}{z} = 1 - \frac{BC}{AB}$$

$$\Rightarrow \frac{y}{z} = 1 - \frac{y}{x}$$

$$\Rightarrow \frac{y}{z} = \frac{x-y}{z}$$

or, $xy + yz = xz$

32.(D) Money given to wife $= \frac{1}{2}$

Money given to his 3 sons equally

$= \frac{2}{3}$ of reamaing $\frac{1}{2}$

$$\Rightarrow \frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$$

Rest of the money given to his 4 daughters

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

$$= \frac{1}{6}$$

Each daughter gets = ₹ 20000

$$\therefore \text{ 4 daughter} = 4 \times 20{,}000 = 80{,}000 = \frac{1}{6}$$

part of total money

$\Rightarrow \therefore$ Total money = 4,80,000

Money given to 3 sons $= \frac{1}{3} \times 4{,}80{,}000$

$= 1, 60, 000$

$$\therefore \text{ Each son gets equally} = \frac{1{,}60{,}000}{3}$$

$= 53333.33$

33. (B) Average marks of 16 children = 76

$\Rightarrow$ Total marks of 16 children $= 75 \times 10$

$= 750$

$\Rightarrow$ Total marks of 6 children $= 1216 - 750$

$= 466$

$\Rightarrow$ Average marks of 6 children = $\frac{466}{6}$

$= 77\frac{2}{3}$

34. (D) Let his heighest run be x and lowest be y.
ATQ, $x - y = 172$
sum of all runs = 40 × 50 = 2000 runs
After excluding two innings = 48 × 38
= (50 – 2) (40–2)
= 2000 + 4 – 180
$\therefore$ Total runs in all innings
= 2000 + 4 – 180 + x + y
$\Rightarrow$ 2000 + 4 – 180 + x + y
$\Rightarrow$ $x + y = 176$
$x + y = 176$
$x - y = 172$
Adding, $2x = 176 + 172$
$\Rightarrow x = \frac{348}{2} = 174$
$\therefore$ Highest score = 174

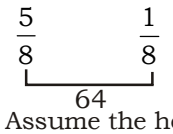
35. (B) Fraction /Ratio = 2 : 3 = $2x : 3x$
Now, 6 is subtracted from numerator
$(2x - 6) : 3x = \frac{2}{3}$ of $\frac{2}{3}$
$\Rightarrow \frac{2x-6}{3x} = \frac{4}{9}$
$\Rightarrow 18x - 54 = 12x$
$\Rightarrow 6x = 54 \Rightarrow x = 9$
$\therefore$ Numerator = 2 × 9 = 18

36. (D) Let the numbers be a, b, c and d respectively then we have,
$a + 3 = b - 3 = 3c = \frac{d}{3}$ — (i)
and $a + b + c + d = 64$ — (ii)
From equation (i) we get,
$b = a + 6$
$c = \frac{a+3}{3}$
$d = 3a + 9$
Now putting the value of equation (ii) in equation 9 (i)
$a + a + 6 + \frac{a+3}{3} + 3a + 9 = 64$
$\Rightarrow 3a + 3a + 18 + a + 3 + 9a + 27 = 192$
$\Rightarrow 16 = 192 - 48 \Rightarrow 16a = 144$
$\Rightarrow a = 9$
Then $b = 15$, $C = 4$ and $d = 36$
So difference between smallest and largest
= 36 – 4 = 32

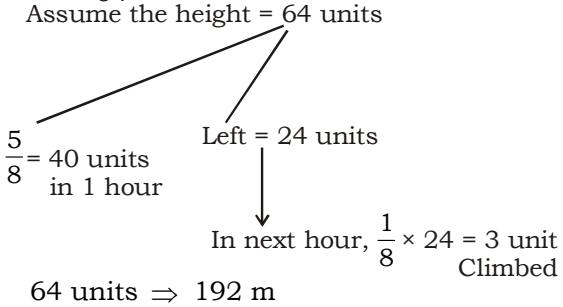
37. (A) Let the three numbers be a, b and c respectively then we have,
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
= 138 + 2 × 131
= 138 + 262
= 400
$\Rightarrow a + b + c = \sqrt{400} = 20$
So the sum of the respective numbers = 20

38. (D) Let the required sum be x.
$x \times \frac{96}{100} - 10000 \times \frac{1}{100} = 31100$
$\Rightarrow x \times \frac{96}{100} = 31100 + 100$
$\Rightarrow x = \frac{31200}{96} \times 100$
= 32500

39. (D) Spider climbed the height = $62\frac{1}{2}\% = \frac{5}{8}$ in 1 hours
In next hours, it covered = $\frac{1}{8}$ of remaining height



Assume the height = 64 units



64 units $\Rightarrow$ 192 m
$\Rightarrow$ 1 unit = 3 m
$\therefore$ Distance climbed in next hour = 3 units
= 9 m

40. (D) Let the original price be x
ATQ,
$x\left(\frac{100+r}{100}\right)\left(\frac{100+r}{100}\right) = 1$
$\Rightarrow x(100 + r) = 10000$
$\Rightarrow x = \frac{10000}{10000 - r^2}$
So the original price was = $\frac{10000}{10000 - r^2}$

41. (A) CP of article = (1920 + 1280) × $\frac{1}{2}$
= 3200 × $\frac{1}{2}$ = ₹1600
The SP for 25% profit = 1600 × $\frac{125}{100}$
= ₹ 2000

42. (C) Cost of 30 kg wheat at ₹11.50/kg
= 11.5 ×30
= ₹ 345
Cost of 20 kg wheat at ₹14.25/kg
= 14.25 × 20

= ₹ 285
Total cost of 50 Kg = ₹ (345 + 285)
= ₹ 630

$\Rightarrow$ Required price = ₹ $\frac{630}{50} \times \frac{130}{100}$ = ₹ 16.3

43. (C)

Cost	50	:	20	: 30
Weight	2	:	4	: 3
cost price $\Rightarrow$	100	:	80	: 90

Total cost price of 9 Kg groundnuts = ₹ 270
Total SP = 33 × 9 = ₹ 297

Required profit percentage = $\frac{27}{270} \times 100$
= 10%

44. (D) Let their investment be $3x$, $2x$ & $4x$.

A	**B**	**C**
$3x \times 36$	$2x \times 36$	$4x \times 36$
	$+2,70,000 \times 24$	$+ 2,70,000 \times 12$

Ratio of profit =
$(3x \times 36) : (72x + 2,70,000 \times 24) : (144x + 2,70,000 \times 12)$

$\frac{3x \times 36}{72x + 2,70,000 \times 24} = \frac{3}{4}$ [Given]

x = 90,000
Hence, A's initial investment = $3x$
= ₹ 2,70,000
B's initial investment = $2x$ = ₹ 1,80,000
C's initial investment = $4x$ = ₹ 3,60,000

45. (A) $\because a = \frac{xy}{x+y}$, $b = \frac{xz}{x+z}$, $C = \frac{yz}{y+z}$

$\therefore \frac{x+y}{xy} = \frac{1}{a}, \frac{x+z}{xz} = \frac{1}{b}, \frac{y+z}{yz} = \frac{1}{c}$

or, $\frac{1}{y} + \frac{1}{x} = \frac{1}{a}, \frac{1}{z} + \frac{1}{x} = \frac{1}{b}, \frac{1}{z} + \frac{1}{y} = \frac{1}{c}$

$\therefore \frac{1}{a} + \frac{1}{b} - \frac{1}{c}$

$= \left(\frac{1}{y} + \frac{1}{x}\right) + \left(\frac{1}{z} + \frac{1}{x}\right) - \left(\frac{1}{z} + \frac{1}{y}\right)$

$\therefore \frac{2}{x} = \frac{bc + ca - ab}{abc}$

or, $x = \frac{2abc}{bc + ca - ab}$

46. (C) One hour work of Jitendra and Surendra = $\frac{32}{6} + \frac{40}{5}$

$= \frac{160 + 240}{30}$

$= \frac{40}{3}$ Pages

Required time = $\frac{110 \times 3}{40}$ hours

$= \frac{330}{40}$ hours

= 8 hours 15 minutes

47. (A) 12 men complete a work in 4 days

$\therefore$ 1 day work of a man = $\frac{1}{48}$

15 women complete a work in days = 4

$\therefore$ 1 day work of a women = $\frac{1}{60}$

work done by 6 men in 2 days

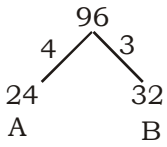
= $\frac{1}{48} \times 6 \times 2 = \frac{1}{4}$

$\therefore$ Remaining work = $1 - \frac{1}{4} = \frac{3}{4}$

Number of women required to finish the remaining work in 3 days = $\frac{\frac{3}{4}}{\frac{1 \times 3}{60}}$ = 15

48. (D) Speed of P = 50 km/hr
Speed of Q = 40 km/hr
$\because$ Per hour, P travelled 100 km more than Q.
$\therefore$ P travelled 100 km more than Q in
= 10 hours
$\therefore$ They meet after 10 hours
$\therefore$ Distance between P and Q
= (50 + 40) km/hr × 10 hours
= 90 × 10 = 900 kms

49. (B) Given A and B can fill in 24 min and 32 min respectively
ATQ,



Let B should be closed after x min
ATQ,
We have,
$(4 + 3) \times x + 4 (18 - x) = 96$
$\Rightarrow 7x + 4 (18 - x) = 96$
$\Rightarrow 7x + 72 - 4x = 96$
$\Rightarrow 3x = 24$
$\Rightarrow x = 8$
So tank B should be closed after 8 min.

50. (C) Let speed of car be x km/hour
ATQ,

$\frac{715}{x} - \frac{715}{x+10}$ = 2 hours

$\Rightarrow \frac{715(10 + x - x)}{x(x+10)} = 2$

$\Rightarrow x(x + 10) = \frac{715 \times 10}{2}$

$\Rightarrow x (x + 10) = 715 \times 5$
$\Rightarrow x (x + 10) = 13 \times 11 \times 5 \times 5$
$(715 = 13 \times 11 \times 5)$
$x (x + 10) = \underbrace{65 \times 55}_{\text{Diff} = 10}$ (From Options)
$\therefore x$ = 55 kms/hr

51. (C) 3 M + 4B $\Rightarrow$ 96 hours

$2\,M + 8B \Rightarrow 80$ hours
$2\,M + 3W \Rightarrow 120$ hours
LCM of 96, 80 and 120 = 480
Let total work be 480 units

$3\,M + 4B \Rightarrow \frac{480}{96} = 5$ units ..... (i)

$2\,M + 8B \Rightarrow \frac{480}{80} = 6$ units
or, $M + 4B = 3$ units .....(ii)

$2\,M + 3W \Rightarrow \frac{480}{120} = 4$ units.....(iii)

Subtracting equation (ii) from (i)
$\Rightarrow 2M = 2$ units
or, $M = 1$unit
putting value of M in equation (i)
$\Rightarrow 3 \times 1 + 4B = 5$

or, $B = \frac{1}{2}$ unit

one hour work of $5M + 12B = 5\times1+12\times\frac{1}{2}$
$= 5 + 6$
$= 11$ units

Required hours $= \frac{480}{11}$ hours

$= 43\frac{7}{11}$ hours

52. (D) Train 1st = 137 m
Train 2nd = 163 m
Net distance to be travelled by both the trains = 137 + 163
= 300 m
speed of the 1st train = 42 kms/hr
speed of another train = 38 kms/hr
$\therefore$ Net speed = (42 + 48) kms/hr
($\because$ They are travelling toward each other i.e in opposite direction)
= 90 km/hr

$= 90 \times \frac{5}{18}$ m /sec
= 25 m/sec

Required time $= \frac{D}{S} = \frac{300}{25}$ sec
= 12 sec

53. (C) Water : Syrup $\rightarrow$ 3 : 5
After drawing $\rightarrow$ 3 : 5
(ratio of the mixture remains the same)
After replacing 1 : 1
by water, the
quantity of syrup
remains same
$\rightarrow 5 : 5 \rightarrow$ (Multiplying by 5)
W : S
After drawing 3 : 5 $\Rightarrow$ Total 8 unit

After replacing 5 : 5 $\Rightarrow$ 2 units of water is be added
$\because$ After drawing, Mixture = 8 unit
$\therefore$ Before drawing, Mixture = (8 + 2) units
= 10 units
Drawn amount = 2 units

$\therefore$ Part of the mixture drawn $= \frac{2}{10} = \frac{1}{5}$

54. (B) $\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \frac{AB}{PQ}$
($\because \Delta ABC \sim \Delta PQR$)

$\Rightarrow \frac{36}{24} = \frac{AB}{10}$

$\Rightarrow AB = \frac{36\times10}{24} = 15$ cms

55. (A) $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \left(\frac{BC}{EF}\right)^2$
($\because \Delta ABC \sim \Delta DEF$)

$\Rightarrow \frac{64\text{cm}^2}{121\text{cm}^2} = \left(\frac{BC}{EF}\right)^2$

$\Rightarrow \frac{BC}{EF} = \sqrt{\frac{64}{121}}$

$\Rightarrow BC = \frac{8\times15.4}{11}$
$= 11.2$ cms

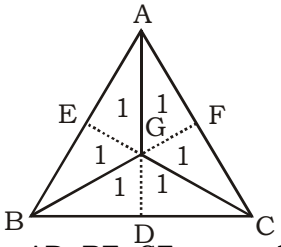
56. (A) $(r\cos\theta - \sqrt{3})^2 + (r\sin\theta - 1)^2 = 0$

$r\cos\theta = \sqrt{3}$ .....(i)

$r\sin\theta = 1$ .....(ii)
From (i) and (ii)
$r = 2$ & $\theta = 30°$

$\Rightarrow \frac{r\tan\theta + \sec\theta}{r\sec\theta + \tan\theta} = \frac{2\tan30° + \sec30°}{2\sec30° + \tan30°} = \frac{4}{5}$

57. (B)



$\because$ AD, BE, CF are median.
$\therefore$ It divides ΔABC in three equal parts.
Area (ΔAGB) = Area (ΔBGC) = Area (ΔCGA)

$= \frac{60}{3}$ sq cm $= 20$ cm^2

Now, each individual Δ is divided into equal parts.

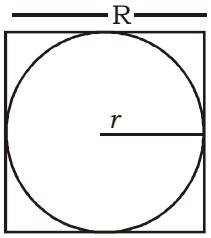
$\therefore$ In ΔBGC, Area of $\Delta BGD = \frac{20}{2} = 10$ cm^2

Similarly in ΔAGB, Area of $\Delta FGB = \frac{20}{10}$
$= 10$ cm^2

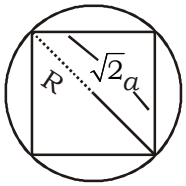
$\therefore$ Area of BDGF = Area of ΔBGF + Area of $\Delta BGD = 10 + 10$
$= 20$ cm^2

Short trick
6 units = 60
$\Rightarrow 2$ units = 20 cm^2

58. (B)



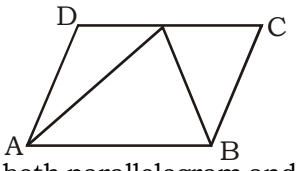
$r = \frac{14}{2} = 7$



$R = \frac{14\sqrt{2}}{2} = 7\sqrt{2}$

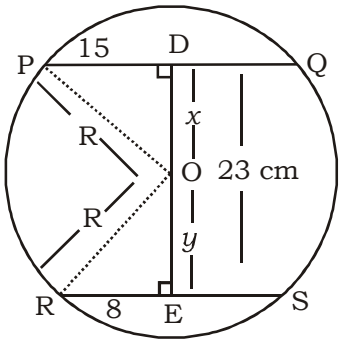
$r : R = 1 : \sqrt{2}$

59. (D)



both parallelogram and rhombus are same as base are same.

60. (D)



PQ||RS
OP = OR Radius (R) (O is centre)
Let DO be x & OE be y cm
P Q is a chord $\Rightarrow$ PQ = 30

$\therefore$ PD = DQ = $\frac{30}{2}$ = 15 cms

Similarly, RS = 16 cms

$\Rightarrow$ RE = ES = $\frac{16}{2}$ = 8 cms

$x^2 + (15)^2 = R^2$ ..... (I) [Applying pythagorus
$y^2 + (8)^2 = R^2$ ..... (ii) theorem]
From equation (i) and (ii)
$x^2 + 225 = y^2 + 64$
$\Rightarrow y^2 - x^2 = 225 - 64 \Rightarrow y^2 - x^2 = 161$ cm^2
$\Rightarrow (y + x)(y - x) = 161$ cm
$\because (x + y) = 23$ cm (Given is question i.e distance between chords)
$\Rightarrow 23 (y - x) = 161$

$\Rightarrow y - x = \frac{161}{23}$

$\Rightarrow y - x = 7$ cm ..... (iii)
$y + x = 23$ cm ..... (iv)
Adding = (iii) & (iv)

$\Rightarrow y = \frac{23+7}{2} \Rightarrow y = 15$ cms

$\therefore R^2 = y^2 + 8^2$

$\Rightarrow R = \sqrt{15^2 + 64}$

$\Rightarrow R = \sqrt{225 + 64}$

$= \sqrt{289} = 17$ cms

61. (A) Distance between the thief & police = 200 m
Speed of police = 11 kms/hr
Speed of thief = 10 kms/hr
Net speed = (11 – 10) kms/hr
($\because$ Travelling is in the same direction)
Distance covered in 6 min
= speed × time

$= 1\text{Km/hours} \times \frac{6}{60}$ hours

$= \frac{1}{10}$ km = 100 m

$\therefore$ Distance left between them after 6 min
= (200–100)
= 100 m

62. (A)

	Upstream		**Downstream**
Distance travelled in same time	3 km		4 km
$\therefore$ speed ratio	3	:	4
$\therefore$ Time ratio	4	:	3

Total time = 14 hours
$\Rightarrow$ (4 + 3) unit = 14 hours
$\Rightarrow$ 7 unit = 14 hours
$\Rightarrow$ 1 unit = 2 hours

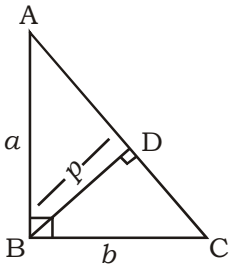
	Upstream	**Downstream**
Time taken $\Rightarrow$	8 hours	6 hours
$\therefore$ Speed $\Rightarrow$	$\frac{48}{8}$ km/hr	$\frac{48}{6}$ km/hr
	$\Rightarrow$ 6 km/hr	8 km/hr

$\therefore$ Speed of stream

$$\frac{\text{Speed (downstream)} - \text{Speed (Upstream)}}{6}$$

$= \frac{8-6}{2} = 1$ km/hr

63. (C)



In right angle triangle ΔABC

$BD \perp AC$ & $BD = p$

$AB = a$

$BC = b$

Area of $\Delta ABC = \frac{1}{2} \times$ base $\times$ height

$\Rightarrow \frac{1}{2} \times a \times b = \frac{1}{2} \times AC \times p$

$\Rightarrow p = \frac{ab}{AC}$ ..... (i)

Squaring equation both sides

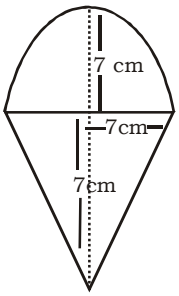
$P^2 = \frac{a^2b^2}{(AC)^2}$

$\Rightarrow P^2 = \frac{a^2b^2}{a^2+b^2}$ $(\because AC^2 = a^2 + b^2)$

Short trick

$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

64. (A)



Height of hemispherical part = 7 cm = radius of hemispherical part & ATQ,

Radius of hemispherical part = height of the cone = 7 cm

$\therefore$ Volume of ice cream = Volume of cone + hemispherical part

$= \frac{1}{3} \pi r^2 h + \frac{2}{3} \pi r^3$

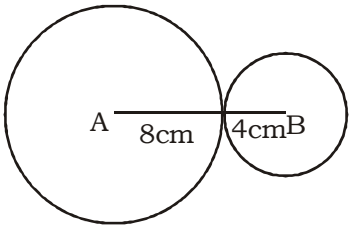
$= \frac{1}{3} \pi r^2 (h + 2r)$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 (7 + 2 \times 7)$

$= \frac{22 \times 7}{3} \times 21 = 22 \times 7 \times 7$

$= 1078 \text{ cm}^2$

65. (A)



Radius of circle having centre A = 8cm

Radius of circle having centre B = $\frac{8}{2}$ = 4cm

Now, AB = diameter = (8 + 4)

$\Rightarrow 2r = 12$

$\Rightarrow r = 6$ cm

$\therefore$ Area of new circle = $\pi r^2 = 36\pi$

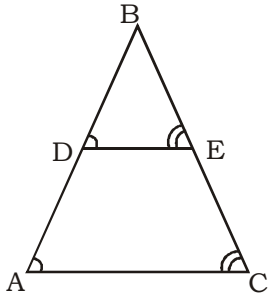
66. (D) $\frac{1}{a^2+ax+x^2} - \frac{1}{a^2-ax+x^2} + \frac{2ax}{a^4+a^2x^2+x^4}$

$= \frac{a^2-ax+x^2-a^2-ax-x^2}{\left[\left(a^2+x^2\right)-(ax)^2\right]} + \frac{2ax}{a^4+a^2x^2+x^4}$

$= \frac{-2ax}{a^4+a^2x^2+x^4} + \frac{2ax}{a^4+a^2x^2+x^4}$

$= 0$

67. (C)



A In ΔDBE & ΔABC

DE $||$ AC, $\angle BDE = \angle BAC$ & $\angle BED = \angle BCA$ [corresponding angles]

& $\angle B$ is common in both

$\therefore$ By AAA, ΔABC is similar to ΔDBE

68. (C)

Interior angle $= \frac{(n-2)180}{n}$

Exterior angle $= \frac{360}{n}$

{Where 'n' is number of sides}

$\frac{(n-2)\times 180}{n} - \frac{360}{n} = 132^\circ$

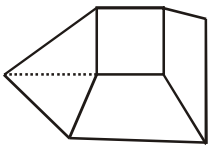
$\Rightarrow \frac{180n - 360 - 360}{n} = 132^\circ$

$\Rightarrow 180n - 720 = 132n$

$\Rightarrow 48n = 720$

$\Rightarrow n = \frac{720}{48} = 15$

69. (A)



Volume of given

pyramid = $\frac{2}{3}$ [(10×8) + (8×5) ×

$\sqrt{(10\times8)\times(8\times5)}$

$= \frac{2}{3}\left[80+40+\sqrt{80\times40}\right]$

$= \frac{2}{3}$ [120 + 57]

$= \frac{2}{3} \times 177$

$= 118\ m^3$

Required level increased = $\frac{118}{100\times80}$

$= \frac{118}{8000}$ m

= 1.47 cm

70. (A) Equation having root 8 & 2

i.e $(x-8)(x-2) = 0$

$\Rightarrow x^2 - 8x - 2x + 16 = 0$

$\Rightarrow x^2 - 10x + 16 = 0$

↓

It is wrong

Now, equation having roots – 9 & –1

$(x-9)(x-1) = 0$

$\Rightarrow x^2 - 9x - x + 9 = 0$

$\Rightarrow x^2 - 10x + 9 = 0$

↓

It is wrong

From (i) & (ii)

Correct equation = $x^2 - 10x + 9$

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

$= \frac{x(4x^2-1)}{(2x+1)\times3(2x-1)} = \frac{x\times(2x-1)(2x+1)}{3\times(2x+1)(2x-3)}$

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

72. (C) sin (A+B) = sin A. cos B + cos A. sin B

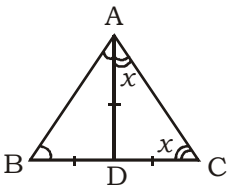
sin 75 = sin (45 + 30)

= sin 45.cos 30 + cos 45.sin 30

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

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

73. (B)



$\because$ AD is median

$\therefore$ BD = CD — (i)

ATQ, AD = $\frac{1}{2}$ BC ..... (ii)

$\therefore$ From (i) & (ii)

AD = CD = BD

$\because$ BD = AD

$\therefore \angle ABD = \angle BAD = 30^\circ$

Let $\angle ACB$ be x

$\therefore \angle ACB = \angle DAC = x^\circ$ ($\because$ DA = CD)

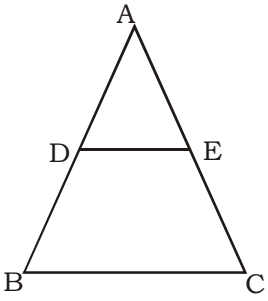
$\therefore \angle A + \angle B + \angle C = 180^\circ$ (In ΔABC)

$\Rightarrow 30 + x + 30 + x = 180^\circ$

$\Rightarrow 2x = 180^\circ - 60^\circ$

$\Rightarrow x = \frac{120}{2} \Rightarrow x = 60^\circ$

74. (B)



DE| | BC

$\frac{AD}{BD} = \frac{2}{3}$

$\Rightarrow \frac{AD}{AB} = \frac{2}{5}$

$\Rightarrow \frac{AD}{AB} = \frac{AD}{AD+BD} = \frac{2}{2+3} = \frac{2}{5}$

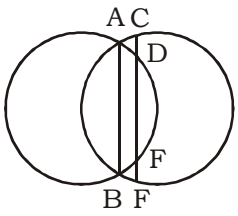
$\therefore \frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \left(\frac{AD}{AB}\right)^2 = \left(\frac{2}{5}\right)^2 = \frac{4}{25}$

$\therefore$ Area of DECB = Area($\Delta ABC - \Delta ADE$)

= 25 – 4 = 21

$\frac{\therefore \text{Area (trapezium DECB)}}{\text{Area } (\Delta ABC)} = \frac{21}{25}$

75. (C)



CD = EF = 4.5

76. (C) Required average = $\frac{6\times 22-(6\times 8)}{5}$ years

$= \frac{132-48}{5}$ years

$= \frac{84}{5}$ years

= 16.8 years

77. (A) Required votes = $7.5 \times \frac{80}{100} \times \frac{45}{100}$

= 2.7 crores

78. (B) Sum = 135 $\Rightarrow x + y = 135$

Difference = $\frac{\pi}{12} = 15 \Rightarrow x - y = 15$

$\therefore x = \frac{135+15}{2} = 75°$

$y = \frac{135-15}{2} = 60°$

79. (B) sin 3A = cos (3A – 60°)
cos (90° – 3A) = cos (3A – 60°)
90° – 3A = 3A – 60°
3A + 3A = 90° + 60°
6A = 150°
A = 25°

80. (B) Time taken by Kamal = $\frac{100}{18\times\frac{5}{18}}$

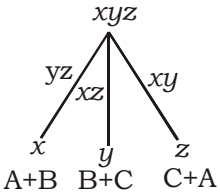
= 20 seconds

$\therefore$ Time taken by Kunal = 20 + 5
= 25 seconds

$\therefore$ Kunal's speed = $\frac{100}{25}\times\frac{18}{5}$ km/hour

= 14.4 km/hour

81. (A)



$2(A + B + C) = \frac{xyz}{xy+yz+xz}$

A alone can do the work = $\frac{2xyz}{xy+yz-zx}$ days

B alone can do the work = $\frac{2xyz}{yz+zx-xy}$ days

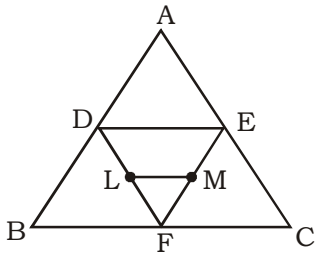
C alone can do the work = $\frac{2xyz}{zx+xy-yz}$ days

82. (D) $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$

$\Rightarrow \frac{yz+xz+xy}{xyz}=0$

$\Rightarrow xy + yz + zx = 0$
Also, $x^2 + y^2 + z^2 = 25$
Now, $(x+y+z)^2 = x^2+y^2+z^2+2xy+2yz+2zx$
$= x^2 + y^2 + z^2 + 2(xy + yz + 2x)$
$= 25 + 2(0)$
$= 25$
$x + y + z = \sqrt{25} = \pm 5$

83. (A)



In ΔDEF
LM || DE

LM = $\frac{1}{2}$ DE ..... (i)

[$\because$ Line joining the mid points of two sides of a Δ is || and half of the 3rd side.]
Similarly, In ΔABC

DE = $\frac{1}{2}$ BC ..... (ii)

From (i) & (ii)

LM = $\frac{1}{2}\times\frac{1}{2}$ BC = $\frac{1}{4}$ BC

$\therefore \frac{LM}{BC} = \frac{1}{4}$; LM : BC = 1 : 4

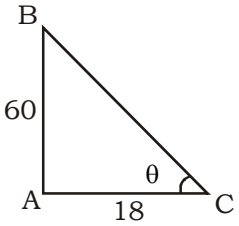
84. (D) $x = \frac{1+\sin\theta}{\cos\theta}$

$\Rightarrow \frac{1}{x} = \frac{\cos\theta}{1+\sin\theta} = \frac{\cos\theta}{1+\sin\theta}\times\frac{1-\sin\theta}{1-\sin\theta}$

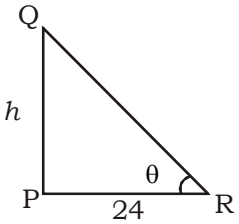
$$= \frac{\cos\theta(1-\sin\theta)}{1-\sin^2\theta}$$

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

85. (C)



$$\tan\theta = \frac{60}{18}$$

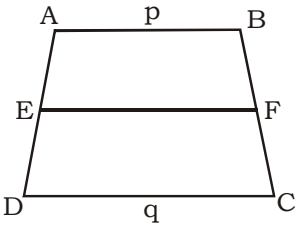


$$\tan\theta = \frac{h}{24} = \frac{60}{18}$$

$h = 80$ m

86. (D) Cannot be determined.

87. (C)



$$EF = \frac{1}{2}(AB + DC)$$

$$= \frac{1}{2}(p + q)$$

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

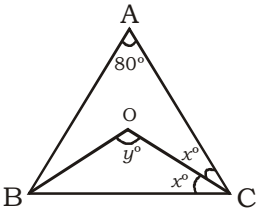
88. (B) Let the number of side be x.

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

$2 = x - 3$

$x = 5$

89. (A)



If $\angle A = 80°$, $\angle B = 60°$,

Then $\angle C = 180 - 140$

$= 40°$

$$\angle BOC = 90 + \frac{\angle A}{2}$$

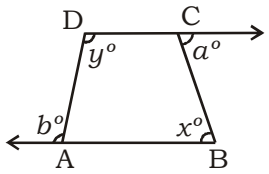
$$= 90 + \frac{80}{2}$$

$= 130°$

$$\angle OCB = \frac{40}{2} = 20$$

Required sum = 130 + 20 = 150°

90. (B)



$180° - b° + 180° - a° + x° + y° = 360°$

$x° + y° = a° + b°$

91. (A) Required percentage rise/fall in production from the previous year is maximum for company y in 2011

$$= \frac{35-25}{25} \times 100 = 40\%$$

92. (C) Average of company x in the period (2012 – 14)

$$= \frac{\text{Production in } (2012 + 2013 + 2014)}{\text{Number of years}}$$

$$= \frac{45+50+40}{3} = \frac{115}{3} \quad \text{..... (i)}$$

Average production of company Y in period (2012 -14)

$$= \frac{\text{Production in } (2012 + 2013 + 2014)}{\text{Number of years}}$$

$$= \frac{35+40+50}{3} = \frac{125}{3} \quad \text{..... (ii)}$$

Taking ratio of equation (i) & (ii)

$$\frac{\text{Average production of company } X}{\text{Average production of company } Y}$$

$$= \frac{\frac{115}{3}}{\frac{125}{3}} = \frac{23}{25}$$

or, 23 : 25

93. (D) Average production of x

$$= \frac{\text{Sum of the production of all the years}}{\text{Number of years}}$$

$$= \frac{30+45+25+50+40}{5} = \frac{190}{5}$$

$$= \frac{200}{5} = 40 = 38 \text{ ..... (i)}$$

Similarly, Average Production of Y

$= \frac{25+35+35+40+50}{5} = \frac{185}{5} = 37$ ..... (ii)

Average production of z

$= \frac{35+40+45+35+35}{5} = \frac{190}{5} = 38$ ..... (iii)

From equation (i), (ii) and (iii)
Average Production of both x & z is maximum.

94. (A) Percentage of production of company z to company y in 2010

$= \frac{\text{Production of company } z}{\text{Production of company } y} \times 10$

$= \frac{35}{25} \times 100 = 140\%$

Similarly percentage of production of company z to company Y in 2011

$= \frac{40}{35} \times 100 = \frac{8}{7} \times 100$

$= \left(1+\frac{1}{7}\right) \times 100$

$= 114\frac{2}{7}\%$

Percentage production of z to y in 2012

$= \frac{45}{35} \times 100$

$= \frac{9}{7} \times 100$

$= \left(1+\frac{2}{7}\right) \times 100$

$= 100 + \frac{2}{7} \times 100$

$= 128\frac{4}{7}\%$

Percentage production z to company y in year 2013 $= \frac{35}{40} \times 100$

$= \frac{7}{8} \times 100$

$= \left(1-\frac{1}{8}\right) \times 100$

$= \left(100-12\frac{1}{2}\right)\%$

$= 87\frac{1}{2}\%$

Hence, in 2010 of production of company z was maximum to the production of company y.

95. (*) Required percent $= \frac{40-25}{25} \times 100 = 60\%$

96. (D) Initial strength of school in 2009 = 3000
In 2010, 350 students gain & 250 students left
$\Rightarrow$ Net 100 students join school
$\therefore$ Strength of school in 2010 = 3000 + 100
= 3100
In 2011, 300 students join and 450 students left
$\Rightarrow$ Net 150 students left the school
$\therefore$ Strength of school in 2011 = 3100 –150
= 2950
In 2012, 450 students join and 400 students left
Similarly, in 2013 net 150 students join.
$\therefore$ Strength of school in 2013 = 3000 + 150
= 3150

97. (A) Percent rise/fail in number of students who left the school to the previous year in 2011

$= \frac{\text{Rise in no. of students left in 2011-12}}{\text{No. of students who left in 2010}} \times 100$

$= \frac{200}{250} \times 100 = 80\%$ increase

Students left in 2012 $= \frac{50}{450} \times 100$

$= 11\frac{1}{9}\%$ decrease

Student left in 2013

$= \frac{50}{400} \times 100$

$= \frac{1}{8} \times 100 = 12\frac{1}{2}\%$ decrease

Student left in 2014

$= \frac{100}{350} \times 100$

$= 28\frac{4}{7}\%$ increase

$\therefore$ Maximum rise/fail was in year 2011.

98. (B) Strength of school in 2011 = 2950
Strength of school in 2012 = 3000
Percent increase in strength of school from (2011 - 2012)

$= \frac{50}{2950} \times 100 = 1.7\%$

99. (B) Take reference from Question. 96
Number of students in school in 2012 = 3000
In 2013, strength of school = 3150 (From in 96)
In 2014, 400 students join and 450 left
$\Rightarrow$ Net 50 students left in 2014
$\therefore$ Strength of students in 2014
= 3150 – 50
= 3100
In 2015, 550 students join and 450 students left $\Rightarrow$ Net 100 students join school in 2015
$\therefore$ Strength of school in 2015
= 3100 + 100
= 3200
Percent of students studying in school in 2012 to that in 2015

$$= \frac{3000}{3200} \times 100 = \left(1 - \frac{1}{16}\right) \times 100$$

$$= \left(100 - \frac{1}{16} \times 100\right)$$

$$= 100 - 6\frac{1}{4}\%$$

$$= 99\frac{3}{4}\% = 93.75\%$$

100. (D) Least number of students who join the school = 300 (2011)
Maximum number of students left the school = 450

$$\text{Ratio} = \frac{300}{450} = \frac{2}{3} = 2 : 3$$

SSC MAINS (MATHS)-6 (ANSWER KEY)

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

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

Correction of Mock test- 4(Maths)

12. (C) Read in question $x = 3 + 2\sqrt{3}$ as

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

also, read solution

$\sqrt{x} + \frac{1}{\sqrt{x}}$ as $\sqrt{x} - \frac{1}{\sqrt{x}}$

71. (B) Read in solution $\frac{1}{2}$ as $\frac{1}{z}$.