SSC MAINS (MATH) - 04 (SOLUTION)

1. (A) Marks scored in Hindi and Maths

$$= \frac{160^\circ}{360^\circ} \times 540 = 240$$

Marks scored in English and Social Science $= \frac{120^\circ}{360^\circ} \times 540 = 180$

Difference = 240 – 180
= 60°

2. (B) 100% = 360°

$$\Rightarrow 22.2\% = \frac{360^\circ \times 22.2}{100}$$

= 79.2° or 80°

3. (B) 540 = 360°

$$\therefore 105 = \frac{360^\circ}{540} \times 105 = 70^\circ$$

4. (B) $\frac{540}{5} = 108$

5. (D) 360° = 540

$$90^\circ = \frac{540}{360}$$

$$\text{Reqd \%} = \frac{135}{540} \times 100 = 25\%$$

6. (C) The distance covered by the wheel in one minute $= \frac{66 \times 1000 \times 100}{60}$

= 110000 cm

The distance covered by the wheel in one revolution = The circumference of the wheel

$= 2\pi r$

$= 2 \times \frac{22}{7} \times \frac{70}{2}$

= 220 cm

$\therefore$ Number of revolutions of the wheel

$= \frac{110000}{220}$

= 500

7. (B) Perimeter of circle $= 2 \times \frac{22}{7} \times 7$

= 44 cm

Perimeter of semi circle = 22 cm

The length of the wire = 22 + 14 = 36 cm

8. (A) Perimeter of rhombus $= 4\sqrt{12^2 + 16^2}$
= 80 cm

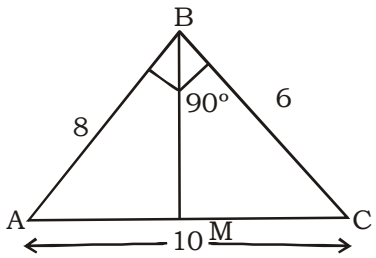
9. (A) r = 21 cm, h = 20 cm

$l = \sqrt{r^2 + h^2} = 29$ cm

$\therefore$ Area of the sheet = Total surface area of the cone $= \pi rl + \pi r^2 = \pi r(l + r)$

$= \frac{22}{7} \times 21(29 + 21) = 3300 \text{ cm}^2$

10. (C)



BM is median of ΔABC
By Appolloneous theorem

$$(BA)^2 + (BC)^2 = 2\left[(BM)^2 + \left(\frac{1}{2}AC\right)^2\right]$$

$(81)^2 + (6)^2 = 2[(BM)^2 + (5)^2]$
$100 = 2[(BM)^2 + (25)]$
$BM^2 = 25$
$BM = 5$

11. (B) $x^{(a+b)(a-b)} \times x^{(b+c)(b-c)} \times x^{(c+a)(c-a)}$

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

$x^0 = 1$

12. (C) $x = 3 + 2\sqrt{3}$, $\frac{1}{x} = 3 - 2\sqrt{3}$

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

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

= 6 – 2 = 4

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

13. (A) Circumference $= 2\pi r = 4x$

$$r = \frac{4x}{2\pi} = \frac{2x}{\pi}$$

$$\text{Area} = \pi r^2 = \pi\left(\frac{2x}{\pi}\right)^2 = \pi \cdot \frac{4x^2}{\pi^2}$$

$\therefore$ Ratio of area of the circle and the square

$= \frac{4}{\pi}x^2 : x^2$

$4 : \frac{22}{7}$
$28 : 22$
$14 : 11$

14. (C) Let the upstream speed be x km/hr and the downstream speed by y km/hr.

Then, $\frac{24}{x} + \frac{36}{y} = 6$

and $\frac{36}{x} + \frac{24}{y} = \frac{13}{2}$

Then, $x = 8$ km/hr, $y = 12$ km/hr

Speed of current $= \frac{1}{2}(12 - 8)$

$= 2$ km/hr

15. (B) $r = \sqrt{22^2 + 19^2 + 8^2} = \sqrt{900} = 30$

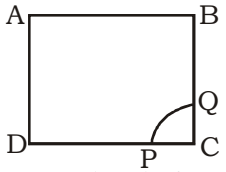
16. (D) Let x, y be the side the square

$$\frac{x^2}{y^2} = \frac{9}{1}$$

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

$x : y = 3 : 1$

17. (D)



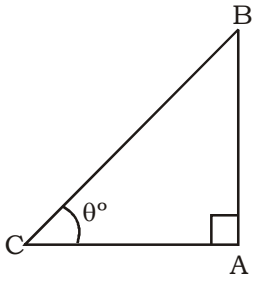
As the cow is tied at the corner of rectangular field, it will graze the area of the field enclosed between two sides of the rectangular

$$= \frac{1}{4}(\pi \times 14 \times 14) = \frac{1}{4} \times \frac{22}{7} \times 14 \times 14 = 154 \text{ m}^2$$

18. (C) $\because$ Exterior angle $= \frac{1}{3} \times 180^\circ = 60^\circ$

$\therefore n \times 60^\circ = 360^\circ \Rightarrow n = 6$

19. (A) Let AB be the rod and AC be its shadow. $\angle ACB = \theta$. Let $AB = x$.



Then, $AC = \sqrt{3}x$

$$\tan\theta = \frac{AB}{AC} = \frac{x}{\sqrt{3}x} = \frac{1}{\sqrt{3}}$$

$\theta = 30^\circ$

20. (A) Side of the equilateral triangle

$$= \sqrt{\frac{4}{\sqrt{3}} \times 400\sqrt{3}}$$

$$= \sqrt{1600}$$

$= 40$ meter

Perimeter $= 40 \times 3 = 120$ meter

21. (C) Let the fraction be $\frac{x}{y}$.

So, that new fraction is $\frac{115\% \text{ of } x}{92\% \text{ of } y}$

$$\therefore \frac{115\% \text{ of } x}{92\% \text{ of } y} = \frac{15}{16}$$

$$\frac{x}{y} = \frac{15}{16} \times \frac{92}{115} = \frac{3}{4}$$

22. (A) $\sin\theta = \sqrt{1 - \cos^2\theta} = \sqrt{1 - \left(\frac{2t}{1+t^2}\right)^2}$

$$= \frac{\sqrt{(1+t^2)^2 - 4t^2}}{(1+t^2)} = \frac{\sqrt{(1-t^2)^2}}{(1+t^2)}$$

$$= \frac{1-t^2}{1+t^2}$$

$$\tan\theta = \frac{1-t^2}{1+t^2} + \frac{2t}{1+t^2} = \frac{1-t^2}{2t}$$

23. (C) $4\left[\left(\frac{1}{2}\right)^4 + \left(\frac{1}{2}\right)^4\right] - 3\left[\left(\frac{1}{\sqrt{2}}\right)^2 - (1)^2\right]$

$$= 4\left[\frac{1}{16} + \frac{1}{16}\right] - 3\left[\frac{1}{2} - 1\right]$$

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

24. (B) $\frac{\left(\frac{1}{2}\right)^2}{\left(\frac{\sqrt{3}}{2}\right)^2} + \frac{\left(\frac{\sqrt{3}}{2}\right)^2}{\left(\frac{1}{2}\right)^2}$

$$= \frac{\frac{1}{4}}{\frac{3}{4}} + \frac{\frac{3}{2}}{\frac{1}{2}} = \frac{1}{3} + 3 = 3\frac{1}{3}$$

25. (D) $\sin 15^\circ \cos 15^\circ$
$= \sin 15^\circ + \cos(90^\circ - 75^\circ)$
$= \sin 15^\circ + \sin 75^\circ$
$= \sin(45^\circ - 30^\circ) + \sin(45^\circ + 30^\circ)$
$= 2\sin 45^\circ \cos 30^\circ$

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

26. (C) $x + y = 2z$ means $x - z = z - y$

$$\therefore \quad \frac{x}{x-z} + \frac{z}{y-z}$$

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

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

27. (A) Let the two number is x and $(100 - x)$.
LCM × HCF = Product of the numbers
$495 \times 5 = x(100 - x)$
or, $x^2 - 100x + 2475 = 0$
or, $x^2 - 55x - 45x + 2475 = 0$
or, $(x - 55)(x - 55) = 0$
$\therefore \quad x = 45$ or $x = 55$
When $x = 55$, we get $100 - x = 45$
Hence their difference $= 55 - 45 = 10$

28. (D) New ratio of income of P and Q:-

$$= \frac{3 \times \frac{120}{100}}{5 \times \frac{20}{100}} = \frac{36}{10} = \frac{18}{5} = 18 : 5$$

29. (A) From Formula,

$$\text{S.I.} = \frac{\text{PRT}}{100}$$

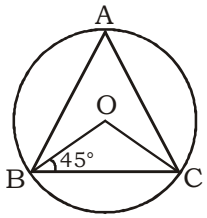
$$80 = \frac{800 \times R \times 2}{100}$$

$R = 5\%$
For C.I.

P = 800 _____ 40 — 50%
_____ 40 + 2 — 50%
_____ 40 + 2 + 2 + 0.1
Total C.I. ⟶ 126.1

Amount = P + C.I.
= 800 + 126.1
= 926.1

30. (B)



Given $\angle OBC = 45^\circ$
Also, $\angle OCB = 45^\circ$
Hence, $\angle BOC = 180^\circ - (45^\circ + 45^\circ) = 90^\circ$

So, $\angle BAC = \frac{\angle BOC}{2} = \frac{90^\circ}{2} = 45^\circ$

31. (B) (A + B + C) in 5 days complete $\frac{1}{4}$ work.

(A + B + C) in 1 day compelte $\frac{1}{20}$ work.

Similarly,

(B + C) in 1 day complete $\frac{1}{24}$ works.

$\therefore$ A's 1 day work $= \frac{1}{20} - \frac{1}{24} = \frac{1}{120}$

A completes a work in 120 days.
$\therefore$ A will completes half work in 60 days.

32. (D) $x^a . x^b . x^c = 1$
$a + b + c = 0$
Again, $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$
$\because$ since $a + b + c = 0$
Hence, $a^3 + b^3 + c^3 = 3abc$

33. (B) Since 20% of the students neither play football nor hockey, it means 80% of the students either play football or hockey or both.
$\therefore \quad n(A \cup B) = n(A) + n(B) - n(A \cap B)$
$80 = 55 + 45 - n(A \cap B)$
$80 - 100 = -n(A \cap B)$
$n(A \cap B) = 20\%$

34. (A) $\left(\frac{1}{64}\right)^0 + (64)^{-\frac{1}{2}} + (-32)^{\frac{4}{5}}$

$$= 1 + 8^{2\times\left(-\frac{1}{2}\right)} + (-1 \times 32)^{\frac{4}{5}}$$

$$= 1 + 8^{-1} + \left[(-1)^{\frac{4}{5}} \times (32)^{\frac{4}{2}}\right]$$

$$= 1 + \frac{1}{8} + (1 \times 16) = 17\frac{1}{8}$$

35. (C) Average

$$= \frac{x+y}{2} = \frac{\frac{b^2}{a}+\frac{a^2}{b}}{2} = \frac{\frac{b^3+a^3}{ab}}{2} = \frac{a^3+b^3}{2ab}$$

Reciprocal = $\frac{2ab}{a^3+b^3}$

36. (B) $\tan 2\theta$

$$= \frac{2\tan\theta}{1+\tan^2\theta} = \frac{2\frac{p}{q}}{1+\frac{p^2}{q^2}} = \frac{2\frac{p}{q}}{\frac{p^2+q^2}{q^2}} = \frac{2pq}{p^2+q^2}$$

37. (B) +13, +15, +17, +.....

38. (A) Area = Base × Height = 75 × 10 = 75 cm^2

Again,

Area = $\frac{1}{2}\ d_1 \times d_2$

$75 = \frac{1}{2} \times 30 \times d_2$

d_2 = 5 cm

39. (D) $S = \frac{L_1+L_2}{T}$

$T = \frac{L_1+L_2}{5}$

$$= \frac{180+220}{72\times\frac{5}{18}} = \frac{400}{20} = 20 \text{ seconds}$$

40. (C) $\angle OSQ = \angle SPR = 40°$ ($\because$ PR| |QS)

$\angle SOQ = 180° - (\angle OSQ + \angle OQS)$

$= 180° - (40° + 35°) = 105°$

41. (C) $\frac{3\sin 55}{\cos(90-55)^\circ} + \frac{3\tan 33°}{\cot(90-33)^\circ}$

$= 3\frac{\sin 55°}{\sin 55°} + \frac{3\tan 33°}{\tan 33°} = 3 + 3 = 6$

42. (A) $\frac{r}{h} = \frac{3x}{4x}$,

volume = $x\pi r^2 h$ = 4851

r = 3.5

r = 10.5 meter and h = 14 meter

$\therefore$ curved surface area

$= 2\pi rh$

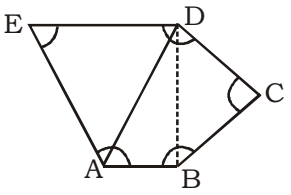
$= 2 \times \frac{22}{7} \times 10.5 \times 14$

= 924 m^3.

43. (B) $n = \frac{\text{Volume of cylinder}}{\text{Volume of one cone}}$

$$= \frac{\pi\times 3\times 3\times 5}{\frac{1}{3}\pi\times\frac{1}{10}\times\frac{1}{10}\times 1} = 13500$$

44. (B)



Here,

$\angle ABC + \angle BCD + \angle CDE + \angle DEA + \angle EAB$

= 3[Sum of angles of trangles]

= 3 × 180° = 540°

45. (C) $x^3 - 5x^2 + 7x - 8$

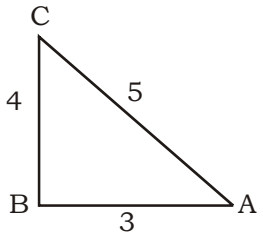
Remainder is obtained by putting $x - 2 = 0$

$x = 2$

$\Rightarrow 2^3 - 5 \times 2^2 + 7 \times 2 - 8$

$\Rightarrow 8 - 20 + 14 - 8 = -6$

46. (B)



$\sin A = \frac{4}{5}$

$\tan A = \frac{4}{3}$

$\sec A = \frac{5}{3}$

$\tan A + \sec A = \frac{4}{5} + \frac{5}{3} = \frac{9}{3} = 3$

47. (D) $\pi r^2 = 770$

$r^2 = \frac{770\times 7}{22} = 245$

$r = \sqrt{245} = 7\sqrt{5}$

$\pi rl = 814$

48. (A) P = ₹4500, R = 5%
Compound Interest – Simple Interest

$= P\left(\frac{R}{100}\right)^2 = 4500\left(\frac{5}{100}\right)^2$

$= \frac{4500}{20\times 20} = ₹11.25$

49. (D) $\left(\frac{1+x}{x}\right)\left(\frac{x+2}{x+1}\right)\left(\frac{x+3}{x+2}\right)\left(\frac{x+4}{x+3}\right) = \frac{x+4}{x}$

50. (D) $\left[2^{9.\frac{1}{6}.\frac{1}{3}}\right]^4 \times \left[2^{9.\frac{1}{3}.\frac{1}{6}}\right]^4, \left[2^{\frac{1}{2}}\right]^4 \times \left[2^{\frac{1}{2}}\right]^4$

$2^2 \times 2^2 = 2^4$

51. (A) Average Speed

$= \frac{3\times 120\times 140\times 80}{120\times 140+140\times 80+80\times 120}$

$= \frac{360\times 140\times 80}{16800+11200+9600} = \frac{4302000}{37600}$

$= 107\frac{11}{47}$ km/hr

52. (A) A's capital = $16\frac{2}{3}$% of total

$= \frac{1}{6}$

B's profit = $83\frac{1}{3}\% = \frac{5}{6}$

∴ B's profit : A's profit : : 5 : 1

∴

	A	B
Capital →	1	5
Month →	15	x
	1	5

$\frac{1\times 15}{5\times x} = \frac{1}{5}$

$x = 15$ months

53. (A) Overall gain % is given by

$\Rightarrow \frac{100+g}{100} + \frac{100}{90}$

$\Rightarrow 900 + 9g = 1000$

$\Rightarrow 9g = 100$

$\Rightarrow g = \frac{100}{9} = 11\frac{1}{9}\%$

54. (B) $S_1 = 75$ and $S_2 = 50$

$\therefore$ stoppage time/hour = $\frac{75-50}{75} = \frac{25}{75}$

$= \frac{1}{3}$ hour = 20 minute

55. (B) $x = a\cos\theta$, $y = b\sin\theta$

$\therefore b^2x^2 + a^2y^2 = b^2a^2\cos^2\theta + a^2b^2\sin^2\theta$

$= a^2b^2 \times 1 = a^2b^2$

56. (C) $\because \cos 90° = 0$

$\therefore$ given product = 0 = 0

57. (C) Let the number of valid votes be x.
Then, 52% of x – 48% of x = 98
ATQ,
or, 4% of x = 98 $\Rightarrow x$ = 2430
Total number of polled votes
= 2450 + 68 = 2518

58. (A) Let the side of square be x.
$2\pi r = 4x$,
where $x^2 = 14400 \Rightarrow x = 120$
$2\pi r = 480 \Rightarrow r = 76.36$ m
So, the area of circular field

$= \pi r^2 = \frac{22}{7} \times 76.36 \times 76.36 = 18325.53$ m^2

59. (C) Let the number of correct answers be x.
$\therefore$ The number of wrong answers = $(120 - x)$
$x \times 1(120 - x) \times 0.25 = 90$

$x - 30 + \frac{x}{4} = 90$

$x = 120 \times \frac{4}{5} = 96$

60. (D) Maximum marks = $\frac{100\times 208}{40} = 520$

61. (C) $\angle P = 50°$
$\angle\theta = 100°$
$\angle R = 150°$
$\angle S = 360° - 300° = 60°$
$\angle Q - \angle S = 100° - 60° = 40°$

62. (D) H = 60 cm
radius = 32 cm
Area of the curved surface = πrl

$L = \sqrt{R^2+H^2} = \sqrt{(32)^2+(60)^2}$

$= \sqrt{1024+3600} = \sqrt{4624} = 68$ cm

Area of curved surface = $\frac{22}{7} \times 32 \times 68$

Total cost of painting = $35 \times \frac{22}{7} \times 32 \times 68 \times \frac{1}{10000}$

= 23.94 approximate

63. (B) Total persons
= 4[3 adult + two children (1 adult)]

Total amount = ₹ 884

Per person ticket = $\frac{884}{4} = 221$

Ticket per student = $\frac{221}{2}$ = ₹ 110.5

64. (B) A's capital = $\frac{1}{3}x$, B's capital = $\frac{2}{3}x$

A's and B's total profit ratio = 2 : 1.
Let B contributes for Y months.

$$\frac{\frac{1}{3}\times x\times 15}{\frac{2}{3}\times x\times 4} = \frac{2}{1} \Rightarrow y = \frac{15}{4}$$

65. (A) Gain = 25%, SP = ₹ 13.25 per litre
∴ Cost price of mixture

$$= \frac{100\times 13.25}{125} = ₹\ 10.6$$

C.P. of 1 litre of water C.P. of 1 litre of liquid

₹ 0 ₹ 12

Mean Price
₹ 10.6

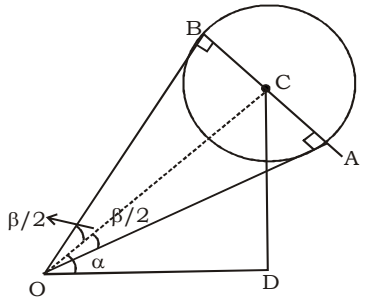
12 – 10.6 = ₹ 1.4 10.6 – 0 = ₹ 10.6

∴ Water : liquid = 1.4 : 10.6
= 7 : 53

66. (B) Area = $\frac{\pi r^2}{4} \Rightarrow \frac{22\times 14\times 14}{7\times 4} = 154\ \text{cm}^2$

67. (B) Let the present age of son is x years.
Age of father = 42 years
ATQ,
$2x$ = 42 years,
x = 21 years
∴ Age of son 5 years back was
= 21 – 5 = 16 years

68. (B)



$\angle BOC = \angle AOC = \frac{\beta}{2}$

$\angle A = BC = r$
∴ In ΔCOD,

$$\sin\alpha = \frac{DC}{C}$$

$DC = OC \sin\alpha$ ... (1)
∴ In ΔCOA,

$$\frac{\sin\beta}{2} = \frac{AC}{OC}$$

$$OC = \frac{r}{\sin\frac{\beta}{2}}$$

From ... (1)

$$\therefore DC = \frac{r}{\sin\frac{\beta}{2}} \times \sin\alpha$$

$$= r\ \text{cosec}\frac{\beta}{2}.\sin\alpha$$

69. (D) LCM of (8, 9, 10) = 360
70. (C) (A + B + C)'s work for 2 hours

$$= 2 \times \frac{1}{6} = \frac{1}{3}$$

Remaining work = $1 - \frac{1}{3} = \frac{2}{3}$

In 7 hours (A + B)'s can fill = $\frac{2}{3}$ of cistern
∴ In 1 hour (A + B)'s can fill

$$= \frac{1}{7} \times \frac{2}{3} \text{ of cistern}$$

$$= \frac{2}{21} \text{of cistern}$$

But (A + B + C)'s 1 hour work = $\frac{1}{6}$

C's one hour work = $\frac{1}{6} - \frac{2}{21} = \frac{1}{14}$

∴ C can fill it alone in 14 hours.

71. (B) $xy + zx = 1 - yz$

$x(y + z) = 1 - yz$

$$\frac{1}{x} = \frac{y+z}{1-yz}$$

Similarly,

$$\frac{x+y}{1-xy} = \frac{1}{2} \text{ \& } \frac{z+x}{1-xz} = \frac{1}{y}$$

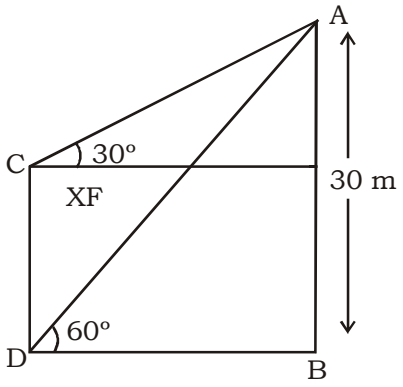
Thus, the given expression

$$= \frac{1}{2} + \frac{1}{x} + \frac{1}{y}$$

$$= \frac{xy + yz + zx}{xyz}$$

$$= \frac{1}{xyz}$$

72. (C)



Let CD be the tower of height x and BD = CF = Y

From $\Delta ABD = \frac{30}{y} = \tan 60°$

or $y = \frac{30}{\sqrt{3}}$

From ΔAFC,

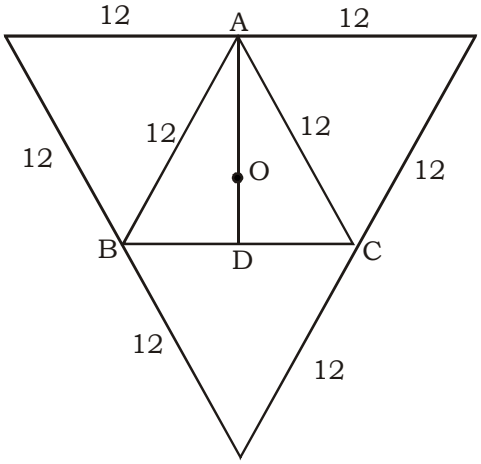
$$\tan 30° = \frac{30 - x}{y}$$

$$\frac{1}{\sqrt{3}} = \frac{30 - x}{\frac{30}{\sqrt{3}}}$$

$$30 - x = \frac{1}{\sqrt{3}} \times \frac{30}{\sqrt{3}} = \frac{30}{3} = 10$$

$x = 20$ meter

73. (B)



Area of equilateral triangle

$$= \frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} \times (12)^2 = \frac{144\sqrt{3}}{4}$$

Now, the area of a regular tetrahedron

$$= 4 \times \frac{144}{4} \times \sqrt{3} = 144\sqrt{3}$$

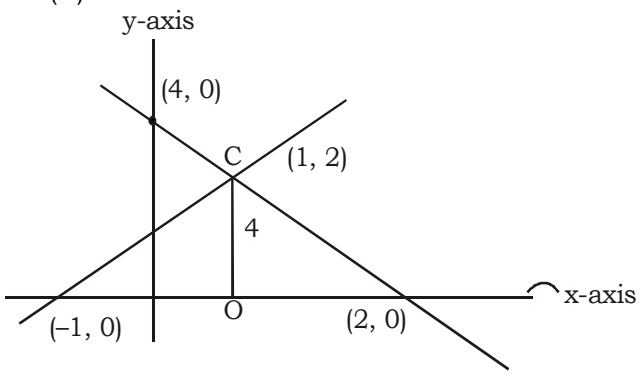
74. (B) $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

$d = \sqrt{(1-2)^2 + (3-2)^2}$

$d = \sqrt{1+1} = \sqrt{2}$

Hence, the distance of common chord = $\sqrt{2}$

75. (B)



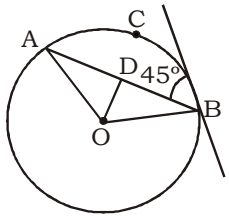
$$\frac{x}{2} + \frac{y}{4} = 1 \qquad \ldots (1)$$

and $\frac{x}{-1} + \frac{y}{-1} = 1 \qquad \ldots (2)$

from equation (1) and (2):-

$$\begin{array}{rl} 2x + y &= 4 \\ x - y &= -1 \\ \hline 3x &= 3 \\ x &= 1 \\ \therefore \quad y &= 2 \\ \text{OC} &= 4 \\ &= 2 \end{array}$$

76. (C)



$\angle ABC = 45°$

$\angle ABO = 45°$

BD = 3 cm

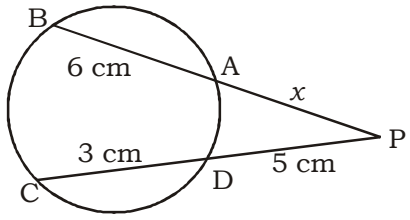
$\cos 45° = \frac{BD}{OB}$

$\cos 45° = \frac{3}{OB}$

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

$OB = 3\sqrt{2}$ cm

77. (A)



$\because PA \times PB = PD \times PC$

$x(x + 6) = 5 \times 8$

$x^2 + 6x - 40 = 0$

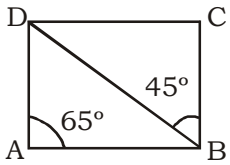
$(x + 10)(x + 4) = 0$

$x = 4, -10$

We take $x = 4$

$\therefore$ AP = 4 cm

78. (B)



$\angle BCD = \angle DAB = 65°$

$\therefore \angle BDC = 180° - (65° + 45°) = 70°$

79. (D) Let x be substracted:-

$\frac{15 - x}{19 - x} = \frac{3}{4}$

$60 - 4x = 57 - 3x$

$x = 3$

80. (D) No. of persons in management

$= 12000 \times \frac{14}{100} = 1680$

No. of females in management

$= 1680 \times \frac{20}{100} = 336$

No. of persons in engineering

$= 12000 \times \frac{16}{100} = 1920$

No. of females in engineering

$= 1920 \times \frac{50}{100} = 960$

Required % $= \frac{960 \times 100}{336}\%$

$= 285.7\%$

$= 286\%$ approx.

81. (C) Required difference

= (792 + 960 + 858 + 750 + 1980 + 1344) – (648 + 960 + 462 + 2250 + 660 + 336)

= 6684 – 5316

= 1368

82. (D) Required ratio $= \frac{1980}{1344} = \frac{165}{112} = 165 : 112$

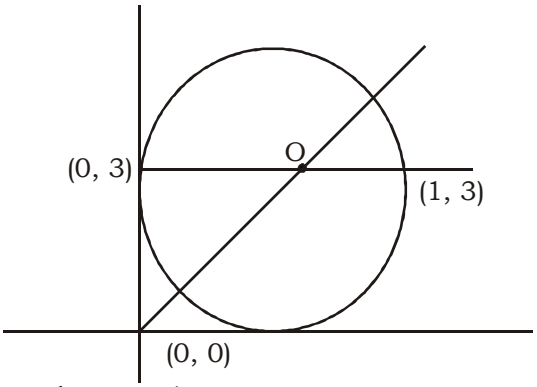
83. (B) Required ratio

$= \frac{792 + 750}{648 + 2250} = \frac{1542}{2898} = 257 : 483$

84. (A) Required percentage

$= \frac{3000 \times 100}{1320} = 227\%$

85. (B) $y = 3$ and $y = 3x$



then n = 1

Then point O is equal to (1, 3) equation of a circle $= x_1^2 + y_1^2 = a^2$

Hence, radius of circle

$a = \sqrt{(1-0)^2 + (3-3)^2}$

$a = \sqrt{(1)^2 + (0)^2}$

$= 1$

Hence, the circle of $(x - 1)^2 + (y - 3)^2 = 1$

86. (A) $x^2 - 3x + 2 = 0$
$x^2 - 2x - x + 2 = 0$
$x(x-2) - 1(x-2) = 0$
$(x-1)(x-2) = 0$
$x = 1$
$x = 2$

Hence, $\left(x - \frac{1}{x}\right) = \left(2 - \frac{1}{2}\right)$

$= \frac{4-1}{2}$

$= \frac{3}{2}$

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

87. (A) Required number of diagonals

$= {}^{100}C_2 - 100 = \frac{100!}{98!2!} - 100$

$= \frac{100 \times 99}{2} - 100 = 4950 - 100 = 4850$

88. (B) $A_1 = 900$
$A_2 = 600$
$R_1 = 10\%$
$R_2 = 4\%$

$\therefore T = \frac{A_1 - A_2}{A_2R_1 - A_1R_2} \times 100$

$= \frac{900 - 600}{600 \times 10 - 900 \times 4} \times 100$

$= \frac{300 \times 100}{2400} = 12.5$ years

89. (A) Since , x_1, x_2, x_3 and y_1, y_2, y_3 are in G.P. whose common ratio is r.

$\therefore$ $x_2 = x_1r$, $x_3 = x_1r^2$ and $y_2 = y_1r$, $y_3 = y_1r^2$

Slope of PQ = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{y_1r - y_1}{x_1r - x_1} = \frac{y_1}{x_1}$

Slope of PR = $\frac{y_3 - y_1}{x_3 - x_1} = \frac{y_1r^2 - y_1}{x_1r^2 - x_1} = \frac{y_1}{x_1}$ $\therefore$

Slope of PQ = Slope of PR

$\Rightarrow$ P, Q, R are collinear.

90. (C) Let $y = mx$ be the equation of tangent (s) from the origin to the circle $(x-7)^2 + (y+1)^2 = 5^2$, there $r = d$

$\Rightarrow \frac{7m - (-1)}{\sqrt{m^2+1}} = \pm 5$

$\Rightarrow$ Let m_1 and m_2 be the slopes of the tangents.

Since, $m_1 : m_2$ = product of the roots = $\frac{12}{12} = -1$

$\therefore$ The angle between two tangents is $\frac{\pi}{2}$.

91. (C) Let x = no. of benches

So, ATQ,

$6(x+1) = 7x - 5$

or $7x - 6x = 6 + 5$

$\Rightarrow x = 11$

So, No. of students = $6(x+1) = 72$

92. (C) Let the C.P. of each article by ₹ 1

For 15 books , the tradesman gives 1 book free.

$\therefore$ C.P. of 15 book = ₹ 16

$\therefore$ S.P. of 15 book

$= 16 \times \frac{135}{100} =$ ₹ $\frac{108}{5}$

$\therefore$ S.P. of 1 book

$= \frac{108}{5 \times 15} =$ ₹ $\frac{36}{25}$

Now, 96% of marked price = $\frac{36}{25}$

$\therefore$ Marked price = $\frac{36 \times 100}{25 \times 96} = \frac{3}{2} =$ ₹ 1.5

$\therefore$ The required % increase

$= \frac{0.5}{1} \times 100 = 50\%$

93. (B) Let the weigth of Mr. Gupta and Mrs. Gupta be $7x$ kg and $8x$ kg respectively.

Then, $7x + 8x = 120$

$15x = 120$

$\Rightarrow x = \frac{120}{15} = 8$kg

Initially weight of Mr. Gupta = $7x = 7 \times 8 = 56$ kg and initially weight of Mrs. Gupta = $8x = 8 \times 8 = 64$kg

After taking dieting, weight of Mr. Gupta

= 56 - 6 = 50kg and ratio of their weight = $\frac{50}{60}$

= 5 : 6

So, Mrs. Gupta reduced weight = 64 - 60 = 4kg.

94.(B) Let the annual instalment be ₹ x

Amount of ₹ 100 after 4 years

= ₹ $\left(100 + \frac{100 \times 5 \times 4}{100}\right) =$ ₹ 120

$\therefore$ Present value of ₹ 120 due after 4 yrs = ₹ 100

$\therefore$ Present value of ₹ x due after 4 yrs = ₹ $\frac{5}{6}x$

Similarly present value of ₹ x due after 3 years = ₹ $\frac{20}{23}x$

Present value of ₹ x due after 2 yrs= ₹ $\frac{10}{11}x$

and Present value of ₹ x due after 1 yr = ₹ $\frac{20}{21}x$

$\therefore$ $\frac{5}{6}x + \frac{20}{23}x + \frac{10}{11}x + \frac{20}{21}x = 6450$

$\Rightarrow$ $x =$ ₹ 1800 (approx.)

95. (D) $A \times 1.2 \times 0.75 = B \times 1.25 \times 0.8$
$\Rightarrow A \times 0.9 = B \times 1$
$\Rightarrow \frac{B}{A} = \frac{0.9}{1} = \frac{9}{10}$
$\therefore$ B : A = 9 : 10

96. (B) Let the amount invested by P and Q are ₹ $5x$ and ₹ $6x$ respectively
Ratio of investment of P, Q and R
$= 5x \times 12 : 6x \times 12 : 6x \times 6 = 5 : 6 : 3$
Total profit = ₹ 98000
= 20% of total investment
$\Rightarrow$ Total investment = ₹ $\frac{98000 \times 100}{20}$
= ₹ 490000
So, R's investment = $\frac{3}{14} \times 490000$
= ₹ 105000

97. (D) Let L and S = length and speed of the train
So, L = (S – 6) kmph × 5 sec _____(i)
& L = (S – 7.5) kmph × 5.5 sec _____(ii)
From (i) and (ii)
(S – 6)kmph × 5 sec = (S – 7.5) kmph × 5.5 sec
or, 5S – 30 = 5.5S – 41.25
So, S = 22.5 kmph
So, L = 22.92 m

98. (D) Let length of rectangle = x
and breadth of rectangle = y
$(x + 2)(y - 2) = xy + 20$
$\Rightarrow xy + 2y - 2x - 4 = xy + 20$
$\Rightarrow 2y - 2x = 24$
$\Rightarrow y - x = 12$ _____(i)
Also, $(x - 2)(y - 1) = xy - 37$
$\Rightarrow xy - x - 2y + 2 = xy - 37$
$\Rightarrow 2y + x = 39$ _____(ii)
On solving Eqs. (i) and (ii),
we get $x = 5$ and $y = 17$
Hence, area of rectangle = xy
$= 5 \times 17 = 85$sq m

99. (B) Let the length of the smaller line segment = x cm.
$\therefore$ The length of larger line segment = $(x + 2)$cm
According to the question.
$(x + 2)^2 - x^2 = 32$
$\Rightarrow x^2 + 4x + 4 - x^2 = 32$
$\Rightarrow 4x = 32 - 4 = 28$
$\Rightarrow x = \frac{28}{4} = 7$
$\therefore$ The required length = $x + 2 = 7 + 2 = 9$cm.

100. (D) Possible combinations $\rightarrow$ (3 ladies & 2 men) or, (4 ladies & 1man) or (5 ladies & no man)
So, Required number of ways
$= {}^5C_3 \times {}^8C_2 + {}^5C_4 \times {}^8C_1 + {}^5C_5 \times {}^8C_0$
$= 280 + 40 + 1 = 321$

SSC MAINS-04 (ANSWER KEY)

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

Note : If your opinion differs regarding any answer please message the mock test and question no to 886030003

For any issues related to Result Processing, kindly contact us on 9313111777.