KD Campus
KD Campus Pvt. Ltd
2007, OUTRAM LINES, 1ST FLOOR, OPPOSITE MUKHERJEE NAGAR POLICE STATION, DELHI-110009

SSC MAINS (MATHS) MOCK TEST-11 (SOLUTION)

1. (C) Let cost price of steam engine is x.

then, $x \times \frac{125}{100} \times \frac{350}{300} \times \frac{110}{100} = 5060$

$x \times \frac{5}{4} \times \frac{7}{6} \times \frac{11}{10} = 5060$

$x = \frac{5060 \times 16}{11}$

$x = ₹\ 7360$

2. (A) The least square number which is divisible by 6, 8 and 15 = 3600

3. (B) $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1$
$= 2(1 + 3\sin^2\theta.\cos^2\theta) - 3(1 + 2\sin^2\theta.\cos^2\theta) + 1$
$= 2 + 6\sin^2\theta.\cos^2\theta - 3 + 6\sin^2\theta.\cos^2\theta + 1$
$= 0$

4. (C) $3 + 4 + 8 + 9 + 13 + 14 + ...$ upto 16 terms
$= 7 + 17 + 27 + ...$upto 8 terms

$= \frac{8}{2}[7 \times 2 + (8 - 1) \times 10] = 4[14 + 70]$

$= 336$

5. (A)

6. (A) Total numbers of odd numbers between 1 to 100 = 50
$\therefore$ Required sum = $(50)^2 = 2500$

7. (B) Given that

$\frac{L}{M} + \frac{M}{N} + \frac{N}{L} = 0$

Then, $\frac{L}{M} + \frac{M}{N} = -\frac{N}{L}$

Square both side

$\left(\frac{L}{M} + \frac{M}{N}\right)^2 = \left(-\frac{N}{L}\right)^2$

$\frac{L^2}{M^2} + \frac{M^2}{N^2} + 2\frac{L}{M}.\frac{M}{N} = \frac{N^2}{L^2}$

Multiply both side $\frac{N}{L}$

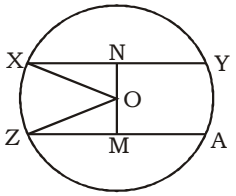
$\frac{LN}{M^2} + \frac{M^2}{LN} + 2 = \frac{N^3}{L^3}$

$\frac{LN}{M^2} + \frac{M^2}{LN} - \frac{N^3}{L^3} = -2$

8. (A) $\sqrt[3]{(-125) \times (-1000)} = \sqrt[3]{(-5)^3(-10)^3}$

$= \sqrt[3]{(50)^3} = 50$

9. (D) Given XY = 14 cm
then XN = 7 cm

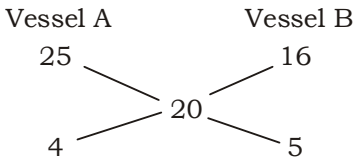


Δ XNO
$(ON)^2 = (XO)^2 - (XN)^2$
$= (25)^2 - (7)^2 = 625 - 49$
$(ON)^2 = 576$
$ON = 24$ cm
Then,
OM = MN – ON
OM = 44 – 24
OM = 20
So that in Δ ZMO
$(ZM)^2 = (OZ)^2 - (OM)^2$
$= 625 - 400$
$(ZM)^2 = 225$
$ZM = 15$ cm
then, ZA = 2ZM = 2 × 15 = 30 cm

10. (C)

	Milk		Water	
Vessel A	5	:	3	$)_{8\times5} = 25 : 15$
Vessel B	2	:	3	$)_{5\times8} = 16 : 24$

ATQ,



Required ratio = 4 : 5

11. (A) Let radius of circle is 'r' and side of square is a :
then according to question,

$2\pi r = 4a \Rightarrow a = \frac{\pi r}{2}$

$\therefore$ Area of square $\left(\frac{\pi r}{2}\right)^2 = \frac{\pi^2 r^2}{4} = \frac{9.56r^2}{4}$

$= 2.46r^2$
Hence, area of circle is grater than area of square.

12. (B) Let journey = 1200 km
Time taken in one-third of journey

$= 1200 \times \frac{1}{3} \times \frac{1}{25} = 16$ hours

Time taken in one-fourth of journey

$= 1200 \times \frac{1}{4} \times \frac{1}{30} = 10$ hours

Time taken in remaining journey

$= 1200 \times \left(1 - \frac{1}{3} - \frac{1}{4}\right) \times \frac{1}{50}$

$= 10$ hours

Average speed during the whole journey

$$= \frac{1200}{16+10+10} = 33\frac{1}{3} \text{ km/hr}$$

13. (C) A→3 hrs. 45 min. = 15/4 hrs.

B→+3 hrs

C→-1 hr

Total work = 15 unit

then

A → 4 unit/hr

B → 5unit/hr

C → -15unit/hr

∴ Tank is Half full of water means

$$= 7.5 \text{ unit} = \frac{15}{2} \text{ units}$$

then time after which the cistern will be emptied $= \frac{7.5}{6} = \frac{75}{60} \times 60 = 75$ minutes

14. (D) Time taken to pass the bridge only = (20 – 8) sec = 12 sec

Speed of the train $= \frac{264}{12} \times \frac{18}{5} = 79.2$ km/hr

15. (A) Given $\frac{4^n \times 20^{m-1} \times 12^{m-n} \times 15^{m+n-2}}{16^m \times 5^{2m+n} \times 9^{m-1}}$

$4^{n+m-1+m-n-2m} \times 5^{m-1+m+n-2-2m-n}$

$\times 3^{m-n+m+n-2-2m+2}$

$= 4^{-1} \times 5^{-3} \times 3^0 = \frac{1}{500}$

16. (A) $a*b = a^b$

So, $5*3 = 5^3 = 125$

17. (B) Selling price of 150 Pens at the rate of ₹12 each pen and 15% profit

$= 150 \times 12 \times \frac{115}{100} = ₹2070$

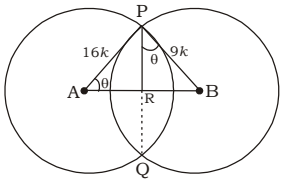
S.P of First 50 pens $= 50 \times 12 \times \frac{110}{100} = ₹660$

Required SP of 100 pens = 2070 – 660 = ₹1410

Cost price of 100 Pens = 100 × 12 = ₹1200

then gain % $= \frac{210}{1200} \times 100 = \frac{35}{2} = 17\frac{1}{2}\%$

18. (C)



In above figure

∠PAR = ∠PAB = ∠BPR

∠RPA = ∠PBA = ∠PBR

∠PRA = ∠APB = ∠BRP

ΔAPR ≅ ΔABP ≅ ΔPBR

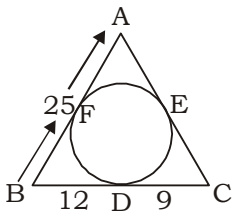
$\frac{AR}{PR} = \frac{AP}{BP}$, $\frac{AP}{BP} = \frac{PR}{BR}$

$\frac{AR}{PR} \times \frac{PR}{BR} = \frac{AP}{BP} \times \frac{AP}{BP} = \left(\frac{AP}{BP}\right)^2 = \left(\frac{16}{9}\right)^2$

AR : BR = 256 : 81

19. (C) $\overline{A} + 1$

20. (B)



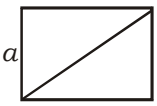
CE = CD = 9

AE = AF = (AB – FB) = (AB – BD)

= 25 – 12 = 13

AC = 9 + 13 = 22

21. (B)



$D = \sqrt{2a}$

Required ratio $= a^2 : \left(\sqrt{2a}\right)^2$

$= a^2 : 2a^2$

$= 1 : 2$

22. (C) Let exterior angle = x

Interior angle = $5x$

ATQ,

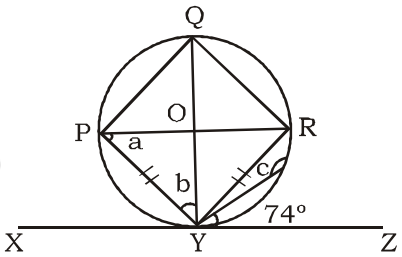
$x + 5x = 180°$

$x = 30°$

So, number of sides of polygon $= \frac{360°}{30°}$

= 12

23. (D)



∠a = ΔZYR = 74°

∠a + ∠c = 180°

∠c = 180° – 74

∠c = 106°

In ΔPYR,

a = ∠I = 74°

∠PYR = ∠I = 74°

then,
$\angle QYX = b + 74°$
$\angle b = 16$
then $\angle a + \angle b + \angle c = 106 + 16 + 74$
$\angle a + \angle b + \angle c = 196°$

24. (D) Volume of sphere = $\frac{4}{3}\pi r^3$

Volume of cone = $\frac{1}{3} \times \pi \times (r)^2 \times r$

ATQ,
Volume of new sphere = Volume of cone

$\frac{4}{3}\pi R^3 = \frac{1}{3}\pi r^3$

$R = \frac{r}{(4)^{\frac{1}{3}}} = \frac{r}{(2)^{\frac{2}{3}}}$

Required ratio= Surface area of smaller sphere : surface area of larger sphere

$= 4\pi R^2 : 4\pi r^2 = 4\pi \left[\frac{r}{(2)^{\frac{2}{3}}}\right]^2 : 4\pi r^2$

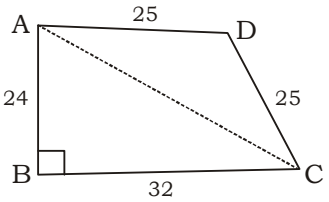
$= 1 : (2)^{\frac{4}{3}}$

25. (A) When n is any integral value
then n = 1, 2, 3
put n = 1 in equation $3^{2n} + 27n + 8$

$\frac{3^2 + 27 + 8}{3} = \frac{3^2}{3} + \frac{27}{3} + \frac{8}{3}$

then remainder is 2

26. (D)



In Δ ABC

$AC = \sqrt{(AB)^2 + (BC)^2}$

$= \sqrt{(24)^2 + (32)^2}$

$= 40$ cm

Semi perimeter of $\Delta ACD = \frac{25 + 25 + 40}{2}$

$= 45$ cm

Area of ΔACD

$= \sqrt{45 \times (45 - 40) \times (45 - 25)(45 - 25)}$

$= \sqrt{45 \times 5 \times 20 \times 20} = 300$ m²

Area of $\Delta ABC = \frac{1}{2} \times 24 \times 32$

$= 384$ m²

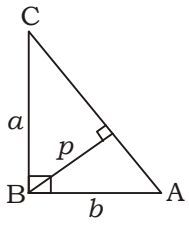
Area of □ ABCD = (300 + 384)m²
= 684 m²

27. (B) Let train fare is ₹ x and reservation charge is ₹ y
then, Ramesh purchased one reserved first class ticket with reservation charge
$\therefore\ x + y = 265$ ....(i)

and for another man $x + y + \frac{1}{2}x + y = 612$

$= 2x + 2y + x + 2y = 1224$ .....(ii)
So, from equation (i) and (ii)
3x + 4y = 1224
3x + 3y = 795
– – – .
$y = 429$
So, Reservation charge is ₹ 429

28. (C)



Length of AC = $\sqrt{a^2 + b^2}$
ATQ,

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

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

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

29. (C) Given $y + a$ is a factor of
$y^2 + Ty + S$, $y^2 + Ly + M$
put, $y = -a$
$\Rightarrow y^2 + Ty + S = 0$
$\Rightarrow (-a) - aT + S = 0$
$\Rightarrow a^2 = aT + m = 0$ .....(i)
and$(-a)^2 = aL + m = 0$
$a^2 = aL - m$ .....(ii)
From equation (i) and (ii)
$aT - S = aL - m$
$aT - aL = S - m$

$a = \frac{S - m}{T - L}$

30. (A) $\sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta}$

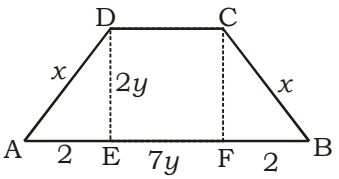
$= \sec^2\theta - \frac{\sin^2\theta(1 - 2\sin^2\theta)}{\cos^2\theta(2\cos^2\theta - 1)}$

$= \sec^2\theta - \frac{\sin^2\theta[\cos^2\theta + \sin^2\theta - 2\sin^2\theta]}{\cos^2\theta[2\cos^2\theta - \cos^2\theta - \sin^2\theta]}$

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

$= \sec^2\theta - \tan^2\theta = 1$

31. (D)



$H = (6y + 7y)\frac{2}{13}$ $H = 2y$

Area $= \frac{1}{2}(6y + 7y)2y$

$208 = 3y^2 \Rightarrow y = 4$

AB = 28; CD = 24; DE = 8

$AD = 8^2 + 2^2 = \sqrt{68}$

$AC^2 = BC^2 = AD^2 + BC^2 + 2AB \cdot CD$

AD = BC

then, AC = BD

$2AC^2 = 2AD^2 + 2(AB.CD)$

$AC^2 = 68 + (28 \times 24)$

$AC = \sqrt{740}$

ATQ, $(AC)^2 = \left(\sqrt{740}\right)^2$

AC = 740

32. (C) $x = a(\sin\theta + \cos\theta)$

$y = b(\sin\theta - \cos\theta)$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{a^2(\sin\theta + \cos\theta)^2}{a^2} + \frac{b^2(\sin\theta - \cos\theta)^2}{b^2}$$

$= (\sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta) + (\sin^2\theta + \cos^2\theta - 2\sin\theta\cos\theta)$

$= 2(\sin^2\theta + \cos^2\theta) = 2$

33. (B) Required ratio $= \frac{\frac{5}{8} \times 4 + \frac{1}{3} \times 3}{\frac{3}{8} \times 4 + \frac{2}{3} \times 3}$

$= \frac{\frac{5}{2} + 1}{\frac{3}{2} + 3} = \frac{\frac{7}{2}}{\frac{7}{2}} = 1:1$

34. (B) $\frac{5x^2 - 3y^2}{xy} = \frac{11}{2} \Rightarrow 5\frac{x}{y} - 3\frac{y}{x} = \frac{11}{2}$

$10\left(\frac{x}{y}\right)^2 - 11\left(\frac{x}{y}\right) - 6 = 0$

$\left(2\frac{x}{y} - 3\right)\left(5\frac{x}{y} + 2\right) = 0$

So, $\frac{x}{y} = \frac{3}{2}$ or $-\frac{2}{5}$

$\frac{x}{y}$ is a positive value. So answer will be $\frac{3}{2}$.

35. (B) 4M = 6F

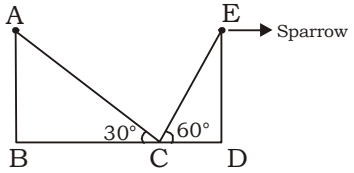
M : F = 3 : 2

$\frac{8(10M + 3F) \times D}{2} = 4M \times 7 \times 12$

$\frac{8(10 \times 3 + 3 \times 2) \times D}{2} = 4 \times 3 \times 7 \times 12$

$D = \frac{3 \times 7 \times 12}{36} = 7$ days

36. (C)



Distance travelled by the sparrow in 2 minutes = BD

$= 50\sqrt{3}\cot 30° + 50\sqrt{3}\cot 60°$

$= 150 + 50 = 200$ m

Speed of the sparrow $= \frac{200}{2} \times \frac{60}{1000}$

$= 6$ km /hr

37. (B) $\because 1^2 + 3^2 + 5^2 + \ldots\ldots + 39^2$

$= \frac{39 \times 40 \times 41}{6} = 260 \times 4 = 10660$

and $1^2 + 3^2 + 5^2 + \ldots\ldots + 11^2$

$= \frac{11 \times 12 \times 13}{6} = 26 \times 11 = 286$

$\therefore$ Required sum of 10660 –286 = 10374

38. (C) 9 articles are sold in a rupee, so the cost price of 1 article = ₹ $\frac{1}{9}$

New cost price $= \frac{1}{9} \times \frac{100}{96} \times \frac{144}{100} =$ ₹ $\frac{1}{6}$

So, 6 articles are to be sold in a rupee.

39. (C) $\frac{1 + \frac{1}{2}}{1 - \frac{1}{2}} \div \frac{4}{7}\left(\frac{2}{5} + \frac{3}{10}\right)$ of $\frac{\frac{1}{2} + \frac{1}{3}}{\frac{1}{2} - \frac{1}{3}}$

$= \frac{\frac{3}{2}}{\frac{1}{2}} \div \frac{4}{7}\left(\frac{7}{10}\right)$ of $\frac{\frac{5}{6}}{\frac{1}{6}}$

$= \frac{3}{1} \div \frac{4}{10}$ of $\frac{5}{1}$

$= \frac{3}{1} \div \left(\frac{4}{10} \times \frac{5}{1}\right)$

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

40. (D) ATQ,

$2x + 3x + 5x = 180° - (15° + 15° + 15°)$

$10x = 135°$

$5x = 67.5°$

Greatest angle = 67.5° + 15° = 82.5°

$= 82.5° \times \frac{\pi}{180°} = \frac{11}{24}\pi$

41. (A) ATQ, Required area of paper used = $2\pi rh$

$= 2 \times \frac{22}{7} \times 1.25 \times 28$

$= 22000 \text{ cm}^2$

42. (D) $\frac{2}{3}, \frac{3}{5}, \frac{8}{11}, \frac{11}{17}$

Multiply & divide them by $3 \times 5 \times 11 \times 17$

$\frac{1870}{3\times5\times11\times17}, \frac{1683}{3\times5\times11\times17},$

$\frac{2040}{3\times5\times11\times17}, \frac{1815}{3\times5\times11\times17}$

So, $\frac{8}{11}$ is the largest fraction.

43. (D) Let cost price of watch be ₹ x, then ATQ,

120% of $x - 90\%$ of $x = 56.25$

$\frac{120 \times x}{100} - \frac{90 \times x}{100} = 56.25$

$x = \frac{56.25 \times 100}{120 - 90}$

$x = \frac{5625}{30}$

$x = 187.5$

44. (C)

A + B	8		3
B	12	24	2
C	12		2

Work done by A and B in 4 days

$= 3 \times 4 = 12$ units

Work done by B in next 2 days

$= 2 \times 2 = 4$ units

Remaining units of work $= 24 - 12 - 4$

$= 8$ units

Time required by C to finish the job

$= \frac{8}{2} = 4$ days

45. (A) Area of a regular hexagon = 6 × Area of an equailateral triangle

$= 6 \times \frac{\sqrt{3}}{4} x^2$

$= \frac{9}{2\sqrt{3}} x^2$ square unit

46. (C) If $x = 2$, $y = 4$, $p = 8$ and $q = 10$

$\sqrt{xyp} + \frac{2y}{p-y} + 2q$

$= \sqrt{2\times4\times8} + \frac{2\times4}{8-4} + 2 \times 10$

$= 8 + 2 + 20 = 30$

47. (A) Given that $x = \sqrt{3} - \frac{1}{\sqrt{3}}$ and $y = \sqrt{3} + \frac{1}{\sqrt{3}}$

then, $x + y = \sqrt{3} - \frac{1}{\sqrt{3}} + \sqrt{3} + \frac{1}{\sqrt{3}} = 2\sqrt{3}$

$x.y = \frac{8}{3}$

Now, $\frac{x^2}{y} + \frac{y^2}{x} = \frac{x^3 + y^3}{xy}$

$= \frac{(x+y)^3 - 3xy(x+y)}{xy}$

$= \frac{(2\sqrt{3})^3 - 3 \times \frac{8}{3} \times 2\sqrt{3}}{\frac{8}{3}}$

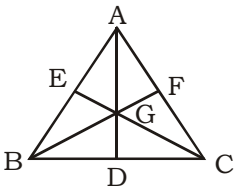
$= \frac{24\sqrt{3}^3 - 16\sqrt{3}}{\frac{8}{3}} = \frac{8\sqrt{3}}{\frac{8}{3}} = 3\sqrt{3}$

48. (C) $\frac{2\sin 68°}{\cos 22°} - \frac{2\cot 15°}{5\tan 75°} - \frac{3\tan 20°.\tan 40°\tan 45°.\tan 50°.\tan 70°}{5}$

$= 2\frac{\cos 22°}{\cos 22°} - \frac{2\tan 75°}{5\tan 75°} - \frac{3.\tan 20°.\cot 20°}{\tan 40°.\cot 40°}{5}$

$= 2 - \frac{2}{5} - \frac{3}{5} = \frac{10-2-3}{5} = 1$

49. (C)



In ΔABC, here AD, BE and CF are medians, suppose they meet at point 'G'.

In ΔABC

BG + GC > BC

$\frac{2}{3}BE + \frac{2}{3}CF > BC$

2 (BE + CF) > 3BC ..... (1)

Similarly,

2 (CF + AD) > 3AC ..... (2)

2 (AD + BE) > 3AB ..... (3)

on addition of equations (1), (2) and (3).

4 (AD + BE + CF) > 3(AB + BC +CA)

50. (C) Walls are 5 cm thick.

$\therefore$ Internal length = $(330 - 2 \times 5) = 320$ cm

Breadth = $(260 - 10)$cm = 250 cm

Height = $(110 - x)$ cm

Here, the cistern is assumed to be open and x is the thickness of bottom.

$\therefore$ $320 \times 250 \times (110 - x) = 8000$ litres

$320 \times 250 \times (110 - x) = 8000 \times 1000 \text{ cm}^3$

$(110 - x) = \frac{8000000}{320 \times 250}$

$110 - x = 100$

$x = 10$ cm = 1 dm.

51. (B) $\frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$

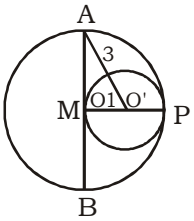
$\frac{350 \times 6}{2} = \frac{M_2 \times 25}{5}$

$M_2 = 210$

More man required = $M_1 - M_2 = 350 - 210 = 140$

52. (C)

53. (B)



AM = $\sqrt{3^2 - 1^2} = 2\sqrt{2}$ cm

AB = $2 \times 2\sqrt{2} = 4\sqrt{2}$ cm

54. (D) 4 5

4 5

16 25

$\frac{9}{16} \times 100 = 56.25\%$

55. (A) Let initial price of sugar be ₹ x /kg.

Initial expenditure = ₹ $10x$

New price of sugar be ₹ $=1.32\,x$/kg

Let the new consumption be ₹ y /kg

New expenditure = $1.32\,xy$

ATQ, $10x \times 1.1 = 1.32\,xy$

$y = \frac{10 \times 1.1}{1.32} = \frac{11}{1.32} = 8\frac{1}{3}$ kg

56. (A) Required area = $\frac{90^\circ}{360} \times \frac{22}{7} \times 7 \times 7$

= 38.5 m²

57. (B) J = a, K = a + 2, L = a + 4, M = a + 6

N = a + 8

Required average = $\frac{5a + 20}{5}$

= a + 4

= J + 4

58. (A) $\frac{12}{9+a} + \frac{12}{9-a} = 3$

$\frac{9 - a + 9 + a}{81 - a^2} = \frac{1}{4}$

$72 = 81 - a^2$

$a^2 = 81 - 72$

$a^2 = 9$

a = 3 km/hr

59. (B) $\frac{3000 \times T \times 6}{100} = 900$

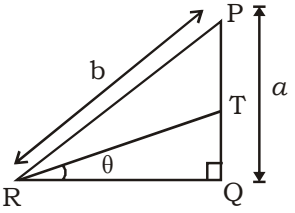
T = 5 years

Now, 1600 = $\frac{4000 \times 5 \times R}{100}$

R = 8%

60. (C) $\frac{2 \times 64 \times 80}{64 + 80} = \frac{2 \times 64 \times 80}{144} = 71.11$ km/hrs

61. (D)



PT = TW = $\frac{a}{2}$

Also in Δ PQR, QR² + PQ² = PR²

In Δ PQR, QR² + a^2 = b²

QR = $\sqrt{b^2 - a^2}$

In Δ QRT, RT² = TQ² + QR²

RT² = $\left(\frac{a}{2}\right)^2 + b^2 - a^2 = \frac{a^2 + 4b^2 - 4a^2}{4}$

= $\frac{4b^2 - 3a^2}{4}$

RT = $\frac{\sqrt{4b^2 - 3a^2}}{2}$

In Δ QRT, cosθ = $\frac{QR}{RT} = \frac{\sqrt{b^2 - a^2}}{\frac{\sqrt{4b^2 - 3a^2}}{2}}$

= $\frac{2\sqrt{b^2 - a^2}}{\sqrt{4b^2 - 3a^2}}$

62. (C) $\frac{1}{3}\pi \times \frac{3}{2} \times \frac{3}{2} \times 4 : \pi \times \frac{2}{2} \times \frac{2}{2} \times 5$

$\Rightarrow 12 : 20$

$\Rightarrow 3 : 5$

63. (D) Let n be the numbers divisible by 4 and 6, LCM of 12.

Hence, Numbers between 100 and 600 divisible by 12 are 108, 120 588

then 588 = 108 + (n-1).12

n = 41

64. (D) 1 : 2 : 3 : 4 = 10 Sum = 540

$\downarrow \times 40$ $\downarrow \times 40$

160 400

65. (B) $\sin^3\alpha + \cos^3\alpha = 1$

$\sin^3\alpha + \cos^3\alpha = \sin^2\alpha + \cos^2\alpha$

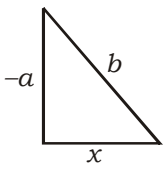
$\sin^2\alpha(\sin\alpha - 1) = \cos^2\alpha(1 - \cos^2\alpha)$

$\Rightarrow \frac{1 - \sin\alpha}{\cos\alpha - 1} = \cot^2\alpha$

The minimum value of $\cos^2\alpha$ is 0

thus, the minimum value of $\frac{1 - \sin\alpha}{\cos\alpha - 1}$ is 0

66. (D)



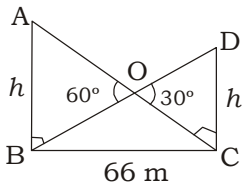
$b^2 = (-a)^2 + x^2$

$b^2 - a = x^2$

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

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

67. (A)



Let the height of the tower be h meter.
In Δ OAB,

$\tan 60^\circ = \frac{h}{OB} = OB = \frac{h}{\sqrt{3}}$

Now, In Δ OCD, , $\tan 30^\circ = \frac{h}{OC}$

$\Rightarrow$ OC = $h\sqrt{3}$

In Δ OBC,

$(h\sqrt{3})^2 + \left(\frac{h}{\sqrt{3}}\right)^2 = 60^2$

$\Rightarrow 3h^2 + \frac{h^2}{3} = 3600$

$\Rightarrow h = 6\sqrt{30}$ meter.

68. (C) 25% = $\frac{1}{4}$

4 5

$\frac{1}{5} = 20\%$

69. (B) $X = \frac{6}{7} = .85714$

$Y = \frac{2}{3} = .6667$

$Z = \frac{8}{9} = .8889$

$A = \frac{4}{5} = .8$

$Z > X > A > Y$

70. (B) SP = $120 \times \frac{4}{5}$ = ₹ 96

71. (C) $10 + 10 \times \frac{3}{4} + 10 \times \frac{3}{4} + 10 \times \frac{3}{4} \times \frac{3}{4} + 10 \times \frac{3}{4} \times \frac{3}{4} \ldots\ldots \infty$

$= 10 + 2\left(10 \times \frac{3}{4} + 10 \times \frac{3}{4} \times \frac{3}{4} + \ldots..\right)$

But S ∞ = $\frac{9}{1-r}$ so we get

$= 10 + \times 10 \frac{\frac{3}{4}}{1 - \frac{3}{4}} = 10 + 60 = 70$ meter

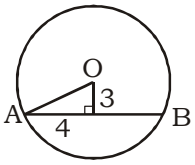
72. (D) $(x-y)^2 = x^2 + y^2 - 2xy$

$(4)^2 = x^2 + y^2 - 2 \times 45$ ($\because xy = 45$)

$16 + 90 = x^2 + y^2$

$106 = x^2 + y^2$

73. (B)



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

74. (A) $\frac{1}{3}\pi r^2 h = \pi r l$

$\frac{1}{3} rh = l$

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

$\frac{1}{9} r^2 h^2 = h^2 + r^2$

$\frac{1}{9} = \frac{1}{r^2} + \frac{1}{h^2}$

75. (D)

76. (D) Let $\theta = 45^\circ$

$\frac{\tan 60^\circ}{\tan 30^\circ} = \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = 3$

77. (C)

1	0.50	0.10
3	5	7
3	2.5	.70

Ratio of money = 30 : 25 : 7 $\Rightarrow$ 62

$\downarrow \times\frac{155}{62}$

155

No. of coins = $30 \times \frac{5}{2} \times 1 \Rightarrow 75$

$25 \times \frac{5}{2} \times 2 \Rightarrow 125$

$7 \times \frac{5}{2} \times 10 = 175$

375

78. (B) $\frac{1}{100+5\times2} : \frac{1}{100+5\times3} : \frac{1}{100+5\times4}$

$= \frac{1}{110} : \frac{1}{115} : \frac{1}{120}$

$= 276 : 264 : 253 \Rightarrow 793$

$\downarrow \times 10$ $\qquad$ $\downarrow \times 10$

2,760 $\qquad$ 7,930

79. (B) $F = (S_1 + S_2)$

$F + 5 = 2\{(S_1 + 5) + (S_2 + 5)\}$

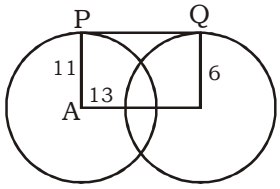
$F + 5 = 2[S_1 + S_2 + 10]$

$F + 5 = 2[\frac{F}{3} + 10]$

$F - \frac{2}{3}F = 20 - 5$

$\frac{F}{3} = 15$, F = 45 years

80. (B)



PQ = $\sqrt{13^2 - 5^2} = \sqrt{144} = 12$ cm

81. (B) $x - y = 4$, $\frac{1}{x} - \frac{1}{y} = -\frac{1}{8}$

$\frac{y-x}{xy} = -\frac{1}{8}$

$(x-y)^2 = (x-y)^2 + 4xy$

$= 4^2 + 4 \times 35$

$= 16 + 128$

$= 144$

$x + y = 12$

82. (C) 20% = $\frac{1}{5}$

CP $\qquad$ SP

5 $\qquad$ 6

Total SP = 6 + 6 = 12 units

Total CP = 12 units

$CP_2 = 12 - 5 = 7$ units

Required loss = $\frac{1}{7} = 14\frac{2}{7}\%$

83. (D)

84. (D) 10% = $\frac{1}{10}$

$110 = 10 \times 11$ $\qquad$ 11×11

100 $\qquad$ 121

210 $\qquad$ $\downarrow \times 100$

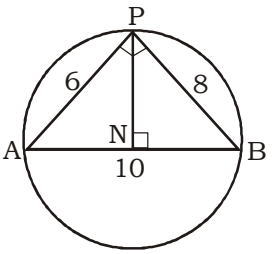
$\times 100$

21,000 $\qquad$ 12,100

85. (B) $4 \times [1^3 + 2^2 + 3^2 + \ldots\ldots 10^3]$

$4 \times 3025 = 12100$

86. (A)



PN = $\frac{6 \times 8}{10} = 4.8$ cm

BN = $\sqrt{8^2 - 4.8^2} = 6.4$ cm

87. (C) $\frac{1}{4} = 0.250$ and $\frac{3}{4} = 0.750$

From option (C)

$\frac{63}{250} = \frac{63 \times 4}{250 \times 4} = 0.252$

$\frac{187 \times 4}{250 \times 4} = \frac{748}{1000} = 0.748$

88. (B) Age of mother – age of daughter = 31 years.....(i)

Age of father – age of son =30 years ....(ii)

Age of father – age of daughter =34 years ...(iii)

From (i) and (iii)

Age of father – age of mother = 3 years

Age of mother = 30 – 3 = 27 years

89. (C) Present age of (A + B + C) = 30 × 3 = 90

Present age of (B + C) = 25 × 2 = 50

∴ A + B + C – B – C = 90 – 50 = 40 years

Present age of A = 40 years

90. (B) ATQ,

$\left(1 - \frac{5}{x}\right)^5 = \frac{32}{211+32} = \frac{32}{243} = \left(\frac{2}{3}\right)^5$

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

$x = 15$ litres

Initial amount of milk in the container = 15 litres

91. (A) $5x \times 12 : 4x \times 4 + (4x + 1000) \times 8 : 3x \times 8 + (3x + 2000) \times 4 = 15 : 14 : 11$

$$\therefore \frac{5x \times 12}{4x \times 4 + (4x + 1000) \times 8} = \frac{15}{14}$$

$$\frac{4x \times 15}{16x + 32x + 8000} = \frac{15}{14}$$

$$56x - 48x = 8000$$

$$x = 1000$$

Investment of C in the beginning
$= 3 \times 1000 = ₹\ 3000$

92. (D) Let the rate of interest per annum = R%

$$\because 2P = \frac{P \times R \times 30}{100} \Rightarrow \frac{20}{3}\% = 6\frac{2}{3}\%$$

93. (A) Expenditure $= \dfrac{\text{Income}}{\left[\dfrac{\text{Profit }\%}{100} + 1\right]}$

ATQ,

$$\frac{I_1}{\frac{35}{100}+1} = \frac{I_2}{\frac{40}{100}+1}$$

$$\frac{I_1}{I_2} = \frac{135}{140}$$

$\therefore I_1 : I_2 = 27 : 28$

94. (D) Given
(Income – Expenditure = 1.5 lakh)

$$\because \text{Profit }\% = \frac{\text{Income} - \text{Exp}}{\text{Exp}} \times 100$$

$$= \frac{1.5}{\text{exp}} \times \frac{100}{10} = 40$$

$$\Rightarrow \text{Expenditure} = \frac{15}{4} = 3.75 \text{ lakh}$$

95. (C) $\therefore$ Profit $\% = \left[\dfrac{\text{Income}}{\text{Exp.}} - 1\right] \times 100$

$$\text{Income} = \left[\frac{\text{Profit }\%}{100} + 1\right] \text{Exp.}$$

ATQ,

$$\text{Exp. A}\left[\frac{50}{100} - 1\right] = \text{Exp. B}\left[\frac{30}{100} + 1\right]$$

$$\frac{\text{Exp. A}}{\text{Exp. B}} = \frac{130}{150}$$

Exp A : Exp B = 13 : 15

96. (A) $\dfrac{\text{Company A}}{\text{Company B}} = \dfrac{30}{45}$

Profit :- Com A : Com B = 2 : 3

97. (D) Number of workers in scale V = 12% of 1500 = 180
Number of working male in scale V =12% of 800 = 96
Number of working female in scale V
= 180 – 96 = 84

98. (B) In scale VII.
Total number of workers = 8% of 1500
= 120
Number of male workers = 10% of 800
= 80
$\Rightarrow$ Number of female workers = 120 - 80
= 40
$\Rightarrow$ Required ratio = 80: 40 = 2:1

99. (A) Number of females in scale I
= 330 – 192 = 138
Number of females in scale VI
= 210 – 72 = 138
$\Rightarrow$ Number of females are same in scale I and VI.

100. (D) Average of working females in all scales

$$= \frac{138 + 81 + 157 + 62 + 84 + 138 + 40}{7}$$

$$= \frac{700}{7} = 100$$

$\therefore$ Required no. of scales = 4 (II, IV, V, VII)

SSC MAINS (MATHS) MOCK TEST-11 (ANSWER KEY)

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