

EXPLANATIONS FOR MOCK TEST - SSC Tier-II MATH(01)

1. (c) A's share = Rs. 250
B's share = Rs. 100
It means the ratio of efficiency of A : B = 250 = 100
= 5 : 2
Ratio of days taken by A and B = 2x : 5x
Now, 5x - 2x = 9 \Rightarrow x = 3
Number of days taken by A = 6
Number of days taken by B = 15
Therefore number of days taken by A and B,
working together = $4\frac{2}{7}$ days
2. (b) Work done by 6 men = Work done by 10 women.
 \Rightarrow Work done by 1 man = work done by $10/6 = 5/3$ women
12 men + 5 women = 25 women
= women
 $W_1 \times D_1 = W_2 \times D_2$, W = women, D = days
 $10 \times 15 = 25 \times D_2$
 $D_2 = 6$
3. (b)
4. (a)
5. (a) $(2^{123} - 2^{122} - 2^{121}) \times (3^{234} - 3^{233} - 3^{232})$:
 $2^{121}(2^2 - 2 - 1) \times 3^{232}$
 $= 2^{121} \times 3^{232} \times 5^1$
Therefore there will be only one zero at the end of the product.
6. (b)
7. (a) always gives unit digit 5 irrespective of its power and similarly 6 also gives 6 as a unit digit irrespective of its power.
So, $5 \times 6 = 30$.
8. (c) The total distance which a monkey has to overcome is 35 metre. Since the monkey first climbs up 5 metre and then he slips down by 2 metre, it means he climbs up only 3 metre in one round of 2 (= 1 + 1) minutes. Now, note that if the monkey has to just climb up 5 metre then he will not be slipped back. Thus he will cover the 30 metre height in 10 rounds and the rest 5 metre height of the top will cover in only one attempt. Since when he will touch (or reach) the top of the pole he will not be slipped back. Thus total number of attempts required = 11 (= 10 + 1).
9. (a) Let the number be x and y. Then, $x(x + y) = 247$ and $y(x + y) = 114$, $x^2 + xy = 247$... (i) $x^2 + y^2 = 114$... (ii)
On adding eq. (i) and (ii), $x^2 + xy + xy + y^2 = 247 + 114$, $x^2 + 2xy + y^2 = 361$, $(x + y)^2 = 19^2$
 $x + y = 19$
10. (d) LCM of the given numbers is always divisible by their HCF. Here 120 is divisible by 8, 12 and 24 but not by 35. So, 35 cannot be the HCF.
11. (b) LCM of 24, 36 and 54 seconds = 216 seconds = 3 minutes 36 seconds
Required time = 10 : 15 : 00 + 3 minutes 36 seconds = 10 : 18 : 36 a.m.
12. (a)
13. (d)
14. (a) Volume of water flown in an hour
= $2000 \times 40 \times 3$ cubic metre
= 240000 cubic metre
Volume of water flown in 1 minute = $240000/60 = 4000m^3 = 4000000$ litre
15. (c) Smallest side of the triangle = x cm (let)
Second side of triangle = $40 - 17 - x = 23 - x$
Semi-perimeter (s) = $40/2 = 20$
 $\sqrt{s(s-a)(s-b)(s-c)} = 60$
 $x = 8$ or 15
The smallest side is 8 cm.
16. (c) A : B = 1 : 3
B : C = 1 : 3 = 3 : 9
C : D = 1 : 3 = 9 : 27
A : B : C : D = 1 : 3 : 9 : 27
Sum of ratios = $1 + 3 + 9 + 27 = 40$
C's share in profit = $\frac{9}{40} \times 40000 = \text{Rs. } 90000$
17. (a) Let the second number be x.
First number = 2x
Third number = $2x/3$
 $2x + x + 2x/3 = 49.5 \times 3$
 $x = 40.5$
Required difference = $2x - 2x/3 = 4x/3$
 $x = 54$
18. (c) Let the marked price of watch be Rs. x.
 $[(x \times 95)/100] - [(x \times 94)/100] = 15$
 $x = 150$
19. (d) Let 10 articles of each kind be bought.
Total cost = Rs. $(10 \times 10 + 14 \times 10) = \text{Rs. } 240$

Total selling price = $13 \times 20 = \text{Rs. } 260$

Gain percent = $\frac{260-240}{240} \times 100 = 8\frac{2}{3}\%$

20. (b) The sum of cost prices of two articles is Rs. x. One of them is sold at a loss of a% and other is sold at a gain of b% and their S.P. is same. C.P. of article sold at a loss of a% = $\frac{100+b}{200-a+b} \times x = (100 + 15) / (200 - 20 + 15) \times 19500 = \text{Rs. } 11500$

C.P. of second article = Rs. 8000

21. (b)

22. (A) Difference = $PR^2 / (100)^2$

23. (D)

24. (d) Here, S.P. of both articles is same. Profit on one is equal to loss on the other. If loss per cent be x, then

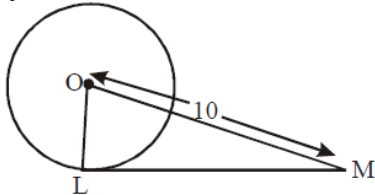
$$25-x - 25x/100 = 0 \rightarrow x = 20$$

25. (d) Let man has x, 20 paise coins., 25 paise coins = 50 - X

$$0.20 \times X + 0.25 \times (50 - X) = 11.25 \text{ or } 0.20x + 12.50 -$$

$$0.25x = 11.25 \rightarrow X = 25$$

26. (a) In $\triangle LOM$



$\angle MLO = 90^\circ$ and $OL = \text{radius} = 6$, $OM = 10$

$$LM = \sqrt{OM^2 - OL^2} = 8 \text{ cm}$$

27. (d)

28. (b) Area of the circle = $\pi r^2 = 36$

$$r = 6/\sqrt{\pi} = AC = 2r = 12/\sqrt{\pi}$$

Diagonal of a square

$$\text{Side of a square} = \frac{1}{\sqrt{2}} \times \text{Diagonal of a square} = \frac{1}{\sqrt{2}} \times$$

$$\frac{12}{\sqrt{\pi}} = \frac{6\sqrt{2}}{\sqrt{\pi}}$$

$$\text{Area of 9 sq. area} = 36/\pi \text{ cm}^2$$

29. (c) $\sqrt{p^2 + q^2 + pq}$ is largest

$$\text{Let } a = p, b = q \text{ and } c = \sqrt{p^2 + q^2 + pq}$$

$$\cos C = (a^2 + b^2 - c^2) / 2ab$$

$$\Rightarrow C = 120^\circ$$

30. (b)

31. (a) :

$$\cos 24^\circ + \cos 55^\circ + \cos 125^\circ + \cos 156^\circ$$

$$\cos 24^\circ + \cos 55^\circ + \cos (180^\circ - 55^\circ) + \cos (180^\circ - 24^\circ)$$

$$\cos 24^\circ \cos 55^\circ - \cos 55^\circ - \cos 24^\circ = 0$$

32. (a) Edge of the cube = $\sqrt[3]{343} = 7 \text{ cm}$

Radius of cone = 3.5 cm and height = 7 cm

$$\text{Volume of the cone} = \frac{1}{3} \pi r^2 h = 90 \text{ c.c.}$$

33. (a) Originally the food would have lasted for 28 days. After 8 days the food would have lasted for 20 days. Let the reinforcement number be x. The food that would have been consumed by 60 men in 20 days, was consumed by $(60+x)$ 15 days

$60 \times 20 = (60+x)15 \rightarrow x = 20$ The strength of the reinforcement was 20.

34. (d) The person had Rs. 100 and 100 paise in the beginning. After spending half of it, he had Rs. 50 and 50 paise. He had Rs. 100 in the beginning (10% error is allowed.)

35. (b)

36. (b) $\frac{3}{4}A - 2 = B + A/4$

$$A - 0.7B = 1.7B - 4$$

Solving, we get $A = 44$ and $B = 20$

Total number = 64

37. (d) Let the marks scored in 5 subjects be 6x, 7x, 8x, 9x and 10x (on a scale of 1)

Average score = 60%

$$= \frac{6x+7x+8x+9x+10x}{5} = 60/100 \rightarrow x = 0.075$$

So, the marks are 0.45, 0.525, 0.6, 0.675 and 0.75. Number of times the marks exceeds 50% is 4.

38. (d) Suppose the person has Rs. 100 with him. Price per orange is Rs. 2 and that of a mango is Rs. 2.50. After keeping Rs. 10 for taxi, he is left with Rs. 90. Price of 20 mangoes = Rs. 40. Remaining money = $(90 - 40) = \text{Rs. } 50$.

So, he can buy = $50/2.5 = 20$ oranges for this amount.

39. (b) From the statements it is clear that he purchase 119 g instead of 100g and he sells 85g instead of 100g. Therefore in this whole transaction he saves $19 + 15 = 34\text{g}$

$$\text{Thus the profit} = \frac{34}{100} \times 100 = 34\%$$

40. (b) Let side of square = x

Radius of sphere = x

Surface area of sphere, $A = 4\pi x^2$

Since, square revolves round a side to generate a cylinder

whose height and radius are x and x, respectively.

$$S = 2\pi * (x * x) = 2\pi x^2$$

It is clear that $A = S$

41. (a) Let the number of boys = x

Number of 25 paise coins = x^2

$$\text{According to question} = \frac{25}{100} x^2 = 400$$

$$x = 40$$

42. (c)

43. (a) As obtained by A, we have $\alpha + \beta = 8$ and $\alpha\beta = 12$

The equation is $x^2 - 8x + 12 = 0$

As obtained by B, we have $\alpha + \beta = 8$ and $\alpha\beta = 7$

The equation is $x^2 + 8x + 7 = 0$

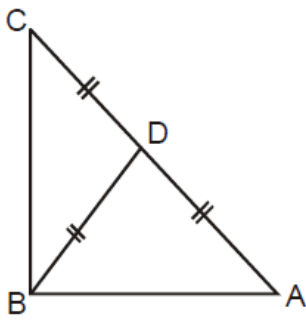
Hence, the correct equation is $x^2 - 8x + 7 = 0$

$$\text{Now, } x^2 - 8x + 7 = 0 \rightarrow x^2 - 7x - x + 7 = 0$$

$$x(x-7) - (x-7) = 0 \rightarrow (x-7)(x-1) = 0$$

$$x = 7 \text{ or } x = 1$$

44. (c)



$CD = BD = DA$

This is possible only when ABC is right angled triangle.

45. (b) We know, the sum of two sides is always greater than third sides.

$10 + 100 > x, 10 + x > 100$ and $100 + x > 10$

$110 > x, x > 90$ and $x > -110$, but x cannot be negative.

$\therefore 90 < x < 110$

46. (c)

47. (d) $\cos\theta = 0.96$

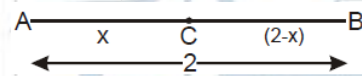
$\sin\theta = 0.28$

$\tan\theta = \sin\theta / \cos\theta = 7/24$

$1/\sin\theta + 1/\tan\theta = 7$

48. Given $AC^2 = AB \times CB$

$X^2 = 2 * (2 - x)$



$x^2 = 4 - 2x$

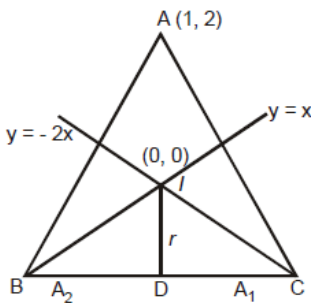
$x^2 + 2x - 4 = 0$

$x = -1 \pm \sqrt{5}$

Now, $BC = 2(-1 \pm \sqrt{5})$

$= 3 - \sqrt{5}$

49. (b) Images of A about $y = x, y = -2x$ are A_1 and A_2 which lie on BC. Now, $A_1 = (2, 1)$ and $A_2 = (-11/5, 2/5)$. Equation of BC is $x - 7y + 5 = 0$. Hence,



$r = ID = 5/5\sqrt{2} = 1/\sqrt{2}$

50. (c) Let the vessel initially contain 8 L of liquid.

Let x L of this liquid be replaced with water.

$(3 - 3x/8) + x = 5 - 5x/8$

$x = 8/5$

Part of the mixture replaced $= (1/8 \text{ of } 8/5) = 1/5$

51. (d) $(102)^2 = 10404$

$\sqrt{104.04} + \sqrt{1.0404} + \sqrt{0.010404}$

$= 10.2 + 1.02 + 0.102 = 11.322$

52. (c) $\frac{16n^2 + 7n + 6}{n} \rightarrow 16n + 7 + (6/n)$

Since, n is an integer, hence for the entire expression to become an integer $(6/n)$ should be an integer

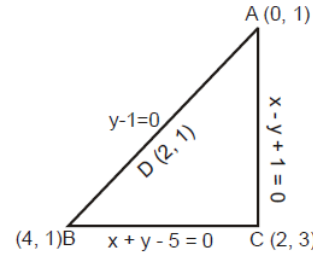
And $(6/n)$ can be integer for $n = 1, 2, 3, 6$. Hence n will be four values.

53. (c)

54. (a) Sheet is revolved about its length $h = 7$ cm and $r = 4$ cm, Volume of the figure, thus formed $= \pi r^2 h$
 $= (22/7) \times 4 \times 4 \times 7 = 352$ cu cm

55. (c)

56. (a)



Since, the triangle is right angled, so the circumcenter will be the middle point of hypotenuse, i.e., $(2, 1)$.

57. (a)

58. (b) Let total number of candidates = 100

Total marks of 40 candidates = 40×74 and total marks of 60 candidates = 60×77

Hence, required average marks = $7580/100 = 75.80$

59. (b)

60. (d)

61. (c) Let the length of train be x metre. Speed = 90 km/h
 $= (90 \times 5)/18$ m/s

Distance covered in 60s = $25 \times 60 = 1500$ m

Now according to question, $2x = 1500$

$x = 750$ m

62. (a)

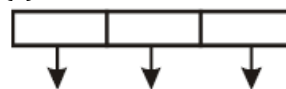
63. (c) Let $f(x) = x^2 + ax + b$ and $g(x) = x^2 + cx + d$

$f(-2) = 4 - 2a + b = 0 \Rightarrow b - 2a = -4$ and $g(-2) = 4 - 2c + d = 0 \Rightarrow d - 2c = -4$

$\therefore b - 2a = d - 2c \Rightarrow b + 2c = d + 2a$

64. (d)

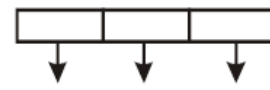
65. (c) When 3 lies at hundreds place



1 way 10 way 9 way

Total integers = $10 \times 9 = 90$

When 3 lies at units place



1 way 10 way 1 way

Total integers = 10

When 3 lies at unit's and hundred's place

Total integers = 10

Total integers = $90 + 10 + 10 = 110$

66. (d)

67. (a)

68. (d) $(a - 1)^2 + (b + 2)^2 + (c + 1)^2 = 0,$

$a - 1 = 0 \Rightarrow a = 1;$

$b + 2 = 0 \Rightarrow b = -2$

$c + 1 = 0 \Rightarrow c = -1$

$\therefore 2a - 3b + 7c$

$= 2 - 3(-2) + 7(-1) = 2 + 6 - 7 = 1$

69. (a) Area to be leveled = Area of rectangle + 2 (Area of semicircular ends)

$= 20 \times 14 + 2 \times \frac{1}{2} \times \left(\frac{22}{7}\right) \times 7 \times 7$

$= 280 + 154 = 434 \text{ m}^2$

Cost of leveling = Rs. $(434 \times 25) = \text{Rs. } 10850$

70. (c)

71. (c) The correct pattern is + 12, + 10, + 8, 6,So, 24 is wrong and must be replaced by $(48 \div 6)$ i.e., 8.

72. (c) The correct pattern is $\times 2, \times 4, \times 2, \times 4$ So, 550 is wrong and must be replaced by (320×2) i.e.,

73. (a)

74. (b) As $\Delta ADE \sim \Delta ABC$

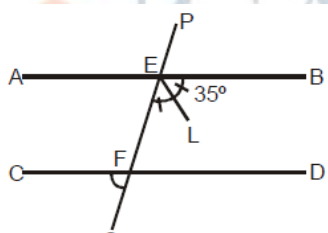
So $AD / AB = DE / BC = AE / AC$

$DE / AE = BC / AC = 2 / 3$

Hence $DE : AE = 2 : 3$

75. (A) $\angle LEB = 35^\circ$

$\angle FEB = 2 \times \angle LEB = 70^\circ$



$\angle AEB = \angle AEF + \angle BEF = 180^\circ$

$\Rightarrow \angle AEF = 180^\circ - 70^\circ = 110^\circ$

$\angle CFQ = \angle AEQ = 110^\circ$ (Alternate angles)

76. (D)

77. (C)

78. (b) Remaining distance = $(3584 - 1440 - 1608) \text{ km} = 536 \text{ km}$

This distance is covered at the rate of $536 / 8 = 67 \text{ km/hour}$

Average speed of whole journey = $3584 / 56 = 64 \text{ km/hour}$

Required difference

$= (67 - 64) = 3 \text{ km/hour more.}$

79. (c)

80. (b) Ratio of wages of A, B and C respectively = $5 \times 6 : 6 \times 4 : 4 \times 9 = 30 : 24 : 36 = 5 : 4 : 6$

\therefore Amount received by A = $\frac{5}{5+4+6} \times 1800 = \text{Rs. } 600$

81. (b) Since O is the centroid, M is the mid-point of PR, QM being the median.

$PR = \sqrt{5^2 + 12^2} = 13 \text{ cm}$

$QM = PM = MR = 6.5 \text{ cm}$

$OM = \frac{2}{3} \times 6.5 = 13/3 = 4 \frac{1}{3} \text{ cm}$

82. (a) In the given figure $AC = BD = 4 \text{ cm}$ So area of shaded part = Area of ABCD - Area of circle of radius 2 cm = 4×4

$- \pi \times (2)^2$

$= 16 - \pi \times 4 = 16 - 4 \times 3.14 = 16 - 12.56 = 3.44 \text{ cm}^2$

83. (c) If $p = 0$, then q 's maximum value = 7

84. (a) the given problem takes the form as follows: 6600 men taking 1700 g per head have provision for $(64 - 14) = 50$ days

$1650 \times 35 \times x = 1700 \times 50 \times 6600$

$x = 10000 \rightarrow$ Strength of reinforcement

$\Rightarrow = 10000 - 6600 = 3400$

85. Angle traced in $60^\circ = 360^\circ$, So, angle traced in $30^\circ = 180^\circ$

Area swept = $\pi r^2 \theta / 360 = \left(\frac{22}{7} \times 7 \times 7 \times \frac{180}{360}\right) = 77 \text{ cm}^2$

86. (d)

87. (c) Required Percentage = $\left[\left(\frac{\text{Area}}{\text{Volume}}\right) \times 100\right]\%$

88. (A) $\frac{\cos^2 \theta - 3 \cos \theta + 2}{\sin^2 \theta} = 1$

$\cos^2 \theta - 3 \cos \theta + 2 = \sin^2 \theta$

$\cos^2 \theta - (\sin^2 \theta) - 3 \cos \theta + 2 = 0$

$\cos^2 \theta - 1 + \cos^2 \theta - 3 \cos \theta + 2 = 0$

$2 \cos^2 \theta - 3 \cos \theta + 1 = 0$

$\cos \theta = \frac{3 \pm \sqrt{3^2 - 4 \times 1 \times 2}}{2 \times 2}$

$= \frac{(3 \pm 1)}{4} = 1 \text{ or } \frac{1}{2} = 60^\circ$

89. (B) $(\sin \theta / \cos \theta) + (\cos \theta / \sin \theta)$

$\sin^2 \theta + \cos^2 \theta = 2 \sin \theta \cdot \cos \theta$

or, $\sin 2 \theta = 1 = \sin 90^\circ$

$\Rightarrow 2 \theta = 90^\circ$

$\theta = 45^\circ$

90. (B) $x^4 + 4 = (x^2)^2 + (2)^2 + 2x^2 \times 2 - (2x)^2$

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

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

91. (d)

92. (a)

93. (d)

94. (c)

95. (a)

96. (B) Required ratio = $\frac{1}{3} : \frac{1}{6} = 2 : 1$

97. (b) Weight of Skin = $1/10$ parts of 16% of proteins =

$\left(\frac{1}{10} \times 16\right)\% = 1.6\%$

98. (c) Proteins and other dry elements = 30%

\therefore Angle subtended by the required arc = $\left(\frac{30}{100} \times 360\right) = 108^\circ$

99. (a) Quantity of water in a body of 50 kg

$= 70\% \text{ of } 50 \text{ kg} = \left(\frac{70}{100} \times 50\right) \text{ kg} = 35 \text{ kg}$

100. (a) Part of the body made of neither bones nor skin = $1 - \left(1/3 + 1/10 + 1/6\right) = 2/5$