

NTSE STAGE – I (DELHI STATE)
003–A (2020 – 21)
(For Class – X)
MENTAL ABILITY TEST (MAT)

QUESTION PAPER

1. $\frac{(6^2 + 7^2 + 8^2 + 9^2 + 10^2)}{(\sqrt{7} + 4\sqrt{3}) - (\sqrt{4} + 2\sqrt{3})}$ is equal to :
1. 355
2. 330
3. 305
4. 366
2. If 20% of $x = y$, then $y\%$ of 20 is the same as:
1. 4% of x
2. 6% of y
3. 8% of x
4. 10% of x
3. The sum of the first 12 terms of an AP. Whose n th term is given by $a_n = 3n + 4$ is:
1. 262
2. 272
3. 282
4. 292
4. Two goods train each 500 m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one:
1. 12 sec
2. 24 sec
3. 48 sec
4. 60 sec
5. The next term of the AP $\sqrt{18}, \sqrt{50}, \sqrt{98}, \dots$ is
1. $\sqrt{146}$
2. $\sqrt{128}$
3. $\sqrt{162}$
4. $\sqrt{200}$
6. If $(p + q)$ th term of an AP is m and $(p - q)$ th term is n , then p th term is :
1. mn
2. \sqrt{mn}
3. $(m - n) / \sqrt{2}$
4. $(m + n) / 2$
7. If a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hr and the time of flight increased by 30 minutes. The original duration of the flight is:
1. 1 hour
2. 2 hours
3. 3 hours
4. 4 hours
8. A tower is observed from a point on the horizontal through the foot of the tower. The distance of this point from the foot of the tower is equal to the height of the tower. The angle of elevation on the top of the tower is:
1. 60°
2. 45°
3. 40°
4. 30°
9. There are 1400 students in a school, 25% of those wear spectacles and $2/7$ of those wearing spectacles are boys. How many girls in the school wear spectacles?
1. 300
2. 100
3. 200
4. 250

10. P, Q and R jointly thought of engaging themselves in a business venture. It was agreed that P would invest Rs 6500 for 6 months, Q, Rs 8400 for 5 months and R, Rs 10000 for 3 months P wants to be the working member for which, he was to receive 5% of the profits. The profit earned was Rs 7400. Calculate the share of Q in the profit.
1. Rs 1900
 2. Rs 2660
 3. Rs 2800
 4. Rs 2840
11. John cycling at a constant speed of 10 km/hr, reaches his school in time. If he cycles at a constant speed of 15 km/hr, he reaches his school in 12 minutes early. How many km he has to cycle for his school is?
1. 4
 2. 6
 3. 9
 4. 12
12. If $7 \sin \alpha = 24 : \cos \alpha : 0 < \alpha < \pi/2$, then the value of $14 \tan \alpha - 75 \cos \alpha - 7 \sec \alpha$ is equal to
1. 3
 2. 4
 3. 1
 4. 2
13. If $x^2 + 1/x^2 = 98 (x > 0)$, then the value of $x^3 + 1/x^3$ is
1. 970
 2. 1030
 3. -970
 4. -1030
14. The correct arrangement of alphabetical order of the words
- a. music
 - b. monk
 - c. minimum
 - d. maximum
1. d, a, c, b
 2. a, c, d, b
 3. d, c, a, b
 4. d, c, b, a
15. At present ages of a father and son are in the ratio of 7:3 and they will be in the present ratio 2:1 after 10 years. What is the present age of father?
1. 70 years
 2. 65 years
 3. 60 years
 4. 50 years

Directions (Questions 16 – 19): Study the following table carefully and answer the questions:
Number of students in different classes of XYZ Primary school:

Classes	Years				
	2014	2015	2016	2017	2018
I	22	28	26	32	18
II	20	26	22	24	16
III	39	33	52	17	29
IV	19	26	38	24	11
V	16	33	37	23	21

16. The difference between the sum of all the students of all the classes in 2017 and 2018 is:
1. 112
 2. 85
 3. 25
 4. 35
17. The sum of all the students in class III in all the years is what percent of the sum of all students of class I in all the years approximately?
1. 30%
 2. 100%
 3. 60%
 4. 135%
18. The square of sum of all the students of all classes in year 2018 is:

1. 2095
3. 6059
2. 9025
4. 9216
19. By what percent the number of students of class I in year 2017 is more than the number of students of Class II for the same year?
1. 60
3. 35
2. 75
4. 33.33

Directions (Questions 20 – 21): First two terms are connected by some relationship. The same relationship is applicable for the next terms identify the suitable pair.

20. Square : Cube
1. Rectangle : Cuboid
3. Quadrilateral : Cuboid
2. Triangle : Square
4. Cuboid : Rectangle
21. 82 : 9
1. 5:26
3. 35:6
2. 6:37
4. 26:5
22. If $A = 2$, $T = 40$ and $ACT = 48$ the TAKE is:
1. 68
3. 74
2. 58
4. 76

Directions (Questions 23 – 27): Identify the wrong number / letters in the series:

23. 126, 98, 70, 41, 14
1. 98
3. 126
2. 70
4. 41
24. 1, 3, 7, 15, 31, 65, 127
1. 7
3. 15
2. 31
4. 65
25. 7, 28, 63, 124, 215, 344
1. 28
3. 124
2. 63
4. 344
26. AD, EG, IJ, MM, QP, UP
1. EG
3. QP
2. UP
4. MM
27. Z8, W5, T2, Q8, N5, K3
1. K3
3. Q8
2. T2
4. Z8

Directions (Questions 28 – 29): First set of words are related in a certain way. You have to choose a word. So that another set of words also become related in same manner.

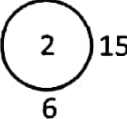
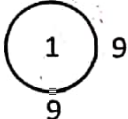
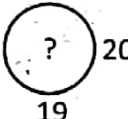
28. Transition : change :: Immobility : ?
1. Stillness
3. Action
2. Liveliness
4. Busyness
29. Grain : Stock :: Stick : ?
1. String
3. Bundle
2. Collection
4. Heap

30. A is B's sister, C is B's mother, D is C's father, E is D's mother. Then how is A related to D?
1. Grand father 2. Grand mother
3. Daughter 4. Grand Daughter

Directions (Questions 31 – 33): Find the odd one out:

31. a. Crusade b. Campaign
c. Expedition d. Cruise
1. a 2. c
3. b 4. d
32. a. Clove b. Cinnamon
c. Apricot d. Pepper
1. a 2. c
3. b 4. d
33. a. Acre b. Yard
c. Mile d. Meter
1. a 2. c
3. b 4. d
34. In a certain code MONKEY is written XDJMNL. How is TIGER written in the same code?
1. SHFDQ 2. HFDSQ
3. QDFHS 4. PQRST
35. In the following matrix, certain numbers are arranged in a certain way. Choose the missing number to complete the matrix.

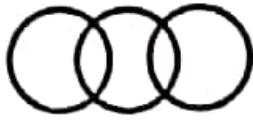
1	7	9
2	14	?
3	105	117

1. 16 2. 12
3. 13 4. 14
36. What value will replace '?' in the figures given below:
- 3  3  10 
1. 0 2. 1
3. 2 4. 3
37. Five plays – K, L, M, N and O are to be staged from Monday to Friday of a week. On each day only one play will be staged. O should be immediately followed by M. L should be staged immediately after N. One play is staged between K and L. N or O should not be the first or last play. Which is the second play to be staged?
1. M 2. O
3. N 4. K
38. In a town of 500 people. 285 people read 'The Hindu' and 212 people read 'Indian Express' and 127 people read 'Times of India'. Only 20 people read 'The Hindu' and 'Times of India', only 29 people read 'The Hindu' and 'Indian Express' and only 35 people read 'Times of India' and 'Indian Express'. 50 people do not read newspaper. Then how many people read only one newspaper?

1. 123
3. 312

2. 213
4. 321

39. Which of the following venn diagram truly represents the relationship between Truck, Ship and Goods?



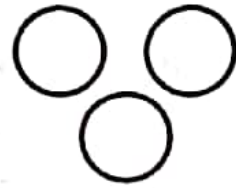
1.



2.

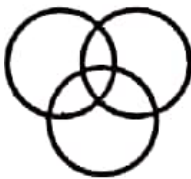


3.

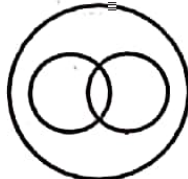


4.

40. Identify the diagram the best represents the relationship among the given animals – Reptiles, Lizard, Lion.



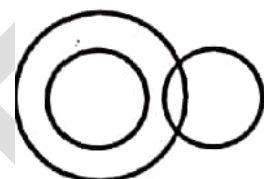
1.



2.



3.



4.

41. If – stands for \div , + stands for \times , \div stands for – and \times stands for +, which of the following equations is correct?

1. $40 - 10 + 5 \div 4 \times 5 = 21$
3. $40 \div 10 - 4 \times 5 + 3 = 32$

2. $40 + 10 - 4 \times 5 \div 3 = 80$
4. $8 - 4 \times 40 \div 2 + 15 = 30$

42. P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre. P is second to the right of T who is neighbour of R and V. S is not the neighbour of P, V is neighbour of U. Q is not between S and W. W is not between U and S. Then who is sitting opposite to W?

1. S
3. U

2. Q
4. T

43. Find the ratio in which rice at Rs 7.20 per kg be mixed with rice at Rs 5.70 per kg. to produce a mixture worth Rs 6.30 per kg?

1. 2:3
3. 3:4

2. 1:3
4. 4:5

44. A pupil's marks were wrongly entered as 83 instead of 63. Due to which the average marks for the class got increased by half. The number of pupils in the class is:

1. 45
3. 39

2. 40
4. 37

45. A watch which gains 5 seconds in 3 minutes was set right at 7 am. In the afternoon of the same day when the watch indicated quarter past 4 O' clock, the true time is:

1. 9 pm
3. 4 pm

2. 7 pm
4. 5 pm

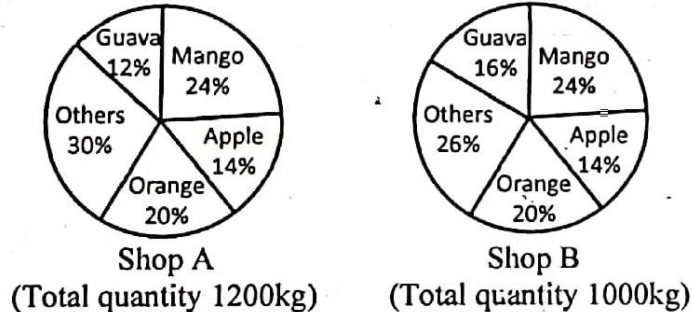
46. A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation.

1. 54%
3. 74%

2. 64%
4. 84%

47. Two goods trains each 390 m long are running in same direction on parallel tracks. Their speeds are 42 km/hr and 36 km/hr respectively. Find the time taken by the faster train to cross the driver of the slower one?
1. 6 min
 2. 12 min
 3. 18 min
 4. 4 min

Directions (Questions 48 – 50): Study the pie chart carefully and answer the following questions. Pie chart shows the percentage quantity of fruits of two shops A and B.



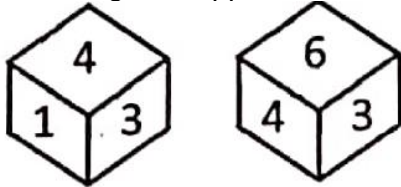
48. What is the difference between the quantity of Guava at Shop B and that of Shop A?
1. 20 kg
 2. 25 kg
 3. 40 kg
 4. 16 kg
49. The quantity of Mango at Shop B is what percentage of the quantity of Mango at shop A?
1. 20%
 2. 120%
 3. 84%
 4. 150%
50. If the price of Mango is Rs 30 per kg, Apple Rs 40 per kg and Orange Rs 20 pr kg, then what is the ratio of their cost at Shop A?
1. 4:5:6
 2. 9:7:5
 3. 4:5:1
 4. 2:5:7
51. In given question, select the correct alternative:
Monotony : Variety : : Crudeness : ?
1. Sobriety
 2. Simplicity
 3. Raw
 4. Refinement
52. If B is 20 metres south from A and C is 10 metres north from D and A is 10 metres west from D, then where is B from C?
1. North – East
 2. North – West
 3. South – West
 4. North
53. Amit ranked 16th from the top and 29th from the bottom among those who passed the examination. 6 students does not participate and 5 failed in it. How many students were there in the class?
1. 50
 2. 55
 3. 44
 4. 52

Directions (Questions 54 – 55): Ananya is older than Shruti, Arti is older than Ananya but younger than Kusum. Kusum is older than Shruti, Shruti is younger than Arti and Geeta is oldest.

54. Who is youngest?
1. Ananya
 2. Shruti
 3. Arti
 4. Kusum

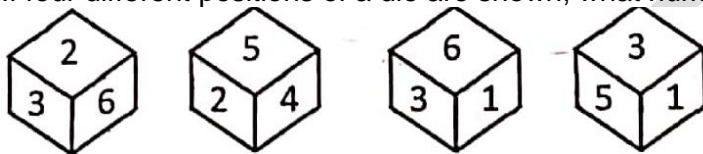
55. Who is the middle with respect to the age?
 1. Shruti
 2. Ananya
 3. Arti
 4. Kusum
56. A and B are brothers, D is brother of E, C is father of A, E is daughter of B, then who is uncle of D?
 1. A
 2. B
 3. C
 4. D

57. Which digit will appear on the face opposite to the face with number 4?



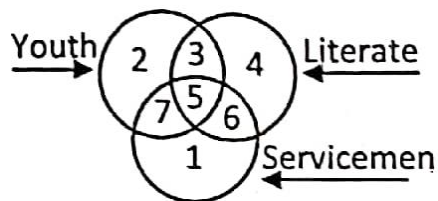
1. 5
 2. 2 or 5
 3. 2
 4. 2 or 3

58. If four different positions of a die are shown, what number is opposite of 3?



1. 6
 2. 5
 3. 2
 4. 4

59. Study the figure given below and find those youth who are in service but not literate?



1. 3 or 4
 2. only 7
 3. 2 or 7
 4. 2 or 5

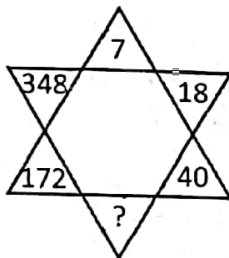
60. In the number 59164823, how many digits will be as far away from the beginning of the number if digits are arranged in descending order as they are in the number?
 1. 3
 2. more than 3
 3. 1
 4. 2

61. How many such pairs of letters are there in the word EDUCATION, each of which has as many letters between them in the word, as they have in English alphabet?
 1. more than 3
 2. 1
 3. 2
 4. 3

Directions (Questions 62 – 65): Study the following information carefully and answer the questions given below:

A, D, E, F, H, J and K are sitting on straight table facing towards south. D sits fourth to the right of A. E sits at the left end of the table. Five persons sit between E and K. J sits third to the left of K. and F does not sit immediate to D.

62. Which of the following person sits exactly at the middle of the row?
 1. J 2. F
 3. H 4. A
63. How many persons sit between A and H?
 1. 1 2. 2
 3. 3 4. 4
64. Three of the following four pairs are alike in a certain way based on their positions and so formed a group. Which of the following does not belong to the group?
 1. AF 2. JH
 3. EA 4. FH
65. What is the position of F with respect to H?
 1. Second to the right 2. Exactly right
 3. Second to the left 4. Third to the right
66. Find out the missing number.



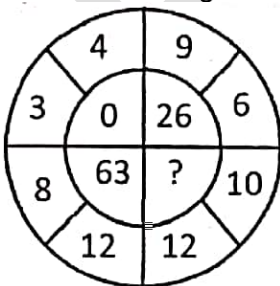
1. 72 2. 84
 3. 68 4. 66

67. Find the missing number in given question:

9	8	7
6	7	8
5	4	6
260	216	?

1. 191 2. 326
 3. 330 4. 336

68. Find the missing number?



1. 7 2. 12
 3. 16 4. 14

69. Complete the series from given options

a_caa_bcc_aabbb_cc

1. bbca 2. Abca
 3. bbac 4. Babc

Directions (Questions 70 – 71): Study the following information to answer the given questions. In a certain code 'always create new ideas' is written as 'ba ri sh gi', 'idea and new thoughts' is written as 'fa gi ma ri', 'create thoughts and insights' is written as 'ma jo ba fa', 'new and better solution' is written as 'ki ri to fa'.

70. What is code for 'ideas'?

- | | |
|--------|-------|
| 1. sha | 2. gi |
| 3. ba | 4. ma |

71. What does 'fa' stand for?

- | | |
|-------------|-------------|
| 1. thoughts | 2. insights |
| 3. new | 4. and |

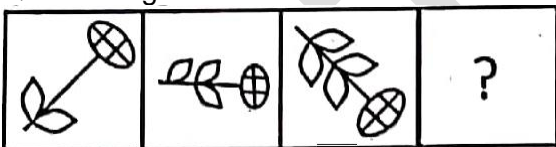
72. Question figure



Answer figure

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |

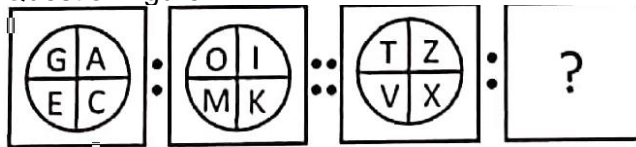
73. Question figure



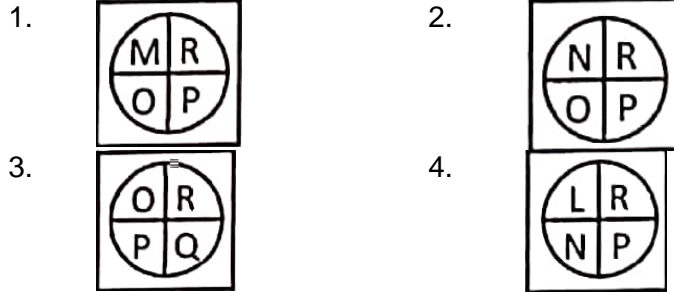
Answer figure

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |

74. Question figure

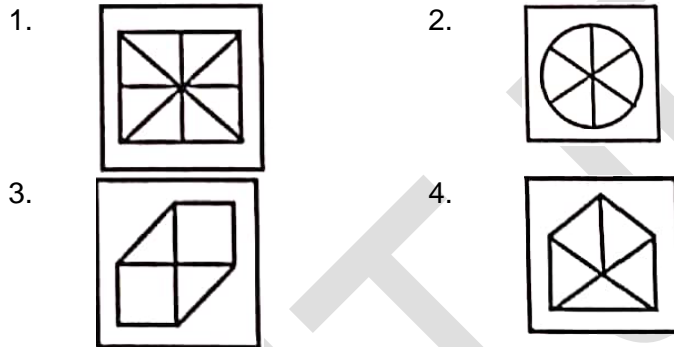


Answer figure

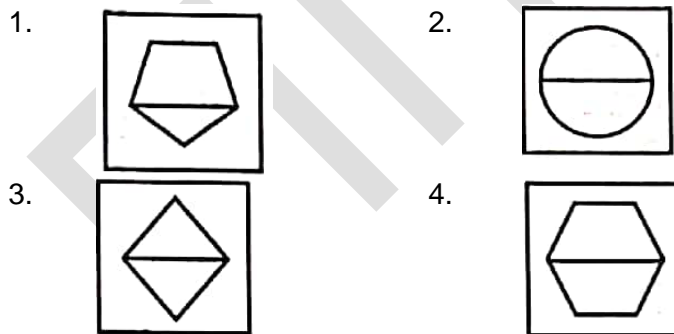


Directions : A set of four figures are given in which three bear close resemblance. Select the odd one out.

75. Select the odd one out.



76. Select the odd one out.



77. If a mirror is kept on a line, then which of the answer figure is the correct mirror image of question figure?

Question figure



Answer figure

1.



2.



3.

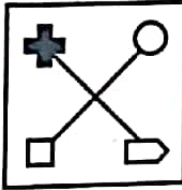


4.



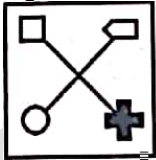
78. Which of the four alternatives given below is the correct water image of the question figure?

Question figure

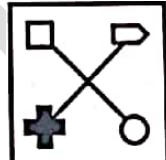


Answer figure

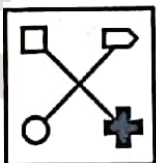
1.



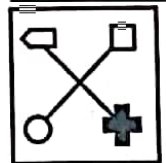
2.



3.

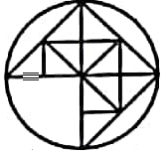


4.



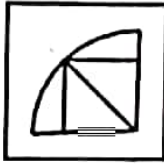
79. Which one of the given alternative figures will complete the given figure pattern?

Question figure

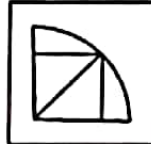


Answer figure

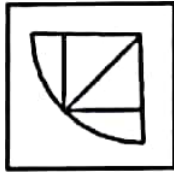
1.



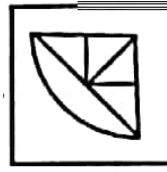
2.



3.



4.



Directions (Questions 80 – 81): All the surfaces of a solid cube of side 4 cm have been coloured black and cut into equal sized cube of side 1 cm each. Now answer the following questions:

80. How many cubes are there which do not have any of their surfaces coloured?

1. 0
2. 24
3. 16
4. 8

81. How many cubes have two of their surfaces coloured with black on the opposite surfaces?

1. 4
2. 2
3. 0
4. 8

82. In a row of 40 children, A is 13th from the left end and B is 9th from the right end. How many children are there between A and C, if C is 4th to the left of B?

1. 12
2. 13
3. 14
4. 15

Directions (Questions 83 – 85): In a family A is younger brother of B and D is the son of B. D is brother of E but E is not son of B. F is grandson of B and C is cousin of E.

83. Who is father of F?

1. A
2. B
3. C
4. Cannot determine

84. The relation of A with D is

1. Father
2. Brother
3. Cousin
4. Uncle

85. The relation of E with F is:

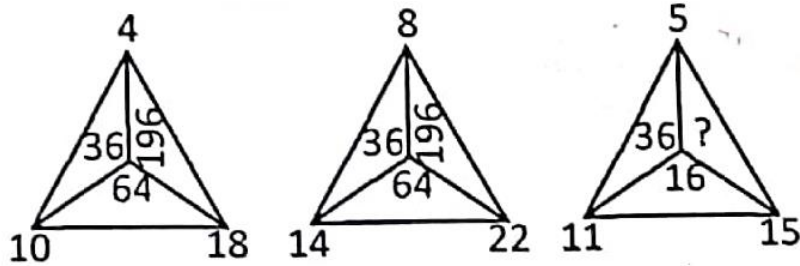
1. Uncle
2. Aunt
3. Grand father
4. Brother

86. How many times are the hands of a clock at right angles in 12 hours?

1. 24 times
2. 48 times
3. 22 times
4. 44 times

Directions (Questions 87 – 90): Find the missing character in the following figures:

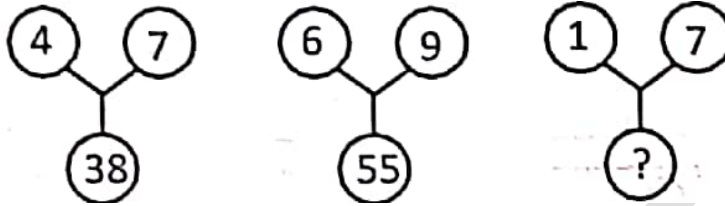
87.



- 1. 16
- 3. 100

- 2. 196
- 4. 144

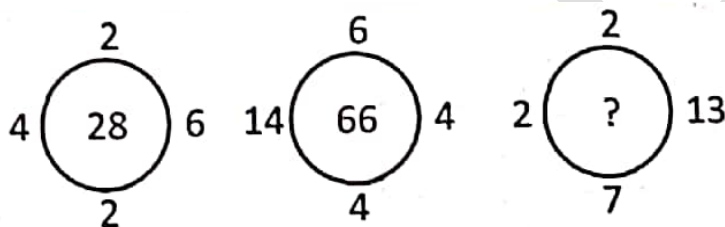
88.



- 1. 49
- 3. 48

- 2. 63
- 4. 50

89.



- 1. 40
- 3. 35

- 2. 32
- 4. 30

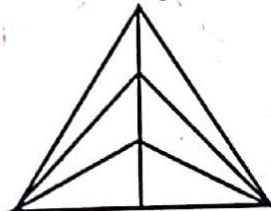
90.

7	9	11
2	3	2
53	88	?

- 1. 125
- 3. 129

- 2. 100
- 4. 64

91. How many triangles are there in the given figure.



- 1. 15
- 3. 16

- 2. 14
- 4. 20

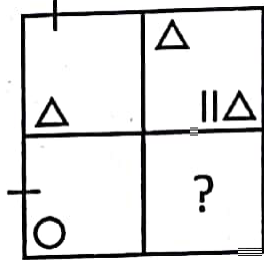
92. If $2 \times 2 = 16$, $2 \times 3 = 36$, $2 \times 4 = 64$ then $2 \times 6 = ?$

- 1. 72
- 3. 96

- 2. 80
- 4. 144

93. $\sqrt{10 + \sqrt{25 + \sqrt{108 + \sqrt{154 + \sqrt{225}}}}}$ find the value:
 1. 10
 2. 8
 3. 6
 4. 4

94. Find the correct figure :

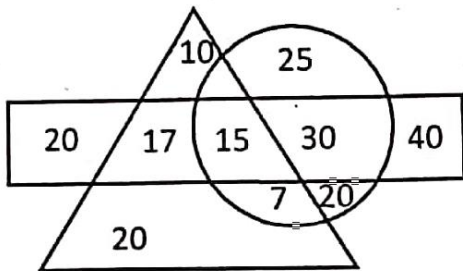


1. 2. 3. 4.

- 95.

- Which number is opposite to 3?
 1. 1
 2. 6
 3. 5
 4. 4

Directions (Questions 96 – 100): Study the diagram and answer each of the following:



- Person who takes tea
 Person who takes Lassi
 Person who takes coffee

96. How many persons who take tea and lassi but not coffee?
 1. 20
 2. 17
 3. 25
 4. 15
97. How many persons are there who take both tea and coffee but not lassi?
 1. 22
 2. 17

- | | | |
|------|---|-------|
| | 3. 7 | 4. 20 |
| 98. | How many persons take lassi? | |
| | 1. 100 | 2. 82 |
| | 3. 92 | 4.122 |
| 99. | How many persons are there who takes only coffee? | |
| | 1. 90 | 2. 45 |
| | 3. 25 | 4.20 |
| 100. | How many persons take all the three? | |
| | 1. 20 | 2. 17 |
| | 3. 25 | 4.15 |

FIITJEE