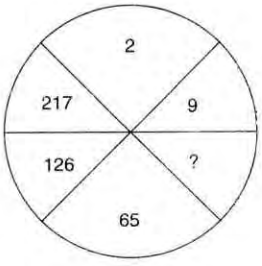
UNIT 6

Inserting A Missing Character

In this type of questions, a set of figures or simply one figure, each one containing certain numbers or a set of letters, combination of numbers and letters in a certain pattern are given. A candidate has to find a missing character in the figure out of the given options.

Example 1. Find the missing character in the following figure.



(a) 26 (b) 27
(c) 28 (d) 63
(e) 17

Sol: The numbers are written according to the rule $n^3 + 1$; n being 1, 2, 3, etc.
$\therefore$ the missing number is $3^3 + 1$ i.e. 28. Hence, the answer is (c).

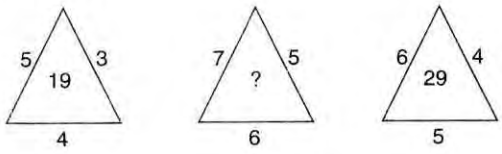
Example 2. Find the number in place of question mark (?) in the following matrix.

3	5	7	9	11	13
8	26	48	82	?	170

(a) 121 (b) 120
(c) 119 (d) 111
(e) 115

Sol: The numbers are according to the rule $n^2 \mp 1$ alternately.
i.e. $3^2-1, 5^2+1, 7^2-1; 9^2+1; 11^2-1$ and 13^2+1.
$\therefore$ the missing number is 120. Hence, the answer is (b).

Example 3. Find the missing character.



(a) 25 (b) 37
(c) 41 (d) 47
(e) 40

Sol: The rule is $3 \times 5 + 4 = 19; 5 \times 7 + 6 = 41; 4 \times 6 + 5 = 29$.
$\therefore$ the missing number is 41. Hence, the answer is (c).

Example 4. Find the missing number in the following matrix.

1	2	3
11	7	5
120	45	?

(a) 15 (b) 16
(c) 17 (d) 18
(e) 19

Sol: Column 1: $11^2 - 1^2 = 120$
Column 2: $7^2 - 2^2 = 45$
$\therefore$ Column 3: $5^2 - 3^2 = 16$
Hence, the answer is (b).

Example 5. Find the missing number.

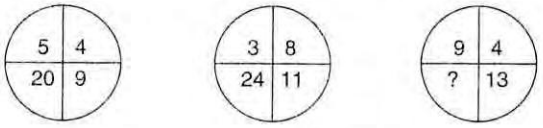
18	24	32
12	14	16
3	?	4
72	112	128

(a) 2 (b) 3
(c) 4 (d) 5
(e) 6

Sol: In each column, the product of 1st and 2nd number is the same as the product of 3rd and 4th number e.g. in the first column, we have $18 \times 12 = 3 \times 72$.
So in the second column, we have
$24 \times 4 = ? \times 112$

$\therefore ? = \dfrac{24 \times 14}{112} = 3$. Hence, the answer is (b).

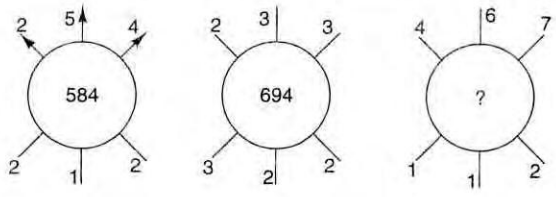
Example 6. Find the missing number.



(a) 52 (b) 36
(c) 117 (d) 81
(e) 37

Sol: The rule is: In the figure: $5 \times 4 = 20$; $5 + 4 = 9$
In the second figure: $3 \times 8 = 24$ and $3 + 8 = 11$.
$\therefore$ In the third figure: $9 \times 4 = 36$. Hence, the answer is (b).

Example 7. Find the missing character:



(a) 937 (b) 824
(c) 769 (d) 678
(e) 786

Sol: In the first figure: $5 \times 1 = 5$; $4 \times 2 = 8$; $2 \times 2 = 4$
In the second figure: $2 \times 3 = 6$; $3 \times 3 = 9$; $2 \times 2 = 4$
$\therefore$ In the third figure: $6 \times 1 = 6, 7 \times 1 = 7, 4 \times 2 = 8$
$\therefore$ the answer is 678 i.e. (d).

Example 8. Insert the missing letter:

B	G	N
D	J	R
G	N	?

(a) U (b) V
(c) W (d) X
(e) Z

Sol: In 1st column, the rule is +1, +2; in column two, the rule is +2, +3 and so in column three, the rule is +3, +4. So the letter is 4 letters from R i.e. W. Hence, the answer is (c).

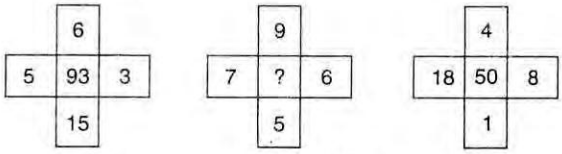
Example 9. Insert the missing characters out of the given options below the matrix.

Z4	X3	V9
A6	C2	?
T5	R4	P15

(a) E10 (b) E12
(c) S10 (d) S15
(e) S12

Sol: Each row consists of alternate letters. So missing letter of the second row is E. The numbers in the columns are 4, 5, 6; 2, 3, 4; 9, 12, 15.
Hence, the missing character is E12. Hence the answer is (b).

Example 10. Find the missing term in the second figure out of the given options given below the figures.



(a) 15 (b) 19
(c) 27 (d) 85
(e) 89

Sol: In first figure: central number = $5 \times 15 + 6 \times 3$.
In the second figure: central number = $7 \times 5 + 9 \times 6 = 89$.
So the answer is (e).

EXERCISE

Find the missing character in the following questions.

1.

5	3	16
9	5	46
7	8	?

(a) 16 (b) 56
(c) 55 (d) 57
(e) 60

2.

11	3	49
5	19	?
7	13	100

(a) 96 (b) 120
(c) 144 (d) 169
(e) 95

3.

3	6	9
5	8	20
4	7	?

(a) 11 (b) 14
(c) 28 (d) 12
(e) 29

4.

3	15	4
7	38	5
3	?	5

(a) 15 (b) 16
(c) 17 (d) 18
(e) 20

5.

1	7	9
2	14	?
3	105	117

(a) 26 (b) 16
(c) 20 (d) 12
(e) 32

6.

5	26	1
9	84	3
11	?	5

(a) 146 (b) 116
(c) 126 (d) 136
(e) 89

7.

12	47	21
10	52	4
64	?	24

(a) 16 (b) 40
(c) 62 (d) 83
(e) 90

8.

1	2	3
11	7	5
120	45	?

(a) 19 (b) 17
(c) 16 (d) 15
(e) 12

9.

13	54	?
7	45	32
27	144	68

(a) 42 (b) 36
(c) 6 (d) 4
(e) 15

10.

18	24	32
12	14	16
3	?	4

(a) 12 (b) 13
(c) 14 (d) 15
(e) 11

11.

7	9	21	27
4	2	36	18
9	4	54	?

(a) 18 (b) 24
(c) 36 (d) 48
(e) 58

12.

1	4	9	?
1	2	3	4
2	4	6	?

(a) 16, 8 (b) 49, 7
(c) 36, 4 (d) 25, 5
(e) 6, 18

13.

5	9	7
4	5	3
1	6	8
40	100	?

(a) 70 (b) 60
(c) 50 (d) 80
(e) 90

14.

11	6	8
17	12	?
25	34	19
19	28	11

(a) 9 (b) 13
(c) 15 (d) 16
(e) 19

15.

4	5	6
2	3	7
1	8	3
21	98	?

(a) 94 (b) 76
(c) 73 (d) 16
(e) 70

16.

3	8	10	2	?	1
6	56	90	2	20	0

(a) 0 (b) 3
(c) 5 (d) 7
(e) 8

17. In the matrix given below, find the values of A, B and C.

9	A	12
B	10	17
8	C	11

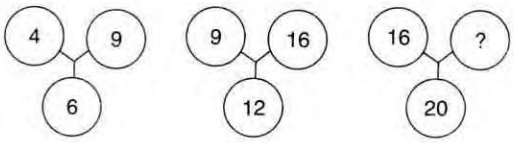
(a) A = 13, B = 11, C = 9
(b) A = 13, B = 9, C = 11
(c) A = 9, B = 11, C = 13
(d) A = 9, B = 13, C = 11
(e) none of these

18.

3C	27D	9F
7I	21K	3M
4D	?	7J

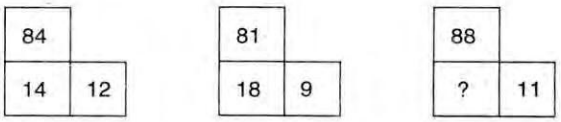
(a) 11E (b) 28G
(c) 35I (d) 48F
(e) 56O

19.



(a) 60 (b) 50
(c) 25 (d) 40
(e) 320

20.

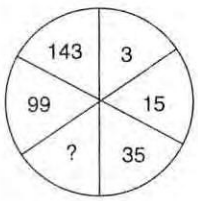


(a) 16 (b) 21
(c) 61 (d) 81
(e) 24

21.

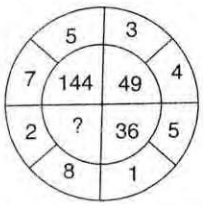
(a) 117 (b) 100
(c) 78 (d) 63
(e) 88

22.



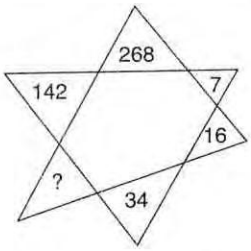
(a) 63 (b) 56
(c) 60 (d) 65
(e) none of these

23.



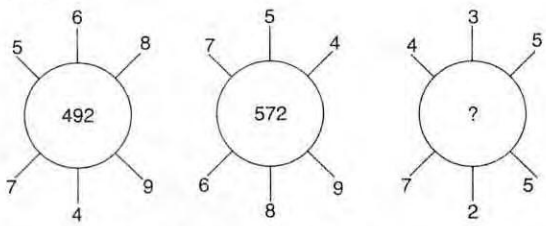
(a) 82 (b) 124
(c) 68 (d) 64
(e) 100

24.



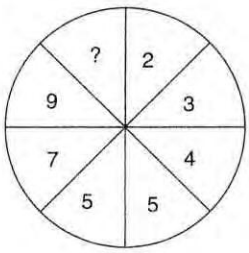
(a) 72 (b) 70
(c) 68 (d) 66
(e) 76

25.



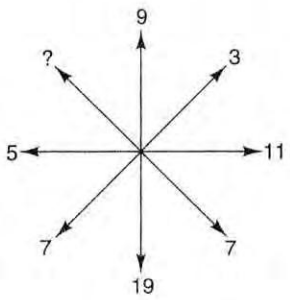
(a) 115 (b) 130
(c) 135 (d) 140
(e) 155

26.



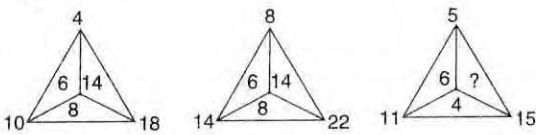
(a) 10 (b) 11
(c) 12 (d) 13
(e) 14

27.



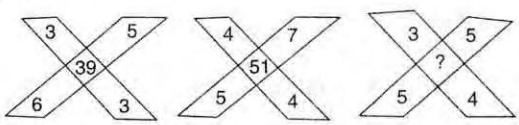
(a) 4 (b) 5
(c) 12 (d) 13
(e) 15

28.



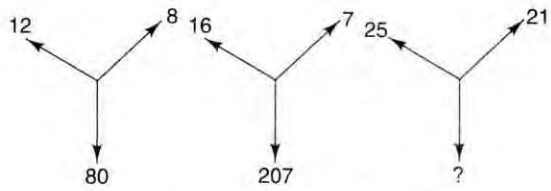
(a) 6 (b) 8
(c) 10 (d) 14
(e) 16

29.



(a) 47 (b) 45
(c) 37 (d) 35
(e) 39

30.



(a) 184 (b) 210
(c) 241 (d) 425
(e) 419

ANSWERS AND SOLUTIONS

1. **(d)** In each row, the third term is the product of first two terms plus 1.
   $\therefore ? = 7 \times 8 + 1 = 57.$
2. **(c)** In a row, the third term is the square of the average of the first two numbers.
   $$\therefore ? = \left(\frac{5+19}{2}\right)^2 = 12^2 = 144.$$
3. **(b)** The third term of each row is half the product of the two numbers. Thus
   $$? = \frac{1}{2}(4 \times 7) = 14.$$
4. **(d)** In each row, the middle number is 3 more than the product of the other two numbers. So the missing number is $3 + 3 \times 5$ i.e. 18.
5. **(d)** In the first column $2 \times 1 + 1 = 3$
   In the second column $14 \times 7 + 7 = 105$
   $\therefore$ In the third column $x \times 9 + 9 = 117$
   $\Rightarrow x = 12$
6. **(c)** In each row, middle term is "square of the first" plus second
   $\therefore$ the missing number is $11^2 + 5 = 126$.
7. **(d)** In the first row: $\frac{12}{4} = \frac{21}{7}$
   In the second row: $\frac{10}{5} = \frac{4}{2}$
   From the options 83 is satisfying the above condition because $\frac{64}{8} = \frac{24}{3} = 8.$
8. **(c)** In each column, the third term is the difference of the other two numbers.
   $\therefore ? = 5^2 - 3^2 = 25 - 9 = 16.$
9. **(d)** In each column, the third number =
   $13 + 2 \times 7 = 27$
   $54 + 2 \times 45 = 144$
   $\therefore$ missing number $\Rightarrow x + 2 \times 32 = 68$ or $x = 4$
10. **(e)** In the first row: $(18 + 24) - 10 = 32$
    In the second row: $(12 + 14) - 10 = 16$
    $\therefore$ In the third row: $3 + x - 10 = 4$ so $x = 11$
11. **(b)** In the first row: $\frac{21}{7} = \frac{27}{9}$
    In the second row: $\frac{36}{4} = \frac{18}{2}$
    $\therefore$ In the third row: $\frac{54}{9} = \frac{x}{4} \Rightarrow x = 24$
12. **(a)** 1st row: $1^2, 2^2, 3^2, 4^2$
    Third row: 2, 4, 6, 8
    $\therefore$ The missing numbers = 16, 8.
13. **(c)** In first column: $5^2 + 4^2 - 1 = 40$;
    In second column: $9^2 + 5^2 - 6 = 100$
    $\therefore$ In third column: $7^2 + 3^2 - 8 = 50$
14. **(d)** In first column: $17 + 19 = 25 + 11$
    In second column: $12 + 28 = 6 + 34$
    $\therefore$ In third column: $8 + 19 = ? + 11$
    $\Rightarrow ? = 16$
15. **(a)** 1st column $= 4^2 + 2^2 + 1^2 = 21$
    2nd column $= 5^2 + 3^2 + 8^2 = 98$
    3rd column $= 6^2 + 7^2 + 3^2 = 94$
16. **(c)** The rule is $x^2 - x = n$
    $\therefore 3^2 - 3 = 6$; $8^2 - 8 = 56$ etc.
    $\Rightarrow x^2 - x = 20$ so $x = 5$.
17. **(d)** The sum of numbers in each row and each column is constant i.e. 30.
18. **(b)** In the first row, letters are consecutive CDE
    In the 2nd row, letters are one step forward I-K-M
    In the third row, the letters are +2 forward i.e. D – – G – – J.
    Number is the product of the two numbers.
    Hence, $4 \times 7 = 28$.
    Hence, the answer is 28 G.
19. **(c)** First figure $\Rightarrow \sqrt{4 \times 9} = 6$; second figure $\Rightarrow \sqrt{9 \times 16} = 12$

$\therefore \sqrt{16\times ?} = 20$ i.e. $16\times ? = 400$ or $? = 25$.

20. **(a)** First figure: $(84 \div 14) \times 2 = 12$ etc.

So $? \Rightarrow \frac{88}{?} \times 2 = 11$

so $? = 16$.

21. **(c)** In the first figure: $9 \times 10 - 4 \times 8 = 58$

$\therefore$ the missing figure $= 15 \times 10 - 9 \times 8 = 78$

22. **(a)** Numbers are

$1 \times 3, 3 \times 5, 5 \times 7, 7 \times 9, 9 \times 11, 11 \times 13$

or

use the rule: +12, +20, +28, +36, 44 etc.

23. **(e)** Required number $= (2 + 8)^2 = 100$.

24. **(b)** Rule is: Double the number and add 2. Starting with 7.

25. **(b)** Central number $= (5 \times 6 \times 8) + (7 \times 4 \times 9)$
$= 240 + 252 = 492$.

$\therefore ? = 4 \times 3 \times 5 + (7 \times 2 \times 5) = 60 + 70$
$= 130$.

26. **(b)** Right half of the circle form the series: 2, 3, 4, 5

Left half of the circle form the series 5, 7, 9, 11.

27. **(e)** $\times 2 + 1$ is the rule. So the missing number is $2 \times 7 + 1$ i.e. 15.

28. **(c)** Fig. 1: $10 - 4 = 6$; $18 - 10 = 8$; $18 - 4 = 14$

Fig. 2: $14 - 8 = 6$; $22 - 14 = 8$; $22 - 8 = 14$

Fig. 3: $11 - 5 = 6$; $15 - 11 = 4$; $15 - 5 = 10$

29. **(c)** Fig. 1: $3 \times 3 + 6 \times 5 = 39$

Fig. 2: $4 \times 4 + 5 \times 7 = 51$

$\therefore$ So $? = 3 \times 4 + 5 \times 5 = 37$

30. **(a)** Fig. 1: $12^2 - 8^2 = 80$

Fig. 2: $16^2 - 7^2 = 207$

Fig. 3: $? = 25^2 - 21^2 = 184$.