

EXERCISE 4.5

Without drawing a diagram, find
(i) 10th square number
(ii) 6th triangular number
Solution:

(i) 10^{th} square number The square number can be remembered using the following rule Nth square number = $n \times n$ So the 10^{th} square number = $10 \times 10 = 100$

(ii) 6^{th} triangular number The triangular number can be remembered using the following rule Nth triangular number = n × (n + 1)/ 2 So the 6^{th} triangular number = 6 × (6 + 1)/ 2 = 21

2. (i) Can a rectangular number also be a square number?(ii) Can a triangular number also be a square number?Solution:

(i) Yes. A rectangular number can also be a square number.

Example – 16 is a rectangular number which can also be a square number.

-		U					
0	0						
•	0						
0	0		0	0	0	0	
0	0		9	0	0	0	
9	9		0	0		0	
9	0		0	0	0	0	
9	0						
0	0						

(ii) Yes. A triangular number can also be a square number.

Example -1 is a triangular number which can also be a square number.

3. Write the first four products of two numbers with difference 4 starting from in the following order: 1, 2, 3, 4, 5, 6,

Identify the pattern in the products and write the next three products. Solution:

We know that

 $1 \times 5 = 5$ $2 \times 6 = 12$ $3 \times 7 = 21$ $4 \times 8 = 32$ So the first four products of two numbers with difference 4 5 - 1 = 4 6 - 2 = 4 7 - 3 = 48 - 4 = 4

4. Observe the pattern in the following and fill in the blanks:

 $9 \times 9 + 7 = 88$

PAGE: 4.23

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 $98 \times 9 + 6 = 888$ $987 \times 9 + 5 = 8888$ $9876 \times 9 + 4 = \dots$ $98765 \times 9 + 3 = \dots$ $987654 \times 9 + 2 = \dots$ $9876543 \times 9 + 1 = \dots$ Solution:

 $9 \times 9 + 7 = 88$

98 **x** 9 + 6 = 888

 $987 \times 9 + 5 = 8888$

 $9876 \times 9 + 4 = 88888$

 $98765 \times 9 + 3 = 888888$

 $987654 \times 9 + 2 = 8888888$

9876543 × 9 + 1 = 88888888

5. Observe the following pattern and extend it to three more steps:

 $6 \times 2 - 5 = 7$

 $7 \times 3 - 12 = 9$

 $8 \times 4 - 21 = 11$

 $9 \times 5 - 32 = 13$

 $10 \times 6 - 45 = 15$

 $11 \times 7 - 60 = 17$

12 **x** 8 - 77 = 19

6. Study the following pattern: 1 + 3 = 2 × 2 1 + 3 + 5 = 3 × 3 1 + 3 + 5 + 7 = 4 × 4

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 $1 + 3 + 5 + 7 + 9 = 5 \times 5$ By observing the above pattern, find (i) 1 + 3 + 5 + 7 + 9 + 11(ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15(iii) $21 + 23 + 25 + \dots + 51$ Solution: (i) 1 + 3 + 5 + 7 + 9 + 11By using the pattern $1 + 3 + 5 + 7 + 9 + 11 = 6 \times 6$ = 36 (ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15By using the pattern $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 = 8 \times 8$ = 64 (iii) $21 + 23 + 25 + \dots + 51$ We know that $21 + 23 + 25 + \dots + 51$ can be written as $(1 + 3 + 5 + 7 + \dots + 49 + 51) - (1 + 3 + 5 + 5)$ +17 + 19) By using the pattern $(1 + 3 + 5 + 7 + \dots + 49 + 51) = 26 \times 26 = 676$ $(1 + 3 + 5 + \dots + 17 + 19) = 10 \times 10 = 100$ So we get $21 + 23 + 25 + \dots + 51 = 676 - 100 = 576$ 7. Study the following pattern: $1 \times 1 + 2 \times 2 = (2 \times 3 \times 5)/6$ $1 \times 1 + 2 \times 2 + 3 \times 3 = (3 \times 4 \times 7) / 6$ $1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 = (4 \times 5 \times 9)/6$ By observing the above pattern, write next two steps. Solution: By using the pattern $1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5$ On further calculation = 5 × 6 × 116 So we get = 55 By using the pattern $1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5 + 6 \times 6$ On further calculation $= 6 \times 7 \times 136$ So we get = 91 8. Study the following pattern: $1 = (1 \times 2)/2$ $1 + 2 = (2 \times 3)/2$ https://byjus.com



 $1 + 2 + 3 = (3 \times 4)/2$ $1 + 2 + 3 + 4 = (4 \times 5)/2$ By observing the above pattern, find (i) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10(ii) $50 + 51 + 52 + \dots + 100$ (iii) $2 + 4 + 6 + 8 + 10 + \dots + 100$ Solution: (i) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10We get $= 10 \times 112$

On further calculation = 55

On further calculation

= 2 (1275) We get = 2550

(ii) $50 + 51 + 52 + \dots + 100$ We can write it as $(1 + 2 + 3 + \dots + 99 + 100) - (1 + 2 + 3 + 4 + \dots + 47 + 49)$ So we get $(1 + 2 + 3 + \dots + 99 + 100) = 100 \times 1012$ $(1 + 2 + 3 + 4 + \dots + 47 + 49) = 49 \times 502$ By substituting the values $50 + 51 + 52 + \dots + 100 = 100 \times 1012 + 49 \times 502$ On further calculation = 5050 - 1225We get = 3825 (iii) $2 + 4 + 6 + 8 + 10 + \dots + 100$ We can write it as $2(1+2+3+4+\ldots+49+50)$ So we get $= 2 (50 \times 512)$

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