

Name:

Exam Style Questions

Triangular Numbers



Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

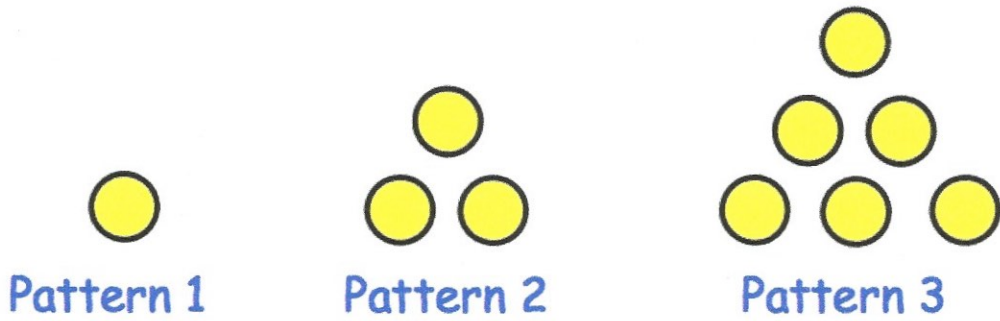
Video 229



Answers and Video Solutions



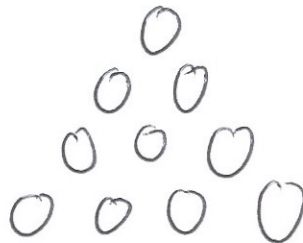
1. The pattern below show the first 3 triangular numbers.



(a) Write down the first three triangular numbers.

1 3 6
.....
(1)

(b) In the space below, draw Pattern 4



(1)

(c) Write down the fourth triangular number.

10
.....
(1)

2. List the first six triangular numbers.



1, 3, 6, 10, 15, 21

(2)

3. Circle the triangular number.



25

27

28

30

(1)

4. John is adding consecutive triangular numbers.



John says,

“when I add consecutive triangular numbers, I get another kind of special number.”

What kind of number does John get?

$$\left. \begin{array}{l} 1 + 3 = 4 \\ 3 + 6 = 9 \\ 6 + 10 = 16 \end{array} \right\} \text{square numbers}$$

(2)

5. Find the difference between the 4th and 8th triangular numbers.



1, 3, 6, 10, 15, 21, 28, 36

$$36 - 10$$

26

(2)

6. 1 is a triangular number and also a square number.



Find another number that is also a triangular number and also a square number.

36

(2)

7. Lexi says



"if I multiply a triangular number by 9 and then add 1, it will give me another triangular number."

1, 3, 6, 10, 15, 21, 28, 36, 45, 55

Show Lexi is correct.

$$6 \times 9 = 54$$
$$54 + 1 = 55 \quad \checkmark$$

$$3 \times 9 = 27$$
$$27 + 1 = 28 \quad \checkmark$$

(2)

8. Write down the largest triangular number that is less than 100.



1, 3, 6, 10, 15, 21, 28, 36, 45, 55, 66, 78, 91

91

.....
(2)

9. Finn lists some consecutive triangular numbers.



$\begin{matrix} +15 & +16 & +17 & +18 & +19 \\ \curvearrowright & \rightarrow & \rightarrow & \rightarrow & \rightarrow \\ \dots, & 120, & 136, & 153, & 171, & \dots \end{matrix}$

(a) Which triangular number comes after 171?

$171 + 19$

190

.....
(1)

(b) Which triangular number comes before 120?

$120 - 15$

105

.....
(1)

10. Is 210 a triangular number?



$190 + 20 = 210$

Yes

.....
(2)

11. The triangular numbers are 1, 3, 6, 10,



The n th term of this sequence is $\frac{1}{2}n(n+1)$

Find the 200th triangular number

$$\frac{1}{2} (200)(201)$$

$$100 \times 201 = 20100$$

20100

(2)

12. The triangular numbers are 1, 3, 6, 10,



The n th term of this sequence is $\frac{1}{2}n(n+1)$

Is 1000 a triangular number?

$$\frac{1}{2} n (n+1) = 1000$$

$$n(n+1) = 2000$$

$$\sqrt{2000} = 44.72\dots$$

$$44 \times 45 \neq 2000$$

No

(2)

13. The triangular numbers are 1, 3, 6, 10,



The n th term of this sequence is $\frac{n(n+1)}{2}$

Is 4950 a triangular number?

$$\frac{n(n+1)}{2} = 4950$$

$$n(n+1) = 9900$$

$$\sqrt{9900} = 99.498\dots$$

Yes

(2)

$$99 \times 100 = 9900$$

14. There are 6 people in a room.
Everybody shakes hands with each other, once.



Work out how many handshakes there were in total.

$$\begin{array}{l} 1^{\text{st}} \text{ person} : 5 \text{ handshakes (not themselves)} \\ 2^{\text{nd}} \text{ person} : 4 \text{ handshakes (not themselves or person 1)} \\ 3^{\text{rd}} \text{ person} : 3 \text{ handshakes (not themselves or people 1 or 2)} \\ 4^{\text{th}} \text{ person} : 2 \text{ handshakes (people 5 \& 6)} \\ 5^{\text{th}} \text{ person} : 1 \text{ handshake (person 6)} \\ \hline 15 \end{array}$$

15

(4)

15. A group of people are in a room.
Everybody shakes hands with each other, once.



In total there were 28 handshakes.

How many people are in the group?

$$1 + 2 + 3 + 4 + 5 + 6 + 7 = 28$$

8 people

(4)