Triangular Numbers - Worksheet

Skill

Group A - Finding small triangular numbers using the nth term $\frac{1}{2}n(n+1)$

Find the following triangular numbers:

1) 4th **2)** 6th **3)** 16th

4) 12th **5)** 5th **6)** 10th

7) 20th **8)** 1st **9)** 8th

10) 7th **11)** 2nd **12)** 15th

Group B - Finding big triangular numbers using the nth term $\frac{1}{2}n(n+1)$

Find the following triangular numbers:

1) 50th **2)** 100th **3)** 150th

4) 200th **5)** 202nd **6)** 290th

7) 1000th **8)** 2500th **9)** 2750th

10) 3000th **11)** 6000th **12)** 12000th

Group C - Identifying triangular numbers

Decide if the numbers below are triangular:

1) 55 **2)** 77 **3)** 91

4) 102 **5)** 136 **6)** 210

7) 351 **8)** 408 **9)** 630

10) 780 **11)** 821 **12)** 1830

Triangular Numbers - Worksheet

Applied

1) Write down the first 10 triangular numbers.

2)

1	12	81	
			45
39		49	
	10	78	4

From the box above, identify any triangular numbers.

3) Write down a number less than 100 that is a triangular number and a square number.

4) Which two-digit triangular number with 6 factors is also a multiple of 7?

5) **(a)** What is the 5th triangular number?

(b) What is the $6\ th$ triangular number?

(c) Find the sum of the 5th and 6th triangular number.

(d) What type of number is your answer to part (c)?

6) At a party, everybody shakes hands with each other once.
Work out how many handshakes there are in total, if there are:

(a) 3 people at the party

(b) 7 people at the party

(c) 12 people at the party

Triangular Numbers - Exam Questions

1) The pattern below shows the first 4 triangular numbers

(a) Write down the first four triangular numbers.

.....

(1)

(b) In the space below, draw pattern 5

.....

(1)

(c) Write down the 5th triangular number.

.....

(1)

(3 marks)

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2) List the first 6 triangular numbers.

.....

(2 marks)

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3) Find the difference between the 3rd and 6th triangular numbers.

.....

(2 marks)

Triangular Numbers - Exam Questions

4) The triangular numbers are $1,\ 3,\ 6,\ 10,\ \ldots$

The nth term of this sequence is

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

Find the 250th triangular number.

.....

(2 marks)

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5) The triangular numbers are $1,\ 3,\ 6,\ 10,\ldots$

The nth term of this sequence is

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

Is 4656 a triangular number?

.....

(3 marks)

Triangular Numbers - Answers

	Question	Answer
	Skill Questions	
Group A	Find the following: **1)** 4th triangular number **2)** 6th triangular number **3)** 16th triangular number **4)** 12th triangular number **5)** 5th triangular number **6)** 10th triangular number **7)** 20th triangular number **8)** 1st triangular number **9)** 8th triangular number **10)** 7th triangular number **11)** 2nd triangular number **12)** 15th triangular number	 **1)** 10 **2)** 21 **3)** 136 **4)** 78 **5)** 15 **6)** 55 **7)** 210 **8)** 1 **9)** 36 **10)** 28 **11)** 3 **12)** 120
Group B	Find the following: **1)** 50th triangular number **2)** 100th triangular number **3)** 150th triangular number **4)** 200th triangular number **5)** 202nd triangular number **6)** 290th triangular number **7)** 1000th triangular number **8)** 2500th triangular number **9)** 2750th triangular number **10)** 3000th triangular number **11)** 6000th triangular number **12)** 12 000th triangular number	 **1)** 1 275 **2)** 5 050 **3)** 11 325 **4)** 20 100 **5)** 20 503 **6)** 42 195 **7)** 500 500 **8)** 3 126 250 **9)** 3 782 625 **10)** 4 501 500 **11)** 18 003 000 **12)** 72 006 000

Triangular Numbers - Answers

Group C	Decide if the numbers below are triangular: **1)** 55 **2)** 77 **3)** 91 **4)** 102 **5)** 136 **6)** 210 **7)** 351 **8)** 408 **9)** 630 **10)** 780 **11)** 821 **12)** 1830	 **1)** Yes (10th) **2)** No **3)** Yes (13th) **4)** No **5)** Yes (16th) **6)** Yes (20th) **7)** Yes (26th) **8)** No **9)** Yes (35th) **10)** Yes (39th) **11)** No **12)** Yes (60th)

Triangular Numbers - Answers

	Question	Answer
	Applied Questions	
1)	Write down the first 10 triangular numbers.	1, 3, 6, 10, 15, 21, 28, 36, 45, 55
2)	1 12 81 45 39 49 10 78 4 From the box above, identify any triangular numbers.	1, 10, 45, 78
3)	Write down a number less than 100 that is a triangular number and a square number.	1 or 36
4)	Which two-digit triangular number with 6 factors is also a multiple of 7?	28 7×4 Factors: 1, 2, 4, 7, 14, and 28
5)	**a)** What is the 5th triangular number? **b)** What is the 6th triangular number? **c)** Find the sum of the 5th and 6th triangular number. **d)** What type of number is your answer to part (c)?	**a)** 15 **b)** 21 **c)** 36 **d)** Square number
6)	At a party, everybody shakes hands with each other, once. Work out how many handshakes there are in total, if there are **a)** 3 people at the party **b)** 7 people at the party **c)** 12 people at the party	**a)** 3 **b)** 21 **c)** 66

Triangular Numbers - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	The pattern below shows the first 4 triangular numbers 		
(a)	Write down the first four triangular numbers.	**(a)** 1, 3, 6, 10	**(1)**
(b)	In the space below, draw pattern 5.	**(b)** 	**(1)**
(c)	Write down the $5th$ triangular number.	**(c)** 15	**(1)**
2)	List the first 6 triangular numbers.	Any 3 correct **(1)** 1, 3, 6, 10, 15, 21 **(1)**	**(2)**
3)	Find the difference between the 3rd and 6th triangular numbers.	3rd $=$ 6 and 6th $=$ 21 or $21 - 6$ **(1)** 15 **(1)**	**(2)**
4)	The triangular numbers are 1, 3, 6, 10, … The nth term of this sequence is $\frac{1}{2}n(n + 1)$ Find the 250th triangular number.	$\frac{1}{2} \times 250(250 + 1)$ or 125×251 **(1)** 31375 **(1)**	**(2)**

Triangular Numbers - Mark Scheme

5)	The triangular numbers are $1,\ 3,\ 6,\ 10,\ \ldots$ The nth term of this sequence is $\frac{1}{2}n(n+1)$ Is 4656 a triangular number?	$\frac{1}{2}n(n+1) = 4656$ $\frac{1}{2}n^2 + \frac{1}{2}n - 4656 = 0$ or $n^2 + n - 9312 = 0$ **(1)** $(n-96)(n+97) = 0$ or $n = 96$ **(1)** Yes, 4656 is a triangular number.	**(3)**