

Y11 Harder Tables and Patterns Practice #1

1. Complete the gaps in the patterns given and write the rules:

a)

x	1	2	3	4	5	...	20	rule
y	1	5	9	13				

b)

x	1	2	3	4	5	...	20	rule
k	100	95	90	85				

c)

n	1	2	3	4	5	...	20	rule
t_n	0	3	8	15				

d)

n	1	2	3	4	5	...	20	rule
t_n	3	8	15	24				

2. How many dots would the 100th in each pattern have?

Write the equation for the number of dots in terms of the position in the pattern.

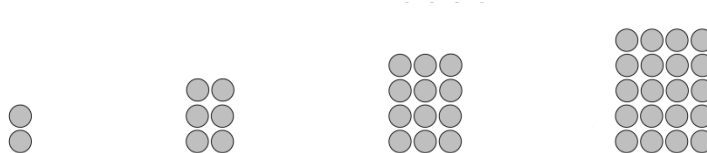
a)



$$t_{100} =$$

$$tn =$$

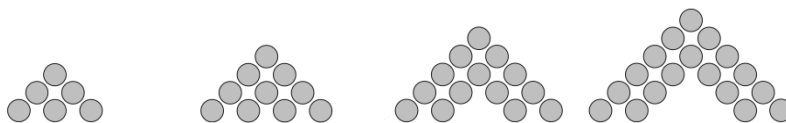
b)



$$t_{100} =$$

$$tn =$$

c)



$$t_{100} =$$

$$tn =$$

d)



$$t_{100} =$$

$$tn =$$

Answers: Y11 Harder Tables and Patterns Practice #1

1. Complete the gaps in the patterns given and write the rules:

a)

x	1	2	3	4	5	...	20	rule
y	1	5	9	13	17		77	$y = 4x - 3$

b)

x	1	2	3	4	5	...	20	rule
k	100	95	90	85	80		5	$k = -5x + 105$

c)

n	1	2	3	4	5	...	20	rule
t_n	0	3	8	15	24		399	$t_n = n^2 - 1$

d)

n	1	2	3	4	5	...	20	rule
t_n	3	8	15	24	35		440	$t_n = (n + 1)^2 - 1$

or $t_n = n^2 + 2n$

2. How many dots would the 100th in each pattern have?

Write the equation for the number of dots in terms of the position in the pattern.

a) even spacing of 4, with 2 more than 4 at the start

$t_{100} = 402$
 $t_n = 4n + 2$

b) increasing spacing by 2 $\Rightarrow n^2$ base, leaving 1, 2, 3, 4 etc

$t_{100} = 10100$
 $t_n = n^2 + n$
or seeing each is a rectangle one higher than wide gives $t_n = n(n + 1)$

c) even spacing of 4, with 3 more than 4 at the start

$t_{100} = 402$
 $t_n = 4n + 2$

d) increasing spacing by 1 $\Rightarrow \frac{1}{2}n^2$ base, leaving 2.5, 4, 5.5, 7 etc

$t_{100} = 5151$
 $t_n = 0.5n^2 + 1.5n + 1$
or seeing each as half a rectangle, one wider than high gives $t_n = \frac{1}{2}(n + 1)(n + 2)$