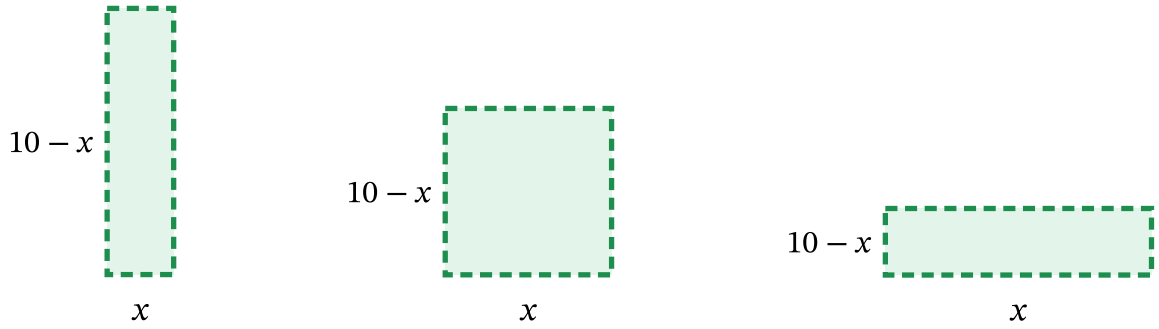
Names (pair) _____ Date _____

A New Kind of Growth

1 IN PAIRS **The fence.** We have 20 m of fencing to enclose a rectangular garden. If one side is x metres, the other is $10 - x$ metres. How does the area of the garden depend on x?

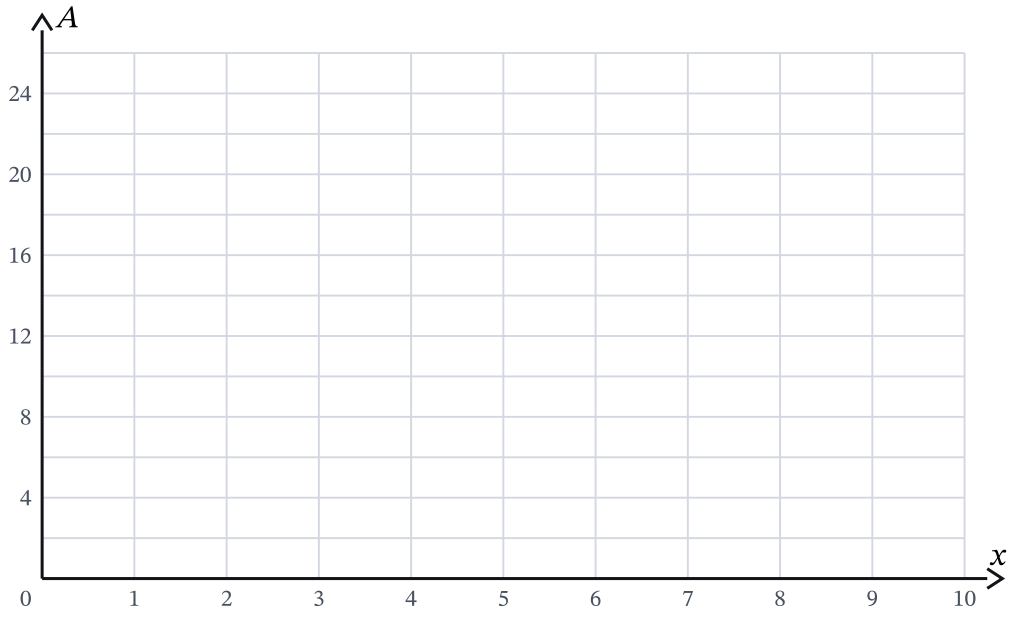


$x = 2$ $x = 5$ $x = 8$

One student draws the rectangle on squared paper, the other works out the area. Swap roles.

x (m)	0	1	2	3	4	5	6	7	8	9	10
$10 - x$ (m)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Area (m²)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Plot the points (x, area) and join them with a smooth curve.



Names (pair) _____ Date _____

a) For which x is the area largest? What is it?

b) When x doubles from 2 to 4, does the area double too?

c) Why is the graph not a straight line?

2 ON YOUR OWN **Patterns.** Draw the next figure and complete the table: how many small squares does figure n have?

a) Squares

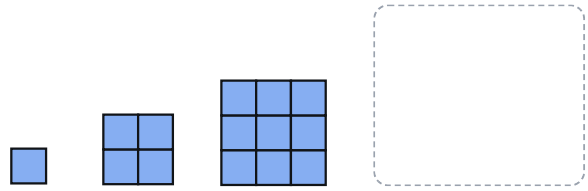


fig. 1 fig. 2 fig. 3 fig. 4

figure n	1	2	3	4	5	6
squares	1	4	9			
1st diff.						
2nd diff.						

b) Staircase

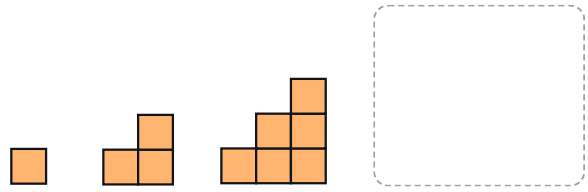


fig. 1 fig. 2 fig. 3 fig. 4

figure n	1	2	3	4	5	6
squares	1	3	6			
1st diff.						
2nd diff.						

Names (group) _____ Date _____

Remember

If the **first differences** are constant, the growth is **linear**. If the first differences change but the **second differences** are constant, the growth is **quadratic**.

3 ON YOUR OWN Work out the differences and circle the kind of growth.

a)

x	1	2	3	4	5
y	3	5	7	9	11
1st diff.		☐	☐	☐	☐
2nd diff.		☐	☐	☐	

linear / **quadratic** / **neither**

b)

x	1	2	3	4	5
y	2	5	10	17	26
1st diff.		☐	☐	☐	☐
2nd diff.		☐	☐	☐	

linear / **quadratic** / **neither**

c)

x	1	2	3	4	5
y	1	2	4	8	16
1st diff.		☐	☐	☐	☐
2nd diff.		☐	☐	☐	

linear / **quadratic** / **neither**

d)

x	1	2	3	4	5
y	0	3	8	15	24
1st diff.		☐	☐	☐	☐
2nd diff.		☐	☐	☐	

linear / **quadratic** / **neither**

4 IN A GROUP **Windows.** Each member of the group builds one figure from squares (or counters). Predict how many squares figure 10 has and check with differences.

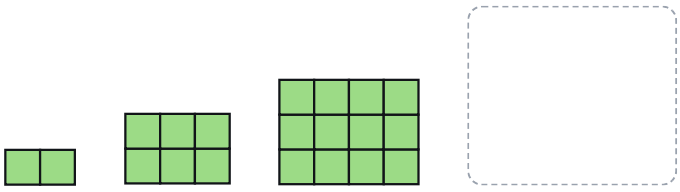


fig. 1 fig. 2 fig. 3 fig. 4

Figure 10 has ☐ squares. How did you work it out?

_____

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Mode **Table and differences**: choose *Your own values* and check the differences.

★ ON YOUR OWN **Exit card.** The sequence 2, 8, 18, 32, … Is the growth linear or quadratic? What is the next number? ☐