Piggy in the middle

The number in the middle of each group of 3 adjoining cells is the average of its two neighbours.

5			**23**	

What number goes in the right hand cell?

Piggy in the middle Solution

The number in the middle of each group of 3 adjoining cells is the average of its two neighbours.

What number goes in the right hand cell?

5			23	

As with most problems it is a good idea to begin by trying some numbers in the problem and see if that gives you a greater understanding.

In order for 23 to be the average of the numbers in the cells either side they must both be the same distance from 23 e.g.

16	23	30
23−7		23+7

Extending that to the other cells would mean:

BUT 9 is not the average of 5 and 16!

5	9	16	23	30
	16−7		16+7	

Let's generalise to try and form an equation:

$23-3x$	$23-2x$	$23-x$	23	$23+x$
	$+x$	$+x$	$+x$	$+x$

There are a few different equations that we could form…

Here is one example. $23-3x=5$

We can solve to get: $18=3x$

$x=6$

5	11	17	23	29

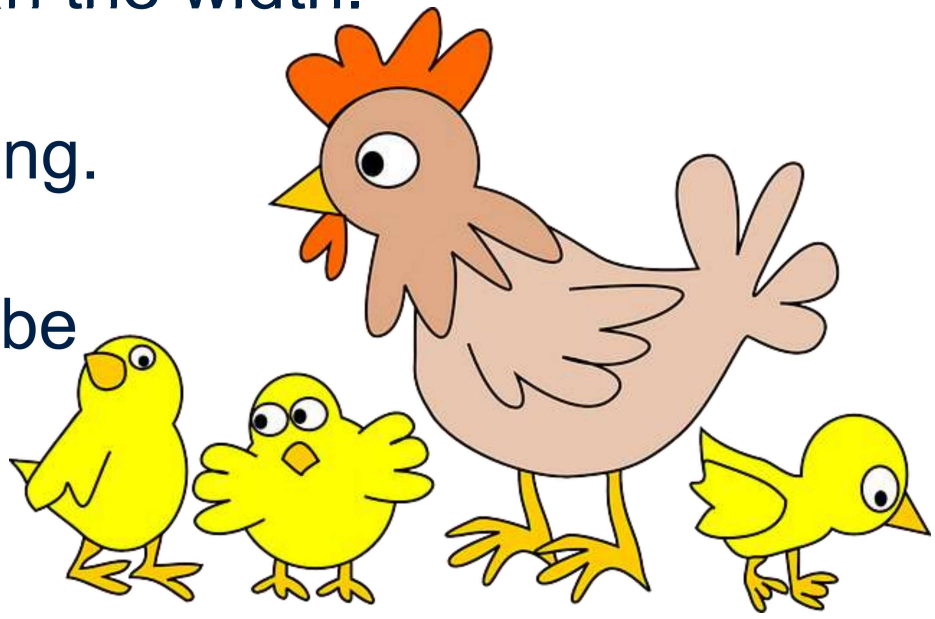
Chicken Run

Victoria has just bought some chickens. She wants to keep them safe in a small enclosure.

The enclosure will be a rectangle where the length is 3m longer than the width.

Victoria has only got 30m of fencing.

The area of the enclosure has to be greater than 20m^2

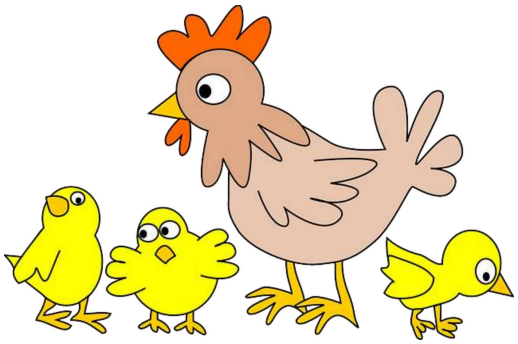


The length and width are integers.

How many different size enclosures can Victoria make?

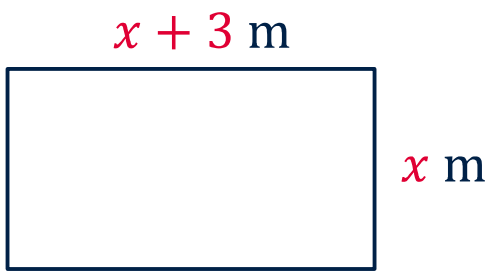
Chicken Run Solution

- The enclosure will be a rectangle
- The length is 3m longer than the width.
- Victoria has only got 30m of fencing.
- The area of the enclosure has to be greater than 20m^2
- The length and width are integers.



How many different size enclosures can Victoria make?

Draw a diagram



Write an inequality for the maximum perimeter of the fence

$$2(x + 3) + 2x \leq 30$$
$$4x + 6 \leq 30$$
$$4x \leq 24$$
$$x \leq 6$$ ← The maximum width of the enclosure

Consider the area of the enclosure for different possible lengths and widths

Width (m)	Length (m)	Area (m^2)
6	9	54
5	8	40
4	7	28
3	6	18

Why have we not considered widths of 2 and 1?

So Victoria can make 3 different sized enclosures with an area greater than 20m^2

Crack the code

Can you decode this message?

12 1 4 7 5 3 12 4 2 5
7 4 3 3 6 15 4 9 2 6 9 8 4 10

Solve the equations in the boxes below. Each letter will have a different positive integer solution between 0 and 16.

$$\frac{4r}{d-4}+\frac{2h}{s}=2$$

$$\frac{g-9}{y+4}=\frac{2}{3}$$

$$3rh+m=13$$

$$\frac{4g}{5}=12$$

$$\frac{2c-5+3(c-2)}{2c-1}=2$$

$$e^3<72$$

$$\frac{s+3y}{8s}=\frac{3}{4}$$

$$\frac{6k}{s}-5=11$$

$$100<t^2<169$$

$$\frac{8}{3a}=\frac{4}{a+3}$$

$$\frac{6r+8}{y}=4$$

$$2(3m+4)=7m+1$$

Hint available on next slide

Crack the code Hint

Can you decode this message?

12 1 4 7 5 3 12 4 2 5

7 4 3 3 6 15 4 9 2 6 9 8 4 10

Solve the equations in the boxes below. Each letter will have a different positive integer solution between 0 and 16.

Solve the equations in the following order:

1. $\frac{4g}{5} = 12$

2. $\frac{2c - 5 + 3(c - 2)}{2c - 1} = 2$

3. $\frac{8}{3a} = \frac{4}{a + 3}$

4. $\frac{g - 9}{y + 4} = \frac{2}{3}$

5. $\frac{6r + 8}{y} = 4$

6. $2(3m + 4) = 7m + 1$

7. $\frac{s + 3y}{8s} = \frac{3}{4}$

8. $\frac{6k}{s} - 5 = 11$

9. $3rh + m = 13$

10. $\frac{4r}{d - 4} + \frac{2h}{s} = 2$

11. $100 < t^2 < 169$

12. $e^3 < 72$

Crack the code Solution

Can you decode this message?

12 1 4 7 5 3 12 4 2 5

7 4 3 3 6 15 4 9 2 6 9 8 4 10

Solve the equations in the boxes below. Each letter will have a different positive integer solution between 0 and 16.

$\frac{4g}{5} = 12$ $g = 15$

$\frac{2c - 5 + 3(c - 2)}{2c - 1} = 2$ $c = 9$

$\frac{8}{3a} = \frac{4}{a + 3}$ $a = 6$

$\frac{g - 9}{y + 4} = \frac{2}{3}$ $y = 5$

$\frac{6r + 8}{y} = 4$ $r = 2$

$2(3m + 4) = 7m + 1$ $m = 7$

$\frac{s + 3y}{8s} = \frac{3}{4}$ $s = 3$

$\frac{6k}{s} - 5 = 11$ $k = 8$

$3rh + m = 13$ $h = 1$

$\frac{4r}{d - 4} + \frac{2h}{s} = 2$ $d = 10$

$100 < t^2 < 169$ $10 < t < 13$

$e^3 < 72$ $e < 4.16..$

"The mystery message cracked"