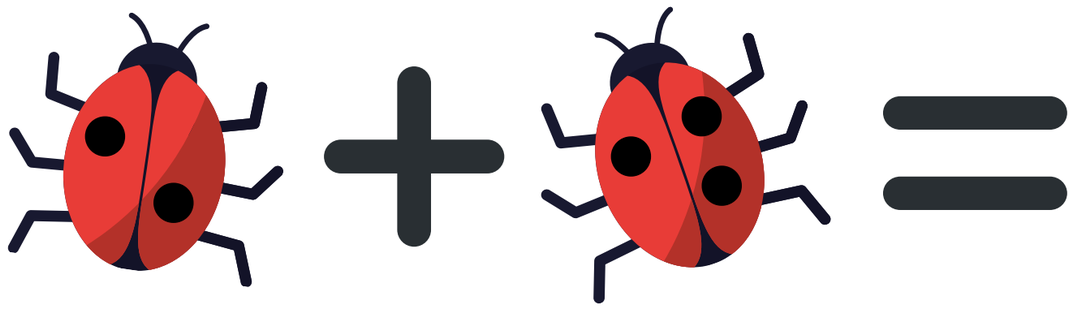
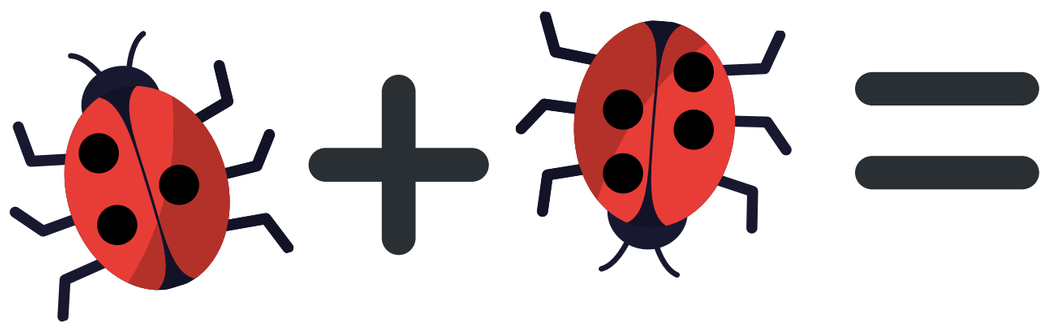
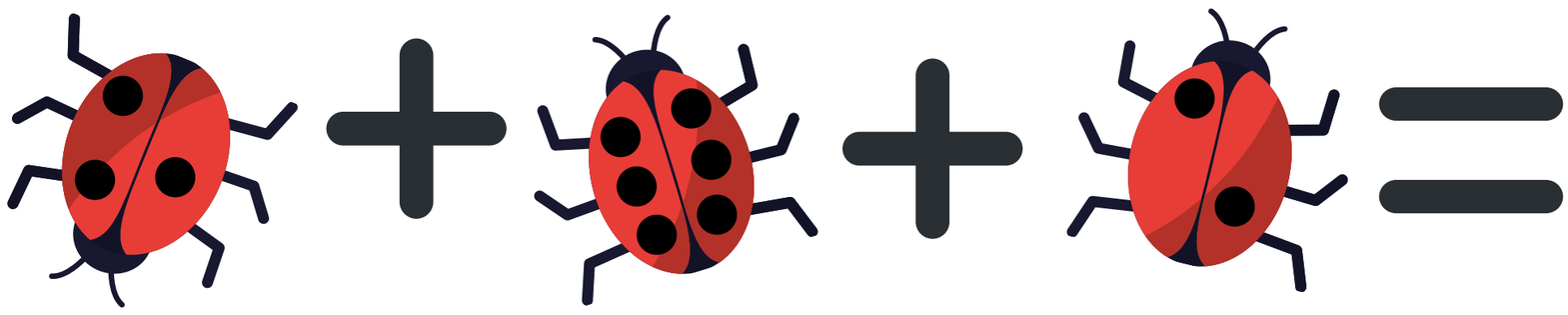
Count the Spots!

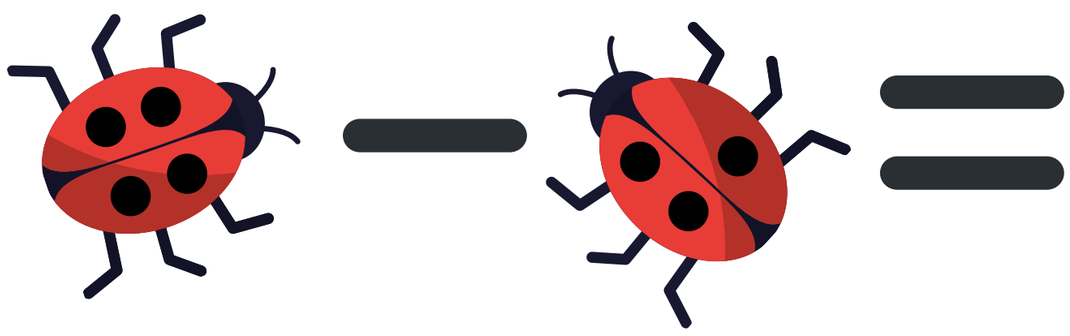
Yr 1

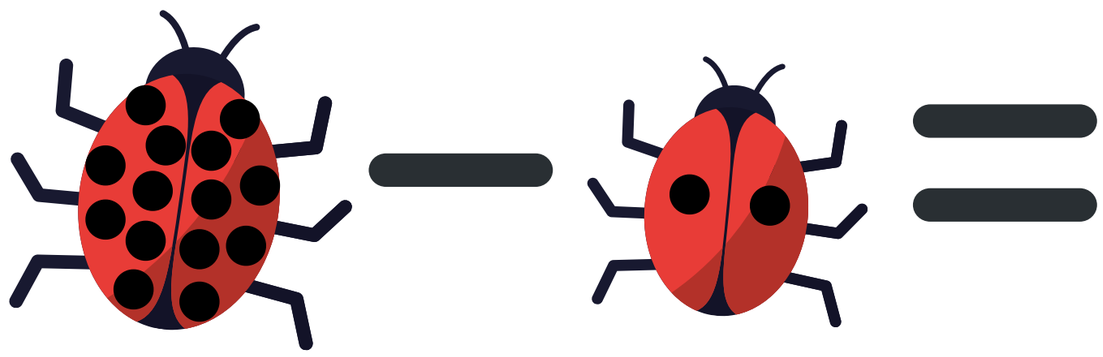
Can you add or subtract the spots on the ladybirds? Good luck!

1 

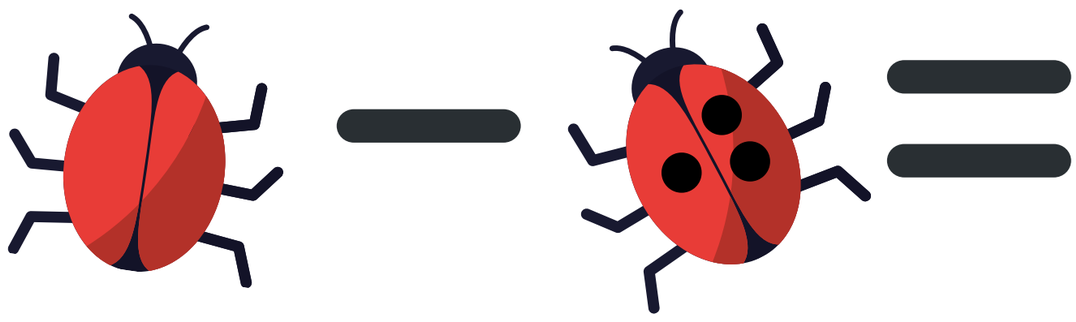
2 

3 

4 

5 

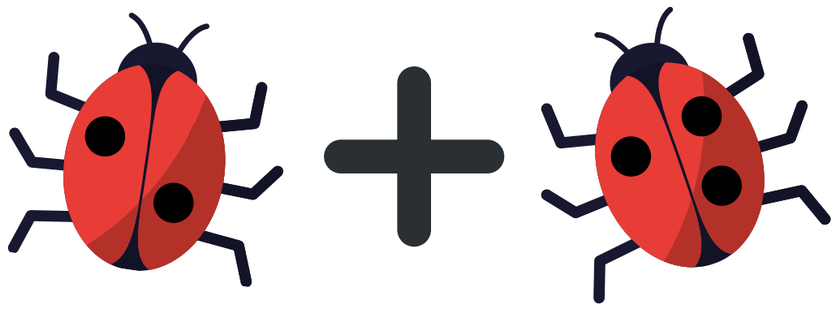
Draw on spots to make 2 the answer.

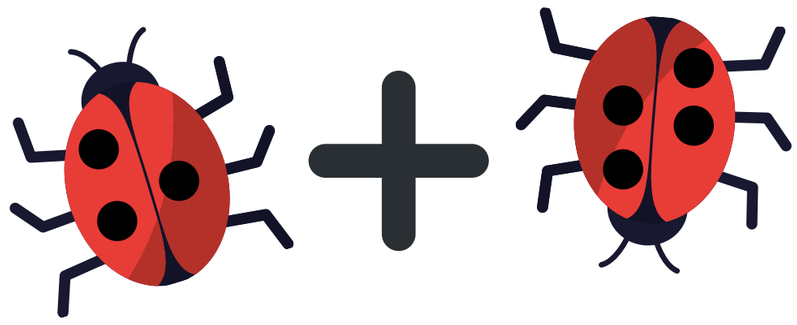
6  = 2

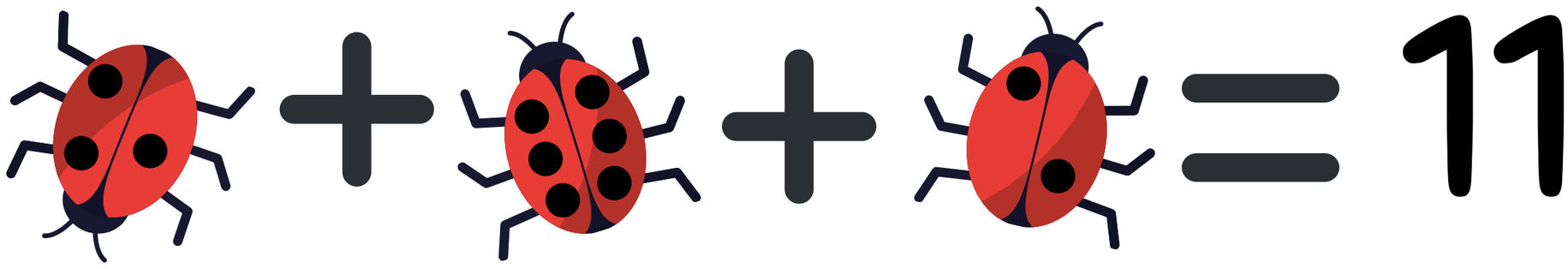
Yr 1

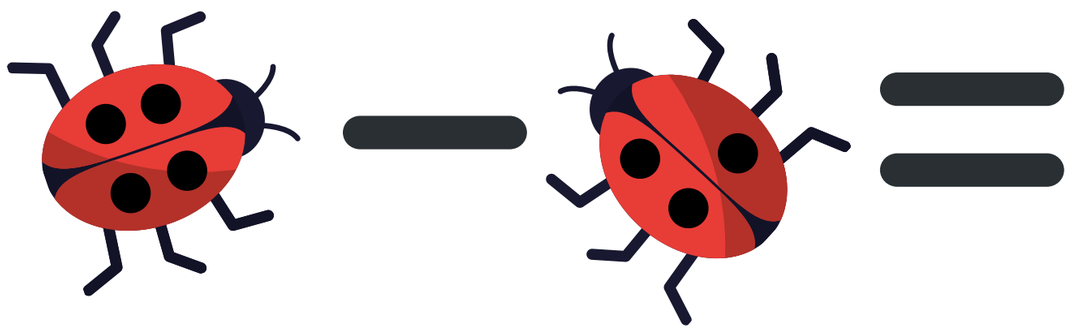
Count the Spots!

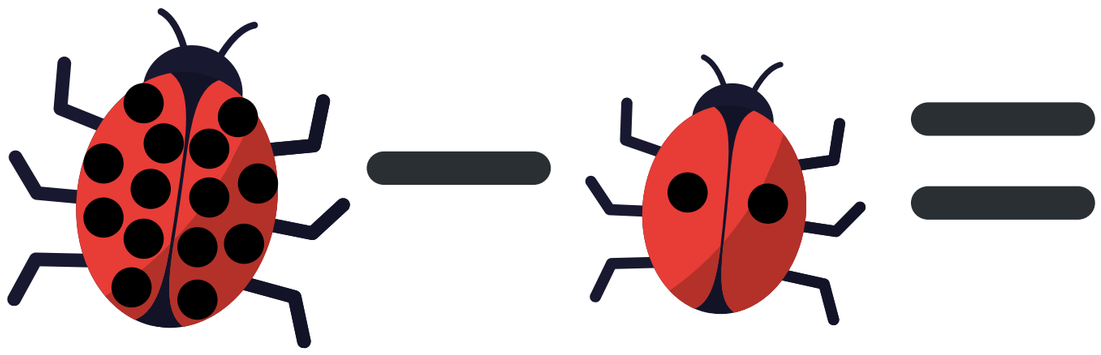
Answers

1  = 5

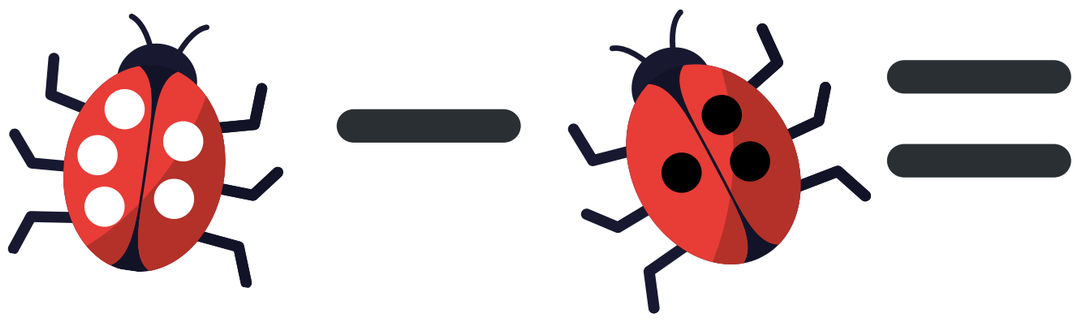
2  = 7

3  = 11

4  = 1

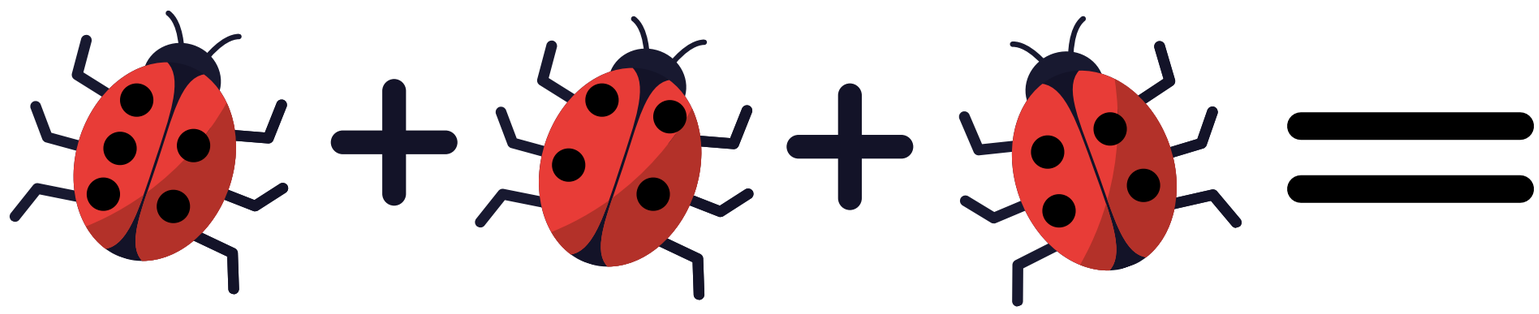
5  = 12

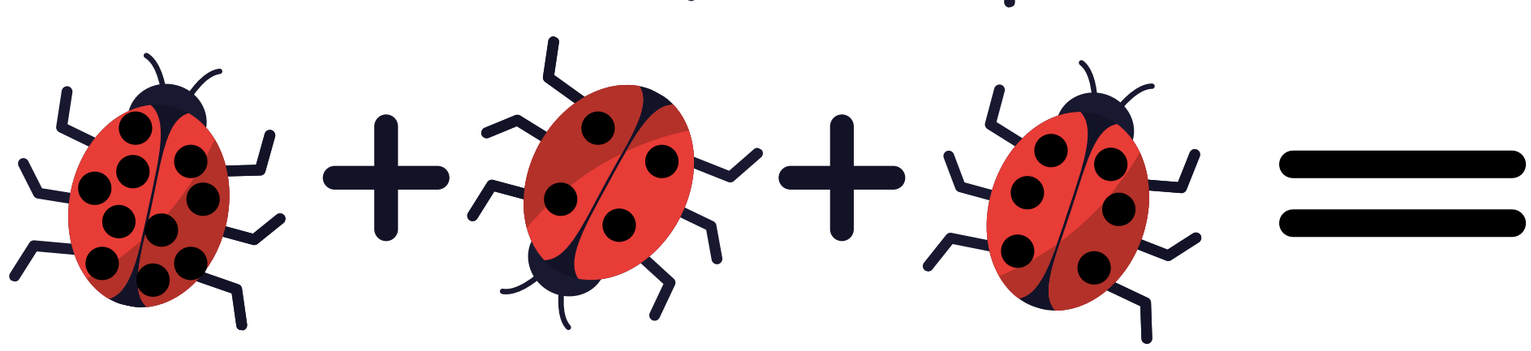
Draw on spots to make 2 the answer.

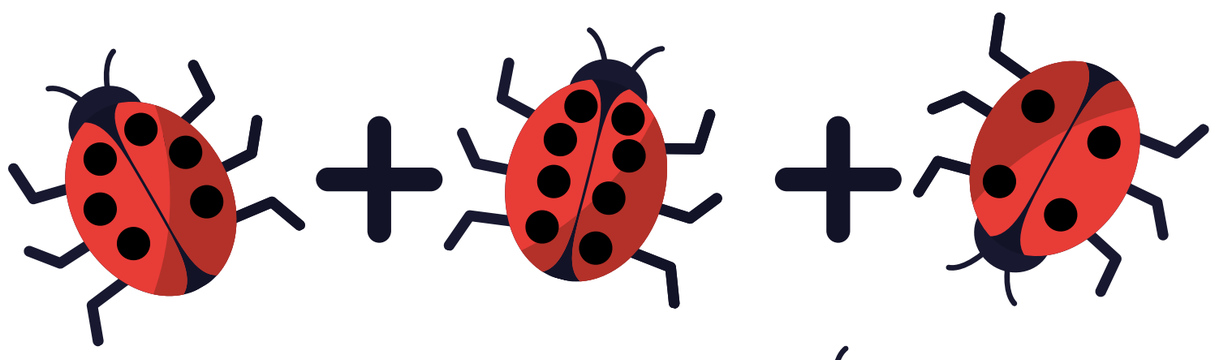
6  = 2

Lots of Spots! Yr 2

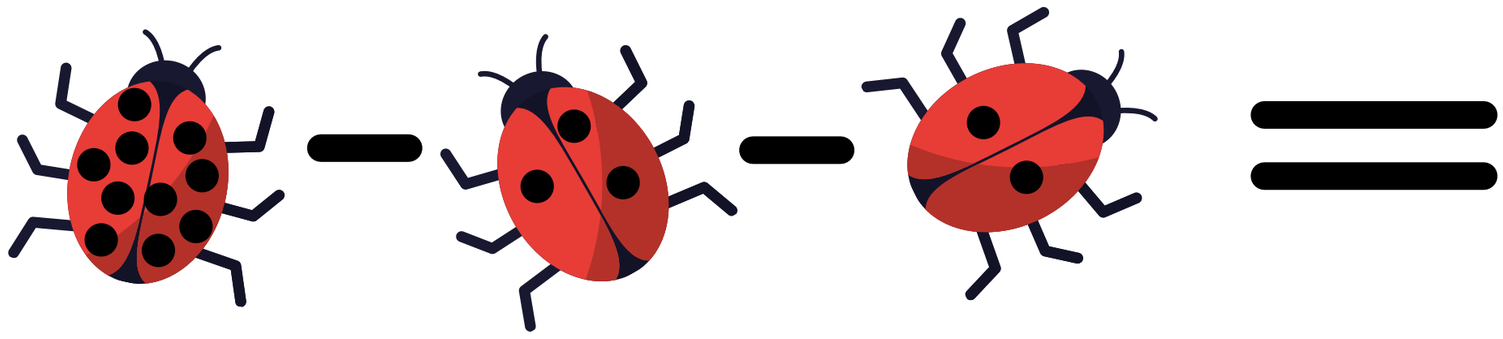
Add and subtract the ladybirds' spots to find the answers!

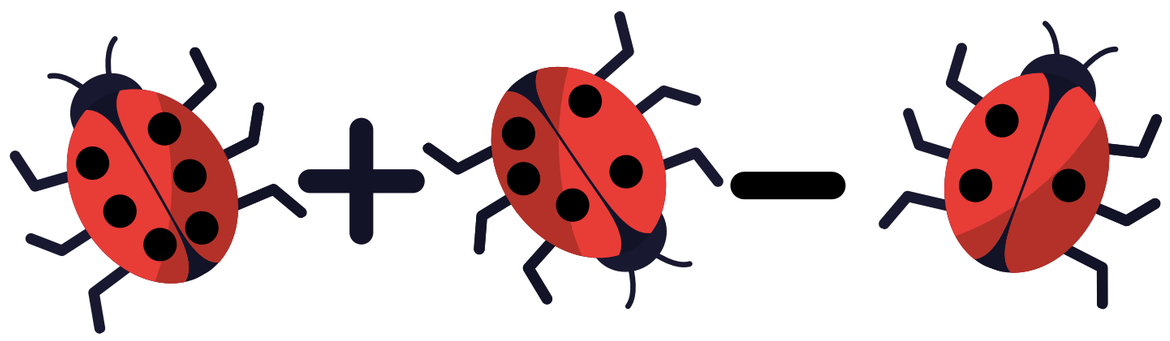
1 

2 

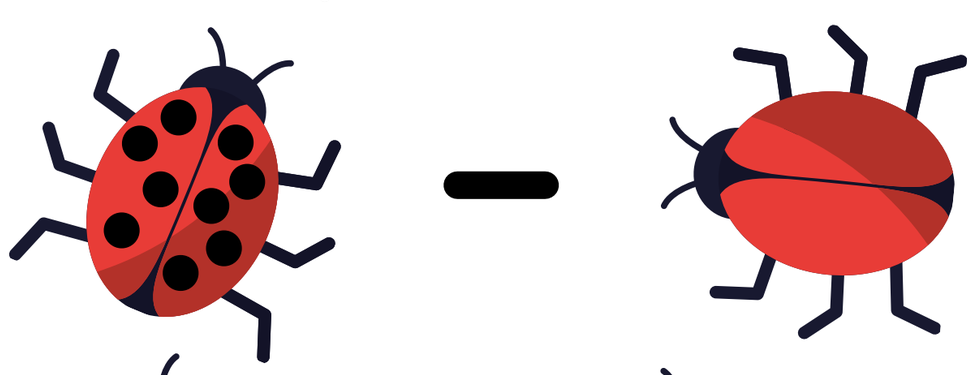
3 

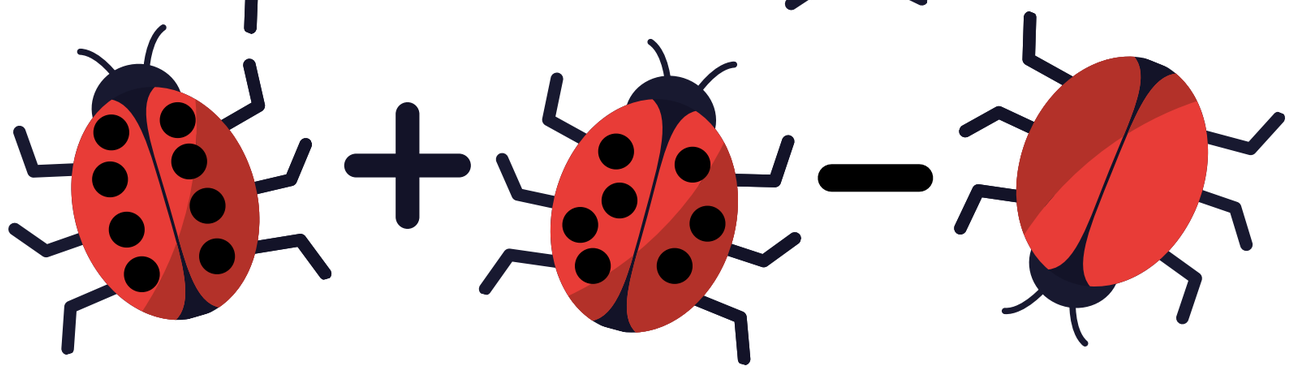
4 

5 

6 

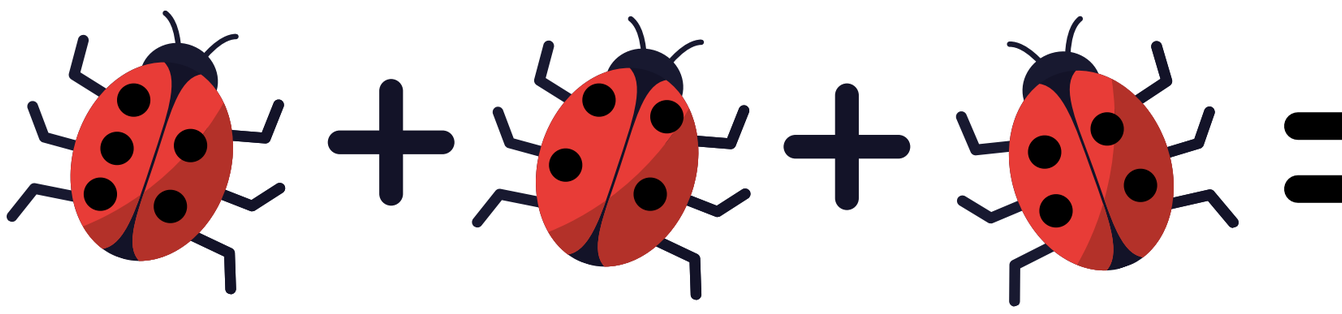
Draw on spots to make the answers right.

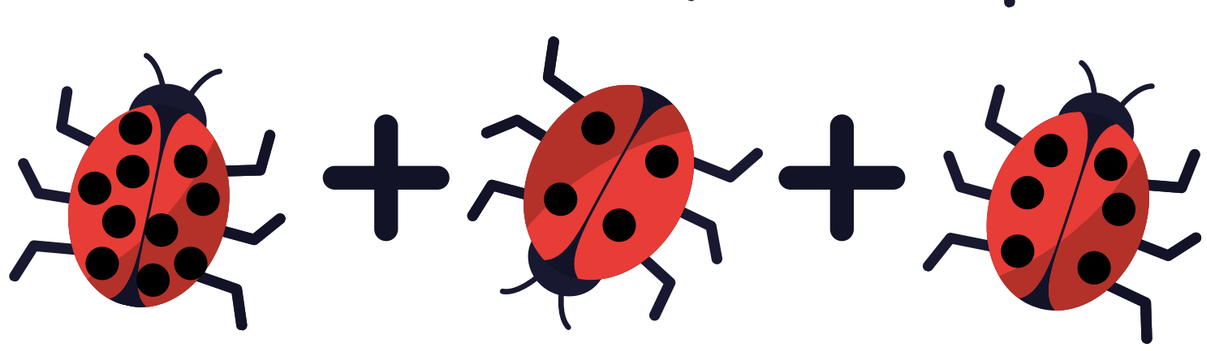
7 

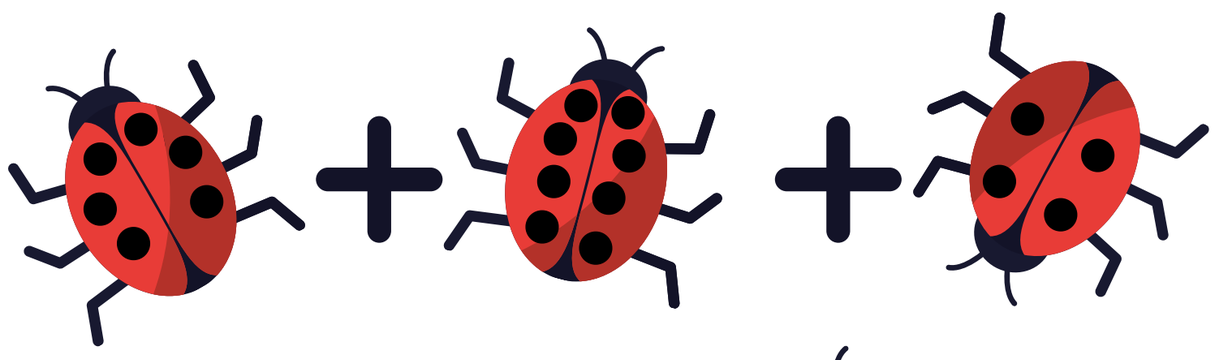
8 

Lots of Spots! Yr 2

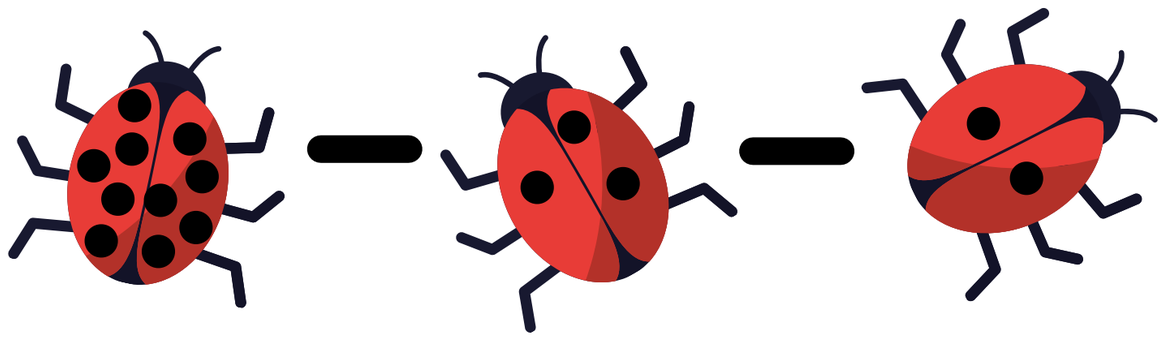
Answers

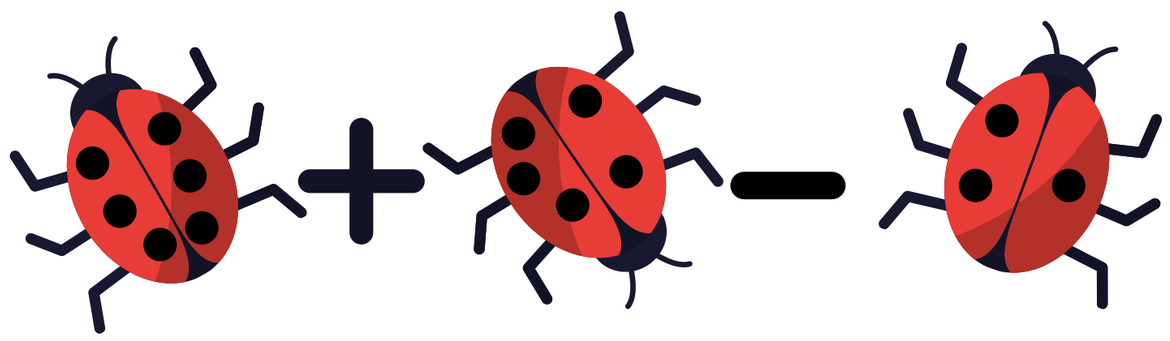
1  = 13

2  = 20

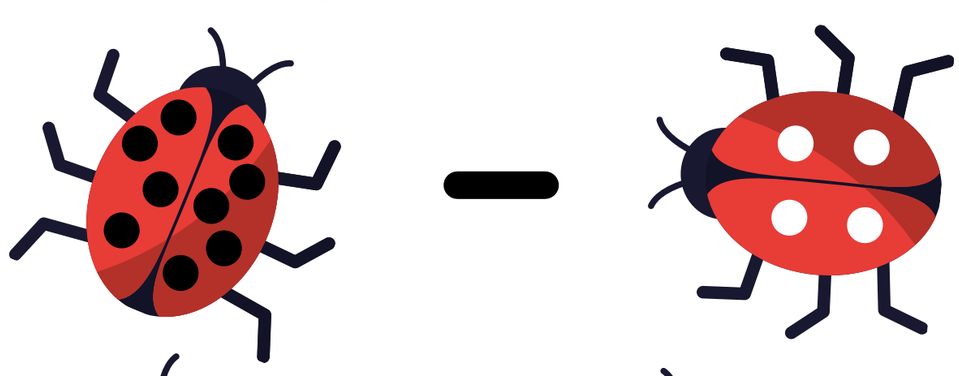
3  = 18

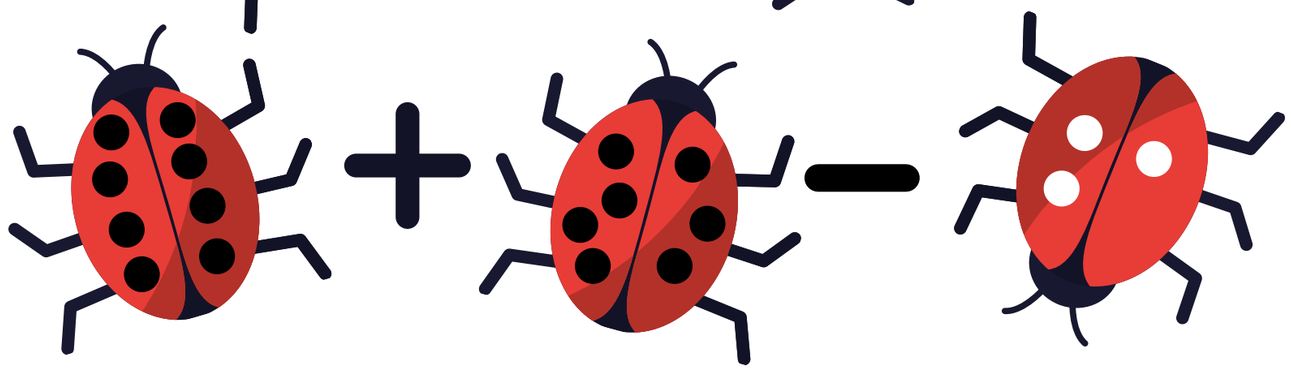
4  = 22

5  = 5

6  = 8

Draw on spots to make the answers right.

7  = 5

8  = 12

So Many Feet! Yr 3

With a magnifiying glass you have discovered several sets of tiny footprints! They were almost certainly made by a centipede or millipede, but which one?

'Centipede' means 'hundred legs'. If the number of footprints rounds to one hundred then maybe they belong to a centipede! Round the footprints to the nearest 100:

1) 87 rounds to _____ Is this a centipede? ☐
2) 176 rounds to _____ Is this a centipede? ☐
3) 134 rounds to _____ Is this a centipede? ☐
4) 45 rounds to _____ Is this a centipede? ☐
5) 55 rounds to _____ Is this a centipede? ☐

Despite the name, centipedes don't actually have 100 legs. Some have only 30 legs, some as many as 354! There are 410 footprints. You reckon there were two centipedes walking together. Which centipede pairs could it be?

a) 350 and 70 legs

```
  3 5 0
+   7 0
-------
-------
```

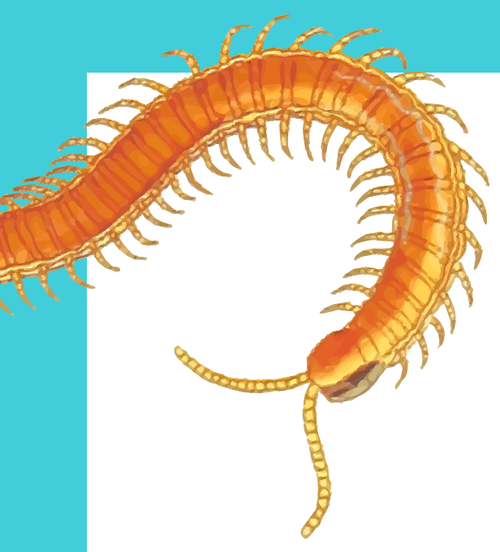
(b) 210 and 210 legs

```
  2 1 0
+ 2 1 0
-------
-------
```

c) 324 and 86 legs

```
  3 2 4
+   8 6
-------
-------
```

Which centipede pairs could it be? _____



So Many Feet! Yr 3

Answers

Round the footprints to the nearest 100:

1) 87 rounds to 100 Is this a centipede? ✓
2) 176 rounds to 200 Is this a centipede? ✗
3) 134 rounds to 100 Is this a centipede? ✓
4) 45 rounds to 0 Is this a centipede? ✗
5) 55 rounds to 100 Is this a centipede? ✓

a) 350 and 70 legs

```
  3 5 0
+   7 0
------
_4_2_0_
    1
```

(b) 210 and 210 legs

```
  2 1 0
+ 2 1 0
------
__4_2_0
```

c) 324 and 86 legs

```
  3 2 4
+   8 6
------
__4_1_0
    1 1
```

Which centipede pair could it be?
Pair c (324 legs and 86 legs) could have made the footprints.
The other pairs are both too many.
(If you would like fully worked solutions to these problems please let us know).

So Many Feet! Yr 4

With a magnifiying glass you have discovered several sets of tiny footprints! They were almost certainly made by a centipede or millipede, but which one?

'Millipede' means 'thousand legs'. If the number of footprints rounds to 1000 then maybe they belong to a millipede! Round the footprints to the nearest 1000:

1) 870 rounds to _____ Is this a millipede? ☐
2) 1760 rounds to _____ Is this a millipede? ☐
3) 1304 rounds to _____ Is this a millipede? ☐
4) 450 rounds to _____ Is this a millipede? ☐
5) 550 rounds to _____ Is this a millipede? ☐

Despite the name, millipedes don't actually have 1000 legs, the record is 750. But there are 1000 footprints. You reckon there were two millipedes walking together. Which millipede pairs could it be?

a) 755 and 325 legs

```
  7 5 5
+ 3 2 5
-------
-------
```

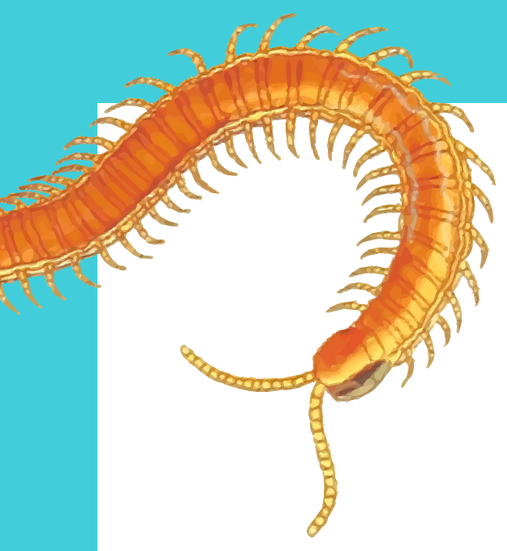
(b) 481 and 429 legs

```
  4 8 1
+ 4 2 9
-------
-------
```

c) 637 and 363 legs

```
  6 3 7
+ 3 6 3
-------
-------
```

Which millipede pair could it be? _____



So Many Feet! Yr 4

Answers

Round the footprints to the nearest 1000:

1)	870	rounds to	1000	Is this a millipede?	✓
2)	1760	rounds to	2000	Is this a millipede?	✗
3)	1304	rounds to	1000	Is this a millipede?	✓
4)	450	rounds to	0	Is this a millipede?	✗
5)	550	rounds to	1000	Is this a millipede?	✓

a) 755 and 325 legs

```
  7 5 5
+ 3 2 5
-------
 10_8_0
    1
```

= 1080

(b) 481 and 429 legs

```
  4 8 1
+ 4 2 9
-------
 _9_0_0
  1 1
```

= 910

c) 637 and 363 legs

```
  6 3 7
+ 3 6 3
-------
 _10_0_0
   1 1
```

= 1000

Which millipede pair could it be?

Pair c (637 legs and 363 legs) could have made the footprints.

The other pairs are too many or too few. (If you would like fully worked solutions to these problems please let us know).

Queens and Counting!

Yr 5

In honey bee hives, there can be millions of bees! Trying to count them individually is tricky, so beekeepers don't do that. Instead they estimate their numbers.

Round the bees to the nearest 1,000 and 10,000:

			Nearest 1000	Nearest 10,000
1)	187000	rounds to	_____	_____
2)	170600	rounds to	_____	_____
3)	23040	rounds to	_____	_____
4)	89450	rounds to	_____	_____
5)	1550	rounds to	_____	_____

6) In hives, a Queen bee will lays all the eggs. A Queen lays 15000 eggs. 95% of these will become worker bees. The remaining eggs will become drones (males) and Queens. 4% will be drones and the rest will be Queens.
How many drones and Queens will there be?
(Hint: 15,000 is 100%. Find 1% by dividing 15,000 by 100).

Drones _____ Queens _____

Extension: How many workers will there be? _____

Queens and Counting! Yr 5

Answers

Round the bees to the nearest 1,000 and 10,000:

			Nearest 1,000	Nearest 10,000
1)	187000	rounds to	187000	190000
2)	170600	rounds to	171000	170000
3)	23040	rounds to	23000	20000
4)	89450	rounds to	89000	90000
5)	1550	rounds to	2000	0

6) How many of each type of bee will there be?

Total eggs = 15000 = 100% 95% of eggs will be workers.

% that will be Non-worker bees = 100% – 95% = 5%

Of this 5%, 4% will be drones. Queens = 5% – 4% = 1%

1% = 100% ÷ 100. 15000 ÷ 100 = 150.

<u>150 eggs will be Queens.</u>

Drones = 4%. 4% = 1% x 4 150 x 4 =

150
150
150
+ <u>150</u> = 600
<u>600</u>

<u>600 will be drones.</u>

<u>Extension</u>

95% = 100% – 5% 100% = 15000

5% = 4% + 1% = 600 + 150 =

600
+ <u>150</u> = 750
<u>750</u>

95% = 15000 – 750 = 14,250

Extension: <u>14,250 bees will be workers.</u>

Queens and Counting!

Yr 6

In honey bee hives, there can be millions of bees! Trying to count them individually is tricky, so beekeepers don't do that. Instead they estimate their numbers.

Round the bees to the nearest 1,000 and 10,000:

		Nearest 1000	Nearest 10,000
1)	170600 rounds to	_____	_____
2)	23040 rounds to	_____	_____
3)	89450 rounds to	_____	_____
4)	1550 rounds to	_____	_____

5) In hives, a Queen bee will lays all the eggs. A Queen lays 15000 eggs. 95% of these will become worker bees. The remaining eggs will become drones (males) and Queens. 4% will be drones and the rest will be Queens.
How many drones, Queens and workers will there be?
(Hint: 15,000 is 100%. Find 1% by dividing 15,000 by 100).

Drones _____ Queens _____ Workers _____

Queens and Counting!

Yr 6

7) The total number of eggs in the hive is 15000. She lays 400 eggs each for ten different hatching zones in the hive every day. In each case, 100 do not hatch and are taken away by the workers. She does this over 5 days. That's a lot of information, but the total number of eggs in the hive is always 15000 when the following is true:

10 x 400 - 100 x 5 = 15000 eggs

In maths, brackets tell us which part of a calculation to do first. The answer is often different. Add brackets to this number sentence/calculation so that it is true and the answer is 15000. Check you've got it right by working out the answer.

Different bee species/types lay different amounts of eggs. Add brackets to the following to make them true:

a) 40 - 8 x 9 = 288 eggs

b) 20 + 2 x 5 - 3 = 27 eggs

c) In your answer to 'a' the brackets cannot go anywhere else as the answer does not make sense. Why is this? _____

_____

Queens and Counting! Yr 6

Answers

Round the bees to the nearest 1,000 and 10,000:

			Nearest 1,000	Nearest 10,000
1)	170600	rounds to	171000	170000
2)	23040	rounds to	23000	20000
3)	89450	rounds to	89000	90000
4)	1550	rounds to	2000	0

5) How many of each type of bee will there be?

Total eggs = 15000 = 100% 95% of eggs will be workers.

% that will be Non-worker bees = 100% – 95% = 5%

Of this 5%, 4% will be drones. Queens = 5% – 4% = 1%

1% = 100% ÷ 100. 15000 ÷ 100 = 150.

<u>150 eggs will be Queens.</u>

Drones = 4%. 4% = 1% x 4 150 x 4 =

	150
	150
	150
+	<u>150</u>
	600

<u>600 will be drones.</u>

95% = 100% – 5% 100% = 15000

5% = 4% + 1% = 600 + 150 = 750

95% = 15000 – 750 = 14,250

	600
+	<u>150</u>
	750

<u>14,250 bees will be workers.</u>

Queens and Counting!

Yr 6

Answers continued

7) 10 x (400 – 100) x 5 = 15000 eggs

Check: (10 x 400) – 100 x 5 = 4000 – 100 x 5 = 3900 x 5
= 19500

10 x (400 – 100) x 5 = 10 x 300 x 5 = 3000 x 5
= 15000

10 x 400 – (100 x 5) = 10 x 400 – 500
= 4000 – 500 = 3500

Different bee species/types lay different amounts of eggs. Add brackets to the following to make them true:

a) (40 – 8) x 9 = 288 eggs

Check: (40 – 8) x 9 = 32 x 9 = 288

40 – (8 x 9) = 40 – 72 = –32 eggs

b) 20 + (2 x 5) – 3 = 27 eggs

Check: (20 + 2) x 5 – 3 = 22 x 5 –3 = 110 – 3 = 107

20 + (2 x 5) – 3 = 20 + 10 –3 = 30 – 3 = 27

20 + 2 x (5 – 3) = 20 + 2 x 2 = 22 x 2 = 44

c) If you put the brackets elsewhere the answer is a negative number. A bee cannot have 'minus' eggs, so the answer does not make sense.

The Unstoppable Army

KS3

A colony of army ants is storming through the rainforest destroying everything in their path. They will eat everything and stop at nothing. Any small animal sleeping in the way will be swarmed and stung or could even be eaten, if the ant colony is hungry enough! They move constantly through the forest in their search for more food.

1) The ants move in a long column. It is 21.5m wide and 100m long. What is the <u>area</u> of the column in m^2? (Reminder: Area = length x width)

Area = _____ m^2

2) If there are 50 ants in every $metre^2$, how many ants are there in the column?

There are _____ ants.

3) Ant colonies are normally estimated, how many ants are there in this colony to the <u>nearest 1000</u>?

There are _____ ants, rounded to the nearest 1000.

4) Some of the ants are 'soldier' ants. They are huge and defend the colony. They have a mass of 15g whereas the small worker ants have a mass of only 0.25g. How many <u>times greater</u> is the mass of a soldier than a worker?

Soldier ants are _____ x greater in mass than workers.

The Unstoppable Army

KS3

5) The column of ants reaches a sleeping mouse. Thinking it would make a good meal, they move as one to eat it, but a rival colony of ants is on the other side. There's an estimated 115,000 number of ants in the rival colony. This has been rounded to the nearest 1000. What are the <u>lowest</u> and <u>highest</u> possible real numbers of ants in the rival colony?

Lowest possible = _____ ants Highest possible = _____ ants

6) There are in fact 115, 271 ants in the rival colony, more than the original colony has. The rival colony is set to fight off the original colony and claim the mouse, when a colossal giant anteater appears, huge and hungry. It can use its long tongue to eat 1000 ants a minute. If it only eats the rival colony, how long will it take to eat all the ants? Give your answer in hours and minutes.

It will take _____ hours and _____ minutes to eat all the rival ants.

<u>Extension:</u> The army ant colonies themselves eat up to 500,000 prey animals every day! This prey is usually other minibeasts like other insects. The total number of insects in the nearby forest area is 2,500,000. 250,000 die every day naturally of old age or are eaten by other predators.

The remaining insects reproduce and in total have 620,000 babies every day. Is this sustainable? Can this area support the ants' incredible appetite long term? How do you know?

Do any of the army ant behaviours described so far explain how your answer can be correct? How does the colony find enough food?

_____

_____

The Unstoppable Army

KS3

Answers

1) The ants move in a long column. It is 21.5m wide and 100m long. What is the <u>area</u> of the column in m^2? (Reminder: Area = length x width)

Area = 100 x 21.5 = 2150m^2 (21.5 x 100 = 21.5 x 10 x 10 = 215 x 10 = 2150m^2)

<u>Area = 2150m^2</u>

2) If there are 50 ants in every $metre^2$, how many ants are there in the column?

No. of ants = 2150 x 50

X	2000	100	50
50	100000	5000	2500

100 000
5 000
+ 2 500
<u>107 500</u>

<u>There are 107500 ants.</u>

3) Ant colonies are normally estimated, how many ants are there in this colony to the <u>nearest 1000</u>?

There are <u>108000 ants</u>, rounded to the nearest 1000.

4) Some of the ants are 'soldier' ants. They are huge and defend the colony. They have a mass of 15g whereas the small worker ants have a mass of only 0.25g. How many <u>times greater</u> is the mass of a soldier than a worker?

Mass of the soldier ÷ Mass of the worker = 15 ÷ 0.25
15 ÷ 0.25 = 15 ÷ ¼ = 15 x 4 = 60
(When dividing by a fraction, you flip the fraction and then multiply. In this case ¼ becomes 4. 15 x 4 = 60)

Soldier ants are <u>60 x greater</u> in mass than workers.

The Unstoppable Army

KS3

Answers continued

5) What are the <u>lowest</u> and <u>highest</u> possible real numbers of ants in the rival colony?

Lowest possible = <u>114,500 ants</u> Highest possible = <u>115, 499 ants</u>

6) There are in fact 115, 271 ants in the rival colony, more than the original colony has. The rival colony is set to fight off the original colony and claim the mouse, when a colossal giant anteater appears, huge and hungry. It can use its long tongue to eat 1000 ants a minute. If it only eats the rival colony, how long will it take to eat all the ants? Give your answer in hours and minutes.

115271 ÷ 1000 = 115.271 minutes

It will take 116 minutes (as it takes 115 minutes to eat the 115,000 then some of a further minute is needed to eat the remaining 271).

There are 60 minutes in an hour. 116 – 60 = 56. Therefore it will take 1 hour and 56 minutes to eat all the ants in the rival colony.

It will take <u>1 hour and 56 minutes</u> to eat all the rival ants.

<u>Extension:</u>

Is this sustainable? Can this area support the ants' incredible appetite long term? How do you know?

<u>This is not sustainable</u>, as the <u>insect population is decreasing</u> overall every day. If they lose 750,000 insects a day to being eaten by ants or by other means of death (500,000 + 250,000 = 750,000), but only gain 620,000, then overall the population is decreasing by 130,000 every day.

Every day: population – 750000 + 620000 = population – 130000

Eventually, the population will die out if the death and birth rates stay the same and the ants will run out of food.

Do any of the army ant behaviours described so far explain how your answer can be correct? How does the colony find enough food?

<u>The colony is constantly on the move to ensure they can find new food.</u>