

Year 6 Maths Mastery

Express Missing Number Problems
Algebraically



Emergency Plumber

1) An emergency plumber charges £15 for a call out and £8 per hour for any work. Which formula below can be used to calculate how much the plumber charges?



$$15h + 8$$

$$8h - 15$$

$$8h + 15$$

$$15h - 8$$

(h is the number of hours the plumber works)

If you finish:



Write some similar problems for your partner.

Hide
Answers

p and q

2a) Write two algebraic expressions to show the relationship between p and q if p is 4 more than q.

$$p - 4 = q$$

$$p = q + 4$$

2b) Write two algebraic expressions to show the relationship between p and q if p is 12 less than q.

$$p + 12 = q$$

$$p = q - 12$$

2c) Write two algebraic expressions to show the relationship between p and q if p is 12 less than q.

$$p = 2q$$

$$p = q \div 2$$

If you finish:



Challenge a partner to write equations to express the relationship between p and q.

Hide
Answers



a and b

3a) Which expressions are a simplification of: $a + a + a + b + b$?

$3a + 2b$

$2a + 3b$

$2b + 3a$

$2b - 3a$

3b) Which expressions are a simplification of: $a + a + a + a - b$?

$4a + b$

$b + 4a$

$4a - b$

$b - 4a$

3c) Write an expression which simplifies: $a - b + a - b - b$.

$2a - 3b$

If you finish:



Explain your answers to a partner.



Write some of your own problems for a partner.



Hide
Answers

Discount

4) A farmer sells barrels of milk for £14. A discount of £6 on any order is given for paying in advance. Write the formula that could be used to calculate the cost of any number of barrels (b) of milk paid for in advance.

$$14b - 6$$

If you finish:



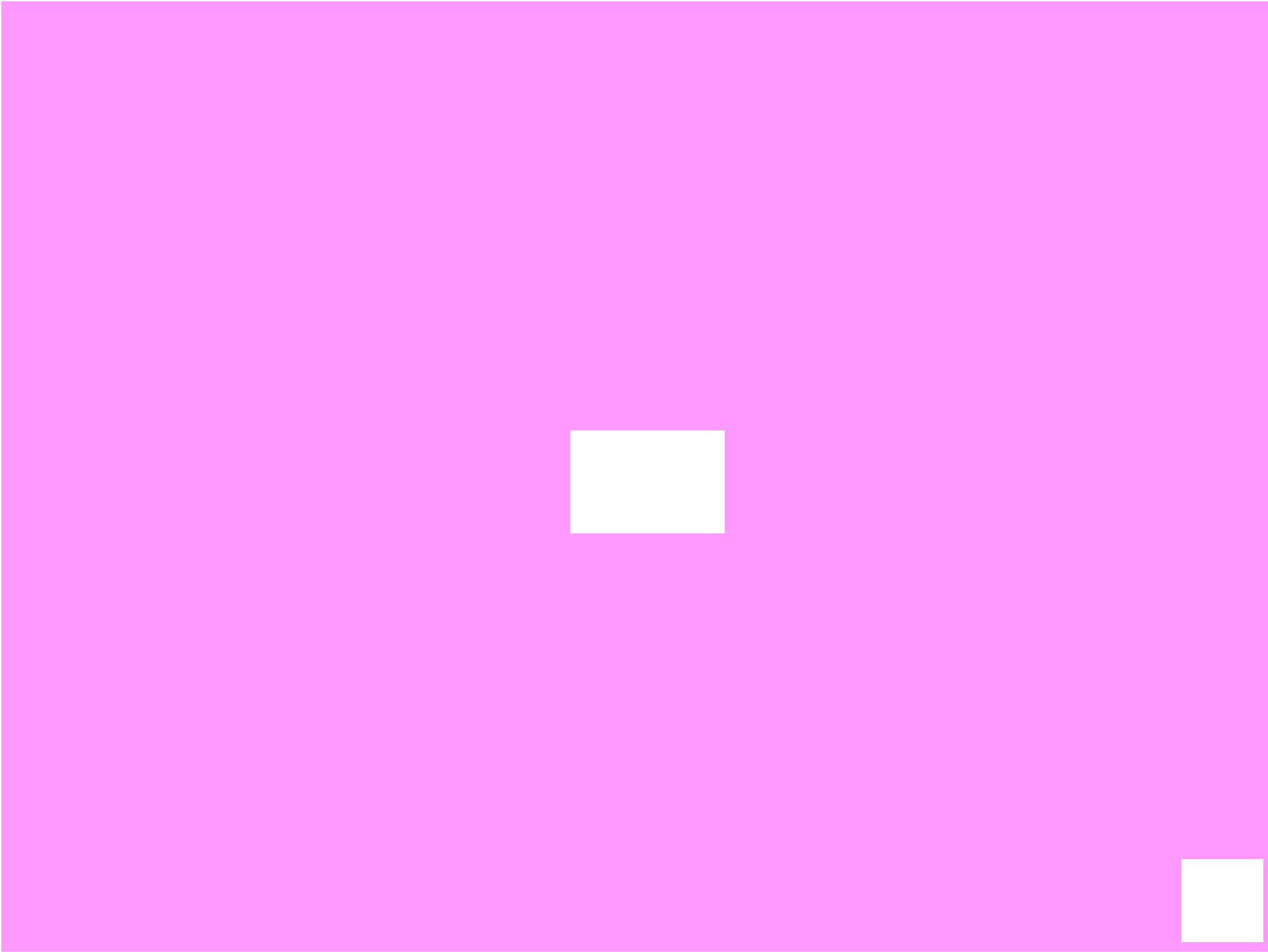
Explain your answer to a partner.



Think about how you could improve your answer.

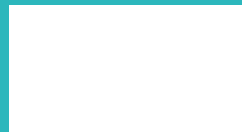


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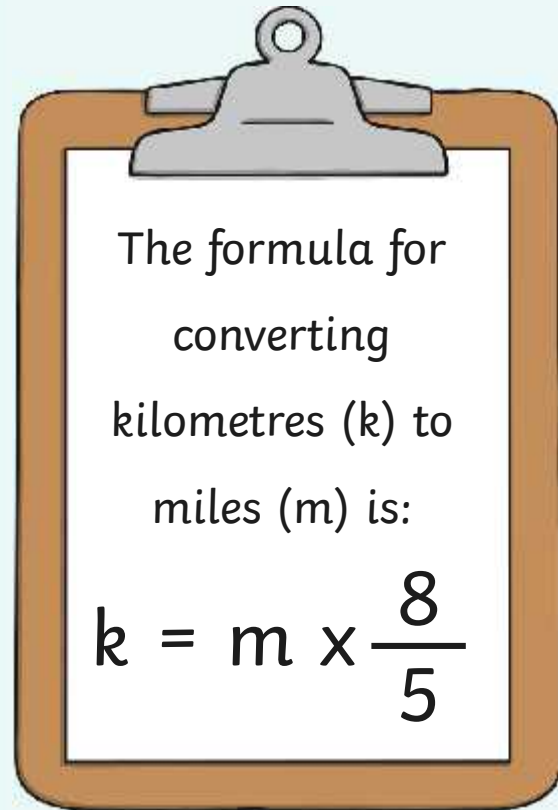


Year 6 Maths Mastery

Use Simple Formulae



Miles and Kilometres



a. Convert the following mileages to kilometres:



8 km



19.2 km



32 km



88 km



100 km

b. Convert the formula so it will convert kilometres to miles.

$$m = k \times \frac{5}{8}$$

Discuss your answers with a partner and test them using your new formula.

Hide
Answers

Area of a Rectangle

$$A = ab$$



The area of a rectangle is expressed by this formula.
(A is the area, a and b are the length of the adjacent sides.)

Complete this table:

a (cm)	b (cm)	A (cm ²)
4	6	24
8	4	32
12	3	36
9	5	45
6	15	90

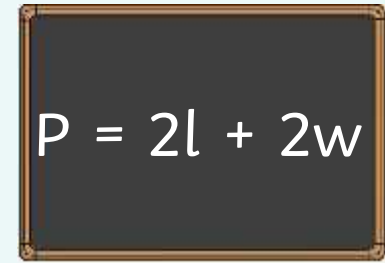
Create your own table for a partner to complete.

Hide
Answers

Perimeter of a Rectangle

The perimeter of a rectangle is expressed by this formula.

(P is the perimeter, l and w are the length of the adjacent sides.)


$$P = 2l + 2w$$

Complete this table:

l (cm)	w (cm)	P (cm)
3	9	24
7	6	26
14	8	44
21	16	74
26	42	136

Create your own table for a partner to complete.

Hide
Answers

Simple Formulae

In each of these formulae, calculate the value of y when $x=6$ and of x when $y = 6$.

Formula	$x = 6$	$y = 6$
$y = x + 2$	$y = 8$	$x = 4$
$y = 2x - 4$	$y = 8$	$x = 5$
$y = 3 + 3x$	$y = 21$	$x = 1$
$2y = x + 8$	$y = 7$	$x = 4$



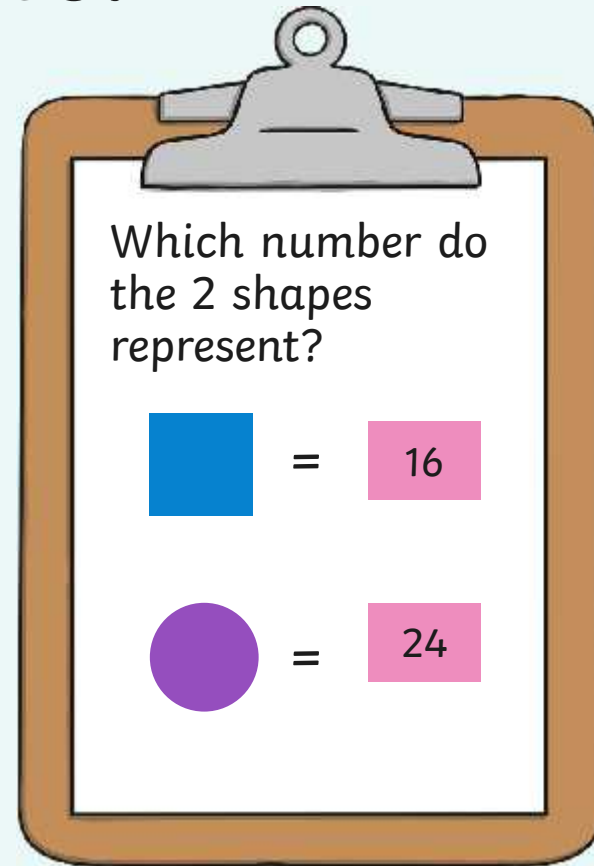
Challenge a partner to find different values of y or x when using different values. Try your own formulae.

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Answers

What numbers?

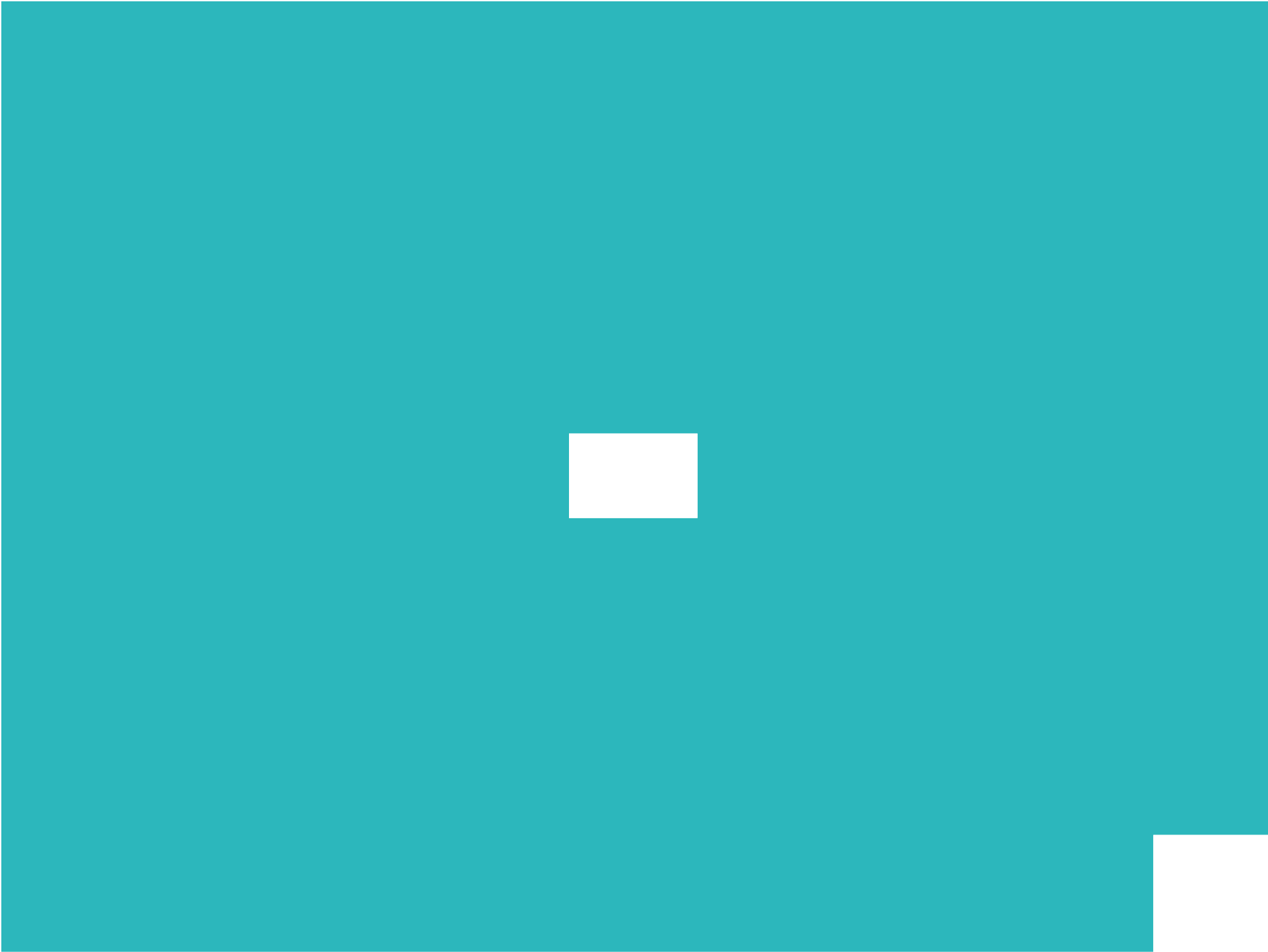
Each shape stand for a number.

$$\begin{array}{ccccccc} \square & + & \bigcirc & + & \bigcirc & + & \square & = & 80 \\ & & & & & & & & \\ & + & & & & & & & \\ \bigcirc & & & & & & & & \\ & + & & & & & & & \\ \square & & & & & & & & \\ & = & & & & & & & \\ & 56 & & & & & & & \end{array}$$



Explain how you found the answer to a partner and then create your own puzzle for them to solve.

Hide Answers



Maths Mastery

Enumerate Possibilities of
Combinations of Two Variables



All the Values

1. In this equation, a and b are different whole numbers between 20 and 30.

Write all the calculations that show all the possible values of a and b in the equation:

$$a - b = 7$$

$$\begin{aligned} a &= 29, b = 22; \\ a &= 28, b = 21 \end{aligned}$$

If you finish:

- 💡 Check your answers with a partner.
- 💡 Discuss with your partner why 'a' could not be 25.
- 💡 Work with your partner to make some questions for other pairs.



b would have to be 18 which is less than 20

Hide
Answers

Possible Combinations

2. In each question, find all the possible combinations:

a. The total of 2 numbers is 17. The numbers are between 6 and 11.

$$7 + 10; 8 + 9$$

b. Two numbers added together make twenty-one. The numbers are eight or more.

$$8 + 13; 9 + 12; 10 + 11$$



If you finish:



Share your answers with a partner.



Write some questions for your partner.

Hide
Answers

Possible Combinations

3. In each question, find all the possible combinations:

c. The sum of two numbers is 35. Both numbers are less than twenty.

$$19 + 16; 18 + 17$$

d. The difference between two numbers is 9.
The sum of the numbers is between 34 and 40.

$$24 - 15; 23 - 14; 22 - 13$$

If you finish:



Share your answers with a partner.



Write some questions for your partner.

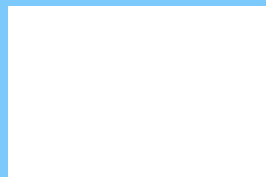


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Answers



Year 6 Maths Mastery

Find Pairs of Numbers that Satisfy
an Equation with Two Unknowns



Different Pairs

1) Find three different possible pairs of whole number values for a and b in these equations:

$$a - b = 6$$

$$a = 10, b = 4$$

$$a = 9, b = 3$$

$$a = 8, b = 2$$

$$cd = 16$$

$$c = 1, d = 16$$

$$c = 2, d = 8$$

$$c = 4, d = 4$$

$$50 - ef = 14$$

$$e = 1, f = 36$$

$$e = 2, f = 18$$

$$e = 4, f = 9$$

$$e = 6, f = 6$$



If you finish:



Share your answers with a partner. Are there any answers that only one of you have?



Give each other an equation to find pairs of whole number values.

Hide
Answers

One pair

2) Calculate the value of each letter.

$$gh = 49, g = h$$

$$g = 7, h = 7$$

$$i = j + 16, i + j = 24$$

$$i = 20, j = 4$$

$$k \div l = 3, kl = 48$$

$$k = 12, l = 4$$

If you finish:



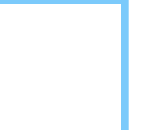
Check your answers with a partner.



Write some of your own equations for your partner to solve.



Hide
Answers



Year 6 Maths Mastery

Generate and Describe
Linear Number Sequences



Compare

Hide
Answers

1) Create these sequences:

a. Start at 1, then add 4, another, 4, another 4 and so on...

1, 5, 9, 13, 17, 21, 25, 29...

b. Use all the numbers in the 4 times table, but subtract 1 each time.

3, 7, 11, 15, 19, 23, 27, 31...

2) Compare the 2 sequences by listing the similarities and differences.

Similarities: count in 4s; odd numbers; units pattern is 1, 5, 9, 3, 7.
Differences: One starts with 1, the other with 3; no numbers in both.



Times Tables

Hide
Answers

3) Compare the multiples of 3 and the multiples of 9. What do you notice?

- All multiples of 3
- Every 3rd number in multiples of 3 is a multiple of 9
- Pattern is: odd, even, odd, even
- Ones in each pattern use all digits from 0-9
- Digital roots of multiples of 3 go 3, 6, 9 whereas digital roots for multiples of 9 are always 9.

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39...

9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108...



Hide
Answers

An Apple a Day

4) Amelia has £5 at the beginning of April. She buys an apple every day for 15p.



a. How much money will she have left at the end of the first week?

£3.95

b. How much money will she have left at the end of the month?

50p

c. Write a sequence generating rule for working out how much money she will have left at the end of any day in April.

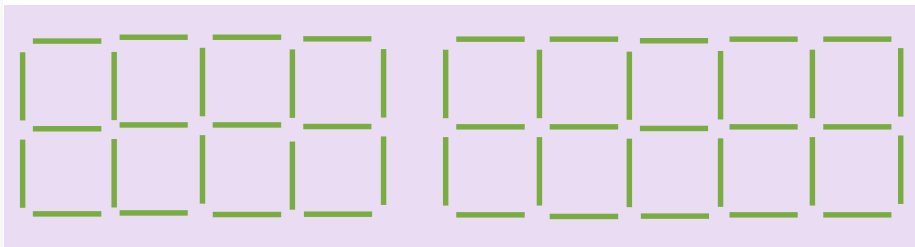
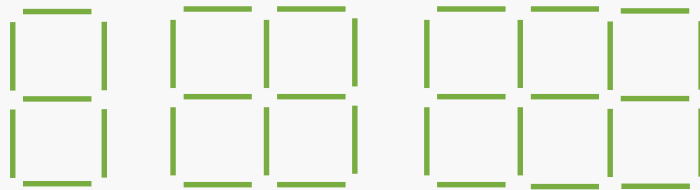
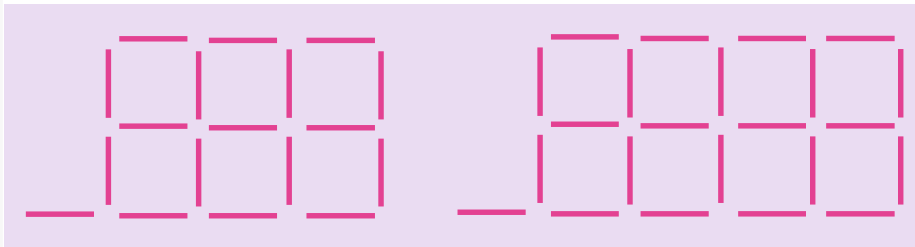
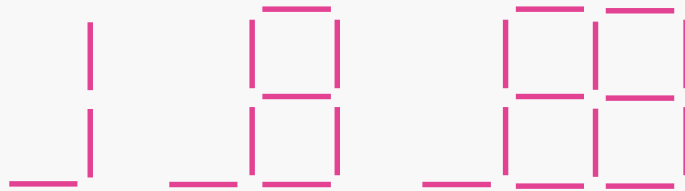
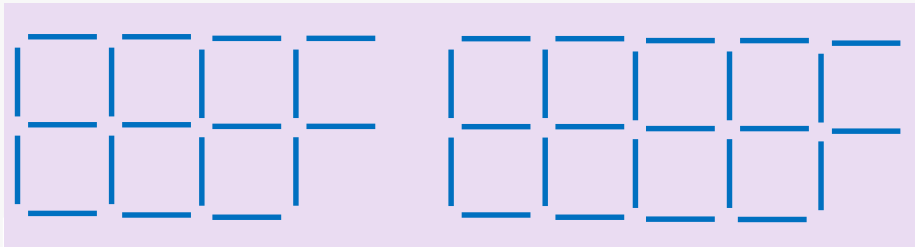
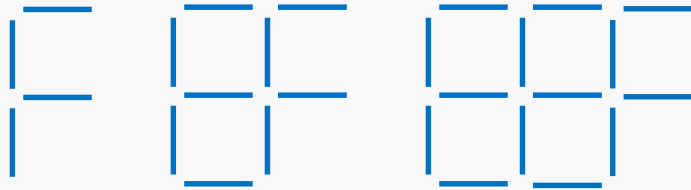
$£5 - (£0.15 \times \text{date})$

If you finish: Share your ideas with a partner. Then challenge them to a similar problem.

Stick Sequences

Hide
Answers

5) Here are 3 stick sequences:



a. Draw the next 2 patterns for each sequence.

b. What is the relationship between the 3 sequences?

Blue and red combine to make green.

