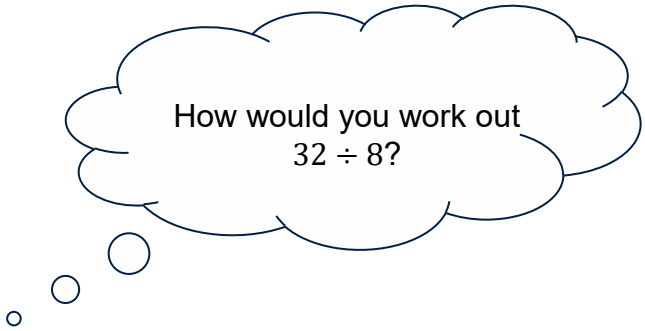
Factorising 1

Did you know?



- Did you use the fact that you know $8 \times 4 = 32$?

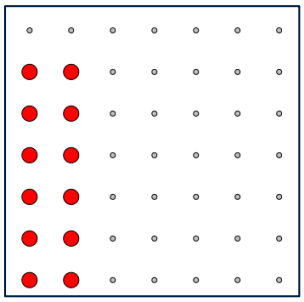
Often, we use multiplication to help us do division as it is more straightforward.

- The same is true for factorising and expanding.
- It can often be easier to expand than to factorise
- So, use expanding to help you factorise

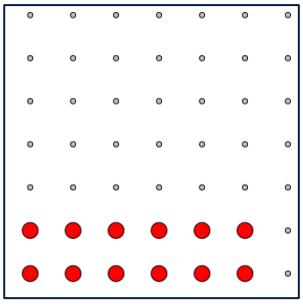
Factors and Rectangles

I have 12 red counters and a large sheet of dotted paper.
How many different rectangular arrays can I make using all 12 counters?

A

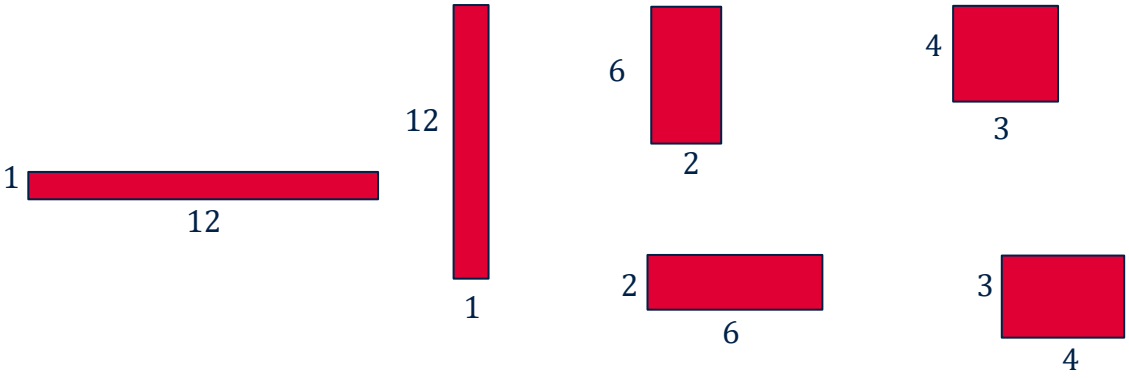


B



- An array is an arrangement of objects in rows and columns
- For this activity we will count A and B as different arrays as they have different orientations

This problem is equivalent to finding the number of rectangles with area 12 that have integer length sides, and counting 2 by 6 as different to 6 by 2



There are six arrays for 12 counters.

Factoring and Rectangles

How many different arrays are there for:

- 7 counters?
- 15 counters?
- 25 counters?
- A prime number of counters?
- What is special about numbers with an odd number of arrays?

Factorising 1

Fully factorise the following:

1. $5x - 30$
2. $9x + 6$
3. $x^2 + 6x$
4. $6y^3 - 12y$
5. $7a^2b + 21ab - 14a$
6. $12x^2 + 12xy + 12y^2$
7. $3t(t-1) + 7(t-1)$
8. $2x(x^2+3) - 5(x^2+3)$

Factorising 2

Fully factorise the following

1. $7x + 28$
2. $14 - 21x$
3. $y^2 - 8y$
4. $3t^4 + 9t^2$
5. $3x^3y - 12xy^2 + 6xy$
6. $8a^3b + 6y^2b - 10b$
7. $6x(x+3) + 5(x+3)$
8. $7y(3-2y) - 2(3-2y)$

Enough Information

You are told that

$$ab = 245$$

$$bc = 635$$

$$a + c = 88$$

What is the value of b?

Enough Information Hints

- Try adding the first two expressions together
- Now factorise
- Have another look at the question

Square Root

By considering prime factors, and without a calculator, find the square root of 27×147

Square Root Hints

- Draw prime factor trees for 27 and 147 separately
- Write down 27 x 147 expressed as a product of their prime factors
- Simplify the expression
- Have another look at the question

The Root Cause

Simplify $\sqrt{2y^2(x+3)^2 + 7(x+3)^2y^2}$

The Root Cause Hint

- Factorise first (Q7 and Q8 from Factorising 1 will help)
- Have another look at the question

Power Puzzle

Simplify

$$\frac{4x^{2.5} - 6\sqrt{x}}{2x^2 - 3}$$

Power Puzzle Hint

- Rewrite $\sqrt{x}$ as a power of x
- What is 2.5 as a fraction?
- Factorise the numerator
- Have another look at the question

Factor Problem

Pick 3 different integers from 1 to 10

Place your numbers in the boxes in as many different ways as possible (i.e 6 ways)

$$\square(\square x + \square)$$

- Write down all the expressions
- Multiply them all out
- Add up all your results and simplify
- Now factorise that answer

Try again with a different set of 3 numbers

What do you notice? Can you prove it?