



Knowledge Organiser

Year 10 Foundation 1-3 (Summer)

Fractions without a Calculator

1

EXAMPLE: Calculate $2\frac{1}{5} - 1\frac{1}{2}$.

Rewrite the mixed numbers as improper fractions: $2\frac{1}{5} - 1\frac{1}{2} = \frac{11}{5} - \frac{3}{2}$

Find a common denominator: $= \frac{22}{10} - \frac{15}{10}$

Combine the top lines: $= \frac{22-15}{10} = \frac{7}{10}$

Ratios

In a proportional division question a **TOTAL AMOUNT** is split into parts in a certain ratio.
The key word here is PARTS — concentrate on 'parts' and it all becomes quite painless:

3

EXAMPLE: Jess, Mo and Greg share £9100 in the ratio 2:4:7. How much does Mo get?

- ADD UP THE PARTS:**
The ratio 2:4:7 means there will be a total of 13 parts: $2 + 4 + 7 = 13$ parts
- DIVIDE TO FIND ONE "PART":**
Just divide the total amount by the number of parts: $£9100 \div 13 = £700$ (= 1 part)
- MULTIPLY TO FIND THE AMOUNTS:**
We want to know Mo's share, which is 4 parts: $4 \text{ parts} = 4 \times £700 = £2800$

Solving Equations

EXAMPLES:

1. Solve $x + 7 = 11$. The opposite of +7 is -7

$$x + 7 = 11$$

$$(-7) \quad x + 7 - 7 = 11 - 7$$

$$x = 4$$

2. Solve $x - 3 = 7$. The opposite of -3 is +3

$$x - 3 = 7$$

$$(+3) \quad x - 3 + 3 = 7 + 3$$

$$x = 10$$

This means 'take away 7 from both sides'.

Pythagoras' Theorem is Used on Right-Angled Triangles

4

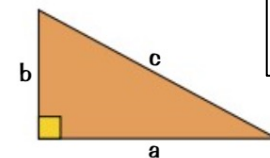
Pythagoras' theorem only works for RIGHT-ANGLED TRIANGLES.

It uses two sides to find the third side.

The formula for Pythagoras' theorem is:

$$a^2 + b^2 = c^2$$

short sides long side



2

The trouble is, the formula can be quite difficult to use. Instead, it's a lot better to just remember these three simple steps, which work every time:

1) SQUARE THEM

SQUARE THE TWO NUMBERS that you are given, (use the x^2 button if you've got your calculator.)

2) ADD or SUBTRACT

To find the longest side, **ADD** the two squared numbers. $a^2 + b^2 = c^2$
To find a shorter side, **SUBTRACT** the smaller from the larger. $c^2 - b^2 = a^2$

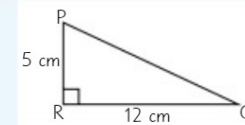
3) SQUARE ROOT

Once you've got your answer, take the **SQUARE ROOT** (use the $\sqrt{\quad}$ button on your calculator). $c = \sqrt{a^2 + b^2}$
 $a = \sqrt{c^2 - b^2}$

EXAMPLES:

1. Find the length of side PQ in this triangle.

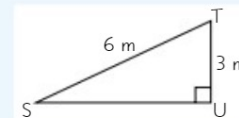
- Square them: $a^2 = 5^2 = 25$, $b^2 = 12^2 = 144$
- You want to find the longest side, so **ADD**: $a^2 + b^2 = c^2$
 $25 + 144 = 169$
- Square root: $c = \sqrt{169} = 13$ cm



Always check the answer's sensible — 13 cm is longer than the other two sides, but not too much longer, so it seems OK.

2. Find the length of SU to 1 decimal place.

- Square them: $b^2 = 3^2 = 9$, $c^2 = 6^2 = 36$
- You want to find a shorter side, so **SUBTRACT**: $c^2 - b^2 = a^2$
 $36 - 9 = 27$
- Square root: $a = \sqrt{27} = 5.196...$
 $= 5.2$ m (to 1 d.p.)



Check the answer is sensible — yes, it's a bit shorter than the longest side.

3. Solve $5x = 15$.

$$5x = 15$$

$$(\div 5) \quad 5x \div 5 = 15 \div 5$$

$$x = 3$$

5x means $5 \times x$, so do the opposite — divide both sides by 5

4. Solve $\frac{x}{3} = 2$.

$$\frac{x}{3} = 2$$

$$(\times 3) \quad \frac{x}{3} \times 3 = 2 \times 3$$

$$x = 6$$

$\frac{x}{3}$ means $x \div 3$, so do the opposite — multiply both sides by 3

4



How do we use Knowledge Organisers in Mathematics

How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.

GLUE HERE

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