Had a look ☐ Nearly there ☐ Nailed it! ☐

Hot Topic

Fractions

You need to be able to work with fractions and mixed numbers confidently **without a calculator**.

1 Adding or subtracting fractions

Add or subtract the whole numbers

Write the fractions as fractions with the same denominator

Add or subtract the fractions

If you have an improper fraction then convert to a mixed number and add

$2\frac{2}{3} + 1\frac{1}{2}$

$= 3 + \frac{2}{3} + \frac{1}{2}$

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

$= 3 + \frac{7}{6}$

$= 3 + 1\frac{1}{6}$

$= 4\frac{1}{6}$

2 Multiplying fractions

Convert any mixed numbers to improper fractions

Multiply the numerators and multiply the denominators, cancelling where possible

Convert any improper fractions to mixed numbers

$3\frac{1}{4} \times 2\frac{2}{3}$

$= \frac{13}{4} \times \frac{8}{3}$

$= \frac{13 \times \cancel{8}^{2}}{\cancel{4}_{1} \times 3}$

$= \frac{26}{3}$

$= 8\frac{2}{3}$

3 Dividing fractions

Convert any mixed numbers to improper fractions

Turn the second fraction 'upside down' and change ÷ to ×

Multiply the numerators and multiply the denominators, cancelling where possible

Convert any improper fractions to mixed numbers

$6\frac{1}{4} \div 1\frac{7}{8}$

$= \frac{\frac{25}{4}}{\frac{15}{8}}$

$= \frac{25}{4} \times \frac{8}{15}$

$= \frac{5}{1}\frac{\cancel{25} \times \cancel{8}^{2}}{\cancel{4} \times \cancel{15}_{3}}$

$= \frac{10}{3}$

$= 3\frac{1}{3}$

Worked example

Target grade 5

Work out $7\frac{1}{3} - 2\frac{3}{4}$ **(3 marks)**

$7\frac{1}{3} - 2\frac{3}{4} = \frac{22}{3} - \frac{11}{4}$

$= \frac{88}{12} - \frac{33}{12}$

$= \frac{55}{12}$

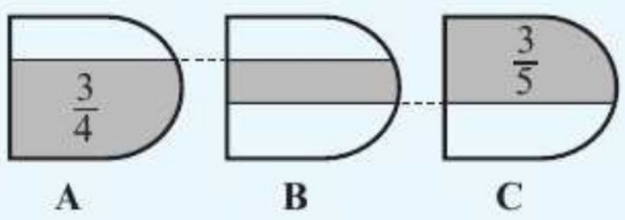
$= 4\frac{7}{12}$

Remember you need to be able to do this **without** a calculator.

Worked example

Target grade 5

The diagram shows three identical shapes.
$\frac{3}{4}$ of shape A is shaded and $\frac{3}{5}$ of shape C is shaded.



What fraction of shape B is shaded? **(3 marks)**

$1 - \frac{1}{4} - \frac{2}{5} = \frac{20}{20} - \frac{5}{20} - \frac{8}{20} = \frac{7}{20}$

Problem solved!

White area on A $= 1 - \frac{3}{4} = \frac{1}{4}$

White area on C $= 1 - \frac{3}{5} = \frac{2}{5}$

So shaded area on B $= 1 - \frac{1}{4} - \frac{2}{5}$

Examiners' report

On the non-calculator paper, students often lose marks on basic arithmetic. Learn your times tables, and check your working!

Real students have struggled with questions like this in recent exams – **be prepared!**

Now try this

Target grade 4

1 Work out

(a) $\frac{7}{10} - \frac{1}{4}$ **(2 marks)**

(b) $3\frac{4}{9} + 1\frac{5}{6}$ **(3 marks)**

Target grade 5

(c) $\frac{3}{4} \div \frac{5}{12}$ **(2 marks)**

(d) $1\frac{7}{8} \times 2\frac{2}{3}$ **(3 marks)**

Target grade 4

2 Three girls shared a full bottle of cola.
Karen drank $\frac{1}{4}$ of the bottle.
Rita drank $\frac{3}{10}$ of the bottle.
Megan drank the rest.

(a) Work out the fraction of the bottle of cola that Megan drank. **(3 marks)**

Rita drank 36 cl of cola.

(b) How much cola was in the full bottle? **(2 marks)**

Worked solution video

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Calculator skills 2

Hot Topic

You need to be able to work out basic percentages quickly using your calculator.

Calculating with fractions

You can enter fractions on your calculator using the ▣ key and the arrows.
For example, to work out $\frac{3}{8}$ of 52:

▣ 3 ▼ 8 ▶ × 5 2 =

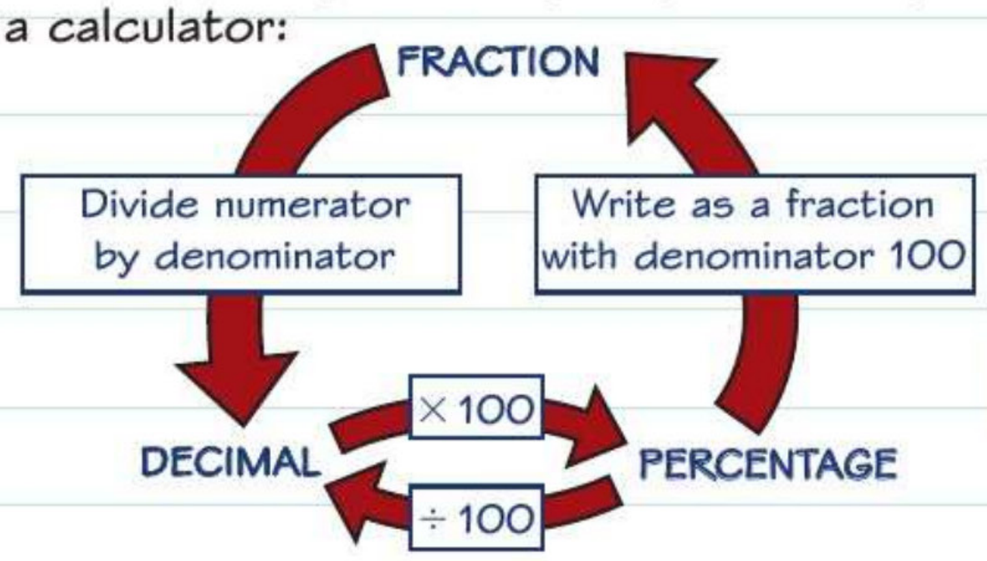
$\frac{3}{8} \times 52$

$\frac{39}{2}$

If you want to convert an answer on your calculator display from a fraction to a decimal you can use the S⇔D key.

Quick conversions

You can convert between fractions, decimals and percentages quickly using a calculator:



You can solve lots of percentage problems by working out what 1% represents. To find a percentage of an amount:

Divide the percentage by 100

↓

Multiply by the amount

Worked example

Target grade 4

A company gives 3.5% of its profits to charity. In 2011 the company made profits of £470 000. How much money did the company give to charity in 2011? **(2 marks)**

3.5 ÷ 100 = 0.035

0.035 × 470 000 = 16 450

The company gave £16 450 to charity.

Worked example

Target grade 4

In a year group of 85 students, 62 buy their lunch at school. Express 62 as a percentage of 85. Give your answer correct to 1 decimal place. **(2 marks)**

62 ÷ 85 = 0.72941...

0.72941... × 100 = 72.941...

72.9% of students buy their lunch in school.

To write one quantity as a percentage of another:

Divide the first quantity by the second quantity

↓

Multiply your answer by 100

Always write down at least five digits from your calculator display before rounding your answer.

Now try this

Target grade 4

1 Last year a university had 226 graduates. 195 of them found jobs immediately. Express 195 as a percentage of 226. Give your answer correct to 1 decimal place. **(2 marks)**

2 Aisha earns £2230 per month and spends 25% of it on rent. Joshua earns £1800 per month and spends 30% on rent. Who spends the greater amount on rent? **(3 marks)**

You need to show your working clearly to demonstrate your strategy.