

Y8 Maths - Autumn

Fractions

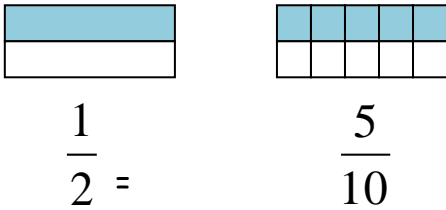
$$\frac{1}{2}$$

← numerator

← denominator

- This means 1 part out of every 2

Example 1



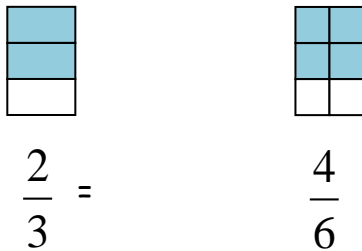
These fractions are all $\frac{1}{2}$

$$\frac{1}{2} \quad \frac{2}{4} \quad \frac{3}{6} \quad \frac{4}{8} \quad \frac{5}{10}$$

Example 2

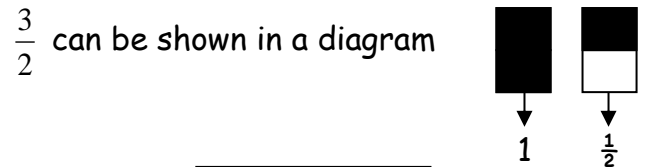
$$\frac{2}{3}$$

- This means 2 part out of every 3



Convert mixed numbers to improper fractions & vice versa

- An improper fraction is top heavy & can be changed into a mixed number



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

Improper fraction Mixed number

- A mixed number can be changed back into an improper fraction

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

$$2\frac{3}{4} = \frac{11}{4}$$

Fraction, decimal, percentage equivalents

LEARN THESE:

$$\frac{1}{4} = 0.25 = 25\%$$

$$\frac{1}{2} = 0.5 = 50\%$$

$$\frac{3}{4} = 0.75 = 75\%$$

Cancel a fraction to its lowest terms

See what number divides exactly into both the numerator and denominator

$$\text{e.g. } \frac{8}{12} \xrightarrow{-4} \frac{2}{3}$$

$$\text{e.g. } \frac{15}{40} \xrightarrow{-5} \frac{3}{8}$$

Order of operations

Bracket

Indices

Divide

Multiply

Add

Subtract

} Do these in the order they appear
} Do these in the order they appear

e.g. $3 + 4 \times 6 - 5 = 22$

↑
first

Fraction of quantity with calculator

$\frac{4}{5}$ means $\div 5 \times 4$

e.g. To find $\frac{4}{5}$ of £40

$$£40 \div 5 \times 4 = £40$$

Percentage of quantity with calculator

Change the percentage to a decimal

e.g. 8% of £240	$12 \frac{1}{2}$ % of 80kg
= 0.08×240	= 0.125×80
= <u>£19.20</u>	= <u>10kg</u>

$$\begin{aligned} &80\% \text{ of } 52 \text{ litres} \\ &= 0.8 \times 52 \\ &= \underline{41.6 \text{ litres}} \end{aligned}$$

Negative numbers

Remember the rules:

- When subtracting go down the number line
- When adding go up the number line

- $8 + - 2$ is the same as $8 - 2 = 6$
- $8 - + 2$ is the same as $8 - 2 = 6$
- $8 - - 2$ is the same as $8 + 2 = 10$

Equivalent fractions, decimals & percentages

- **Percentage to decimal to fraction**

$$27\% = 0.27 = \frac{27}{100}$$

$$7\% = 0.07 = \frac{7}{100}$$

$$70\% = 0.7 = \frac{70}{100} = \frac{7}{10}$$

- **Decimal to percentage to fraction**

$$0.3 = 30\% = \frac{3}{10}$$

$$0.03 = 3\% = \frac{3}{100}$$

$$0.39 = 39\% = \frac{39}{100}$$

- **Fraction to decimal to percentage**

$$\frac{4}{5} = \frac{80}{100} = 80\% = 0.8$$



Change to 100

$$\frac{3}{8} = 3 \div 8 = 0.375 = 37.5\%$$

Increase/Decrease by a percentage

- **To increase £12 by 5%**

$$= 1.05 \times £12 \quad (100\% + 5\% = 105\%)$$

OR

$$= £12 + 5\% \text{ of } £12$$

- **To decrease £50 by 15%**

$$= 0.85 \times £50 \quad (100\% - 15\% = 85\%)$$

OR

$$= £50 - 15\% \text{ of } £50$$

Calculate with fractions

- Add & subtract fractions**

~Make the denominators the same

e.g. $\frac{1}{5} + \frac{7}{10}$	$\frac{4}{5} - \frac{10}{15}$
$= \frac{2}{10} + \frac{7}{10}$	$= \frac{12}{15} - \frac{10}{15}$
$= \frac{9}{10}$	$= \frac{2}{15}$

- Multiply fractions**

~Write 7 as $\frac{7}{1}$

~Multiply numerators & denominators

e.g. $5 \times \frac{2}{3}$	$\frac{4}{5} \times \frac{2}{3}$
$= \frac{5}{1} \times \frac{2}{3}$	$= \frac{8}{15}$
$= \frac{10}{3} = 3\frac{1}{3}$	

- Divide fractions**

~Write 7 as $\frac{7}{1}$

~Flip numerator & denominator after ÷

~Multiply numerators & denominators

e.g. $5 \div \frac{2}{3}$	$\frac{4}{5} \div \frac{2}{3}$
$= \frac{5}{1} \times \frac{3}{2}$	$= \frac{4}{5} \times \frac{3}{2}$
$= \frac{15}{2} = 7\frac{1}{2}$	$= \frac{12}{10} = 1\frac{2}{10} = 1\frac{1}{5}$

- Calculate fraction of quantity**

To find $\frac{4}{5}$ of a quantity $\div 5 \times 4$

e.g. $\frac{4}{5}$ of £20 = $20 \div 5 \times 4 = \text{£}16$

To find the original quantity

If an amount has been increased by 5%

Original amount = new amount \div 1.05

If an amount has been decreased by 12%

Original amount = new amount \div 0.88

Repeated percentage change

To increase £12 by 5% per year for 4 years

= £12 \times 1.05⁴

To decrease £50 by 12% per year for 4 years

= £50 \times 0.88⁴