Decimals — Knowledge Organiser

Key Vocabulary

- decimal place
- decimal fraction
- recurring decimal
- equivalent fraction
- tenth
- sharing
- partitioning
- exchanging
- rounding to 3d.p.
- hundredth
- thousandth
- equal to
- remainder
- grouping

Place Value

Tens	Ones	tenths	hundredths	thousandths
	1 1 1	0.1 0.1 0.1 0.1	0.01 0.01	0.001 0.001 0.001 0.001 0.001 0.001

$3 + \frac{4}{10} + \frac{2}{100} + \frac{6}{1000}$ ← 3.426 → $3 + 0.4 + 0.02 + 0.006$

1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

Fractions to Decimals

$\frac{7}{20} = \frac{35}{100}$ or 0.35

$\frac{7}{25} = \frac{28}{100}$ or 0.28

$\frac{7}{50} = \frac{14}{100}$ or 0.14

$\frac{8}{200} = \frac{4}{100}$ or 0.04

When the denominator is not a factor or multiple of 100

$\frac{7}{8} = 7 \div 8$

	0	8	7	5
8	7	7 0	6 0	4 0

Dividing Decimals by Integers

8.12 ÷ 4

	2	0	3
4	8	1 (1)	2

6.93 ÷ 3 = 2.31

Ones	tenths	hundredths
1 1	0.1 0.1 0.1	0.01
1 1	0.1 0.1 0.1	0.01
1 1	0.1 0.1 0.1	0.01

Multiplying and Dividing by 10, 100 and 1000

Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths
			2	.	0	8	
		2	0	.	8		
			2	.	0	8	

× 10 ←, → ÷ 10

Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths
		4	3	.	5		
4	3	5	0	.			
		4	3	.	5		

× 100 ←, → ÷ 100

Thousands	Hundreds	Tens	Ones	.	tenths	hundredths	thousandths
			1	.	3	5	1
1	3	5	1	.			
			1	.	3	5	1

× 1000 ←, → ÷ 1000

Multiplying Decimals by Integers

	3	. 4	5
×			3
1	0	. 3	5
	1	1	

3.21 × 3 = 9.63

Ones	tenths	hundredths
1 1 1	0.1 0.1	0.01
1 1 1	0.1 0.1	0.01
1 1 1	0.1 0.1	0.01

Decimal Numbers as Fractions

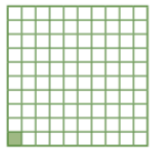
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$

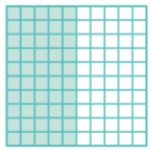
0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1

$\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ 1

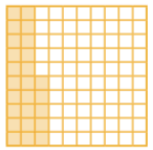
$\frac{1}{5}$ $\frac{2}{5}$ $\frac{1}{2}$ $\frac{3}{5}$ $\frac{4}{5}$



$\frac{1}{100} = 0.01$

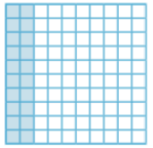


$\frac{50}{100} = \frac{1}{2} = 0.5$



$\frac{25}{100} = \frac{1}{4} = 0.25$

$\frac{75}{100} = \frac{3}{4} = 0.75$



$\frac{20}{100} = \frac{1}{5} = 0.2$

$\frac{1}{3} = 0.33$ $\frac{1}{8} = 0.125$ $\frac{1}{1000} = 0.001$

Fractions — Knowledge Organiser

Key Vocabulary

- numerator
- denominator
- proper fraction
- improper fraction
- factor
- highest common multiple
- lowest common multiple
- equivalents
- common numerator
- common denominator
- decimal equivalent
- simplify
- simplest form
- mixed number
- whole number
- mixed number

Simplify Fractions

$\frac{9}{12}$

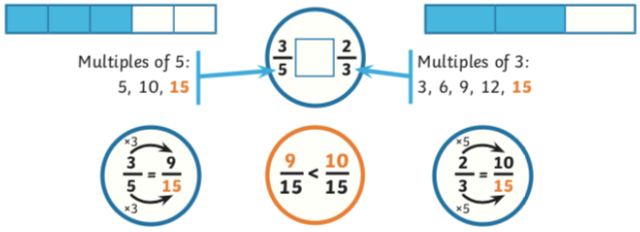
Factors of 9: 1, 3, 9

Factors of 12: 1, 2, 3, 4, 6, 12

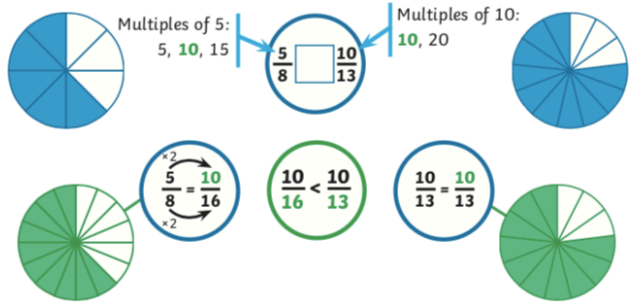
$\frac{9}{12} = \frac{3}{4}$ (÷3)

Compare and Order Fractions

Use the Common Denominator



Use the Common Numerator



Adding and Subtracting Proper Fractions

Same Denominators

$\frac{4}{7} + \frac{2}{7} = \frac{6}{7}$

$\frac{8}{11} - \frac{3}{11} = \frac{5}{11}$

Different Denominators

$\frac{2}{7} + \frac{3}{5}$

Multiples of 7: 7, 14, 21, 28, **35**
Multiples of 5: 5, 10, 15, 20, 25, 30, **35**

$\frac{2}{7} = \frac{10}{35}$, $\frac{3}{5} = \frac{21}{35}$

$\frac{10}{35} + \frac{21}{35} = \frac{31}{35}$

$\frac{9}{10} - \frac{1}{4}$

Multiples of 10: 10, **20**
Multiples of 4: 4, 8, 12, 16, **20**

$\frac{9}{10} = \frac{18}{20}$, $\frac{1}{4} = \frac{5}{20}$

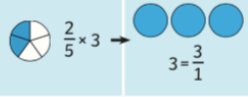
$\frac{18}{20} - \frac{5}{20} = \frac{13}{20}$

Multiplying Proper Fractions

Multiplying Fractions by Fractions

$\frac{1}{2} \times \frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

Multiplying Fractions by Whole Numbers



$\frac{2}{5} \times \frac{3}{1} = \frac{6}{5} = 1\frac{1}{5}$

Adding and Subtracting Mixed Numbers

Add or subtract the whole numbers and fractions separately.

$2\frac{2}{5} + 1\frac{3}{10}$

$2 + 1 = 3$

$\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10} = \frac{7}{10}$

$3 + \frac{7}{10} = 3\frac{7}{10}$

$2\frac{1}{2} - 1\frac{1}{4}$

$2 - 1 = 1$

$\frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$

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

Convert the mixed numbers to improper fractions.

$2\frac{2}{5} + 1\frac{3}{10}$ $2\frac{1}{2} - 1\frac{1}{4}$

$2\frac{2}{5} = \frac{12}{5}$ $1\frac{3}{10} = \frac{13}{10}$ $2\frac{1}{2} = \frac{5}{2}$ $1\frac{1}{4} = \frac{5}{4}$

$\frac{12}{5} + \frac{13}{10} = \frac{24}{10} + \frac{13}{10} = \frac{37}{10}$

$\frac{37}{10} = 3\frac{7}{10}$

$\frac{5}{2} - \frac{5}{4} = \frac{10}{4} - \frac{5}{4} = \frac{5}{4}$

$\frac{5}{4} = 1\frac{1}{4}$

Dividing Fractions by Whole Numbers

$\frac{2}{5} \div 2 = \frac{1}{5}$

Multiplication and division are the inverse of one another so:

÷ 2 is the same as × $\frac{1}{2}$

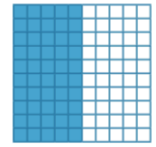
$\frac{2}{5} \times \frac{1}{2} = \frac{2}{10}$

Percentages — Knowledge Organiser

Key Vocabulary

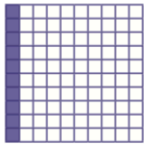
- per cent (%) = 'out of 100'
- percentage
- discount
- equivalent fraction
- equivalent decimal
- convert
- compare
- order
- the whole

Equivalent Fractions, Decimals and Percentages

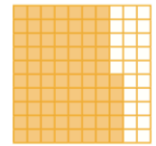


$\frac{50}{100} = \frac{1}{2} = 0.5 = 50\%$

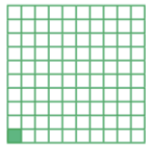
$\frac{25}{100} = \frac{1}{4} = 0.25 = 25\%$



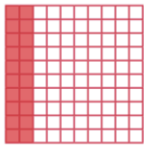
$\frac{10}{100} = \frac{1}{10} = 0.1 = 10\%$



$\frac{75}{100} = \frac{3}{4} = 0.75 = 75\%$



$\frac{1}{100} = 0.01 = 1\%$



$\frac{20}{100} = \frac{2}{10} = 0.2 = 20\%$

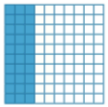
Fractions to Percentages

$\frac{15}{50} \xrightarrow{\times 2} \frac{30}{100} = 0.3 = 30\%$

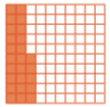
$\frac{60}{200} \xrightarrow{\div 2} \frac{30}{100} = 0.3 = 30\%$

Order Fractions, Decimals and Percentages

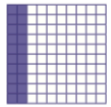
$\frac{3}{10} > 25\% > 0.2$



$\frac{30}{100} = 30\%$

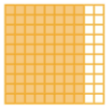


$\frac{25}{100} = 25\%$



$\frac{20}{100} = 20\%$

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



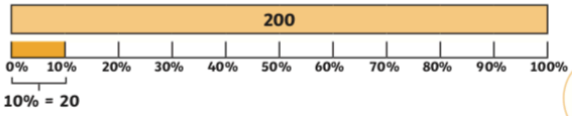
$\frac{80}{100} = 80\%$

$\frac{80}{100} = 80\%$

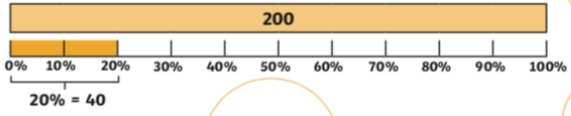
$\frac{80}{100} = 80\%$

Finding a Percentage of an Amount

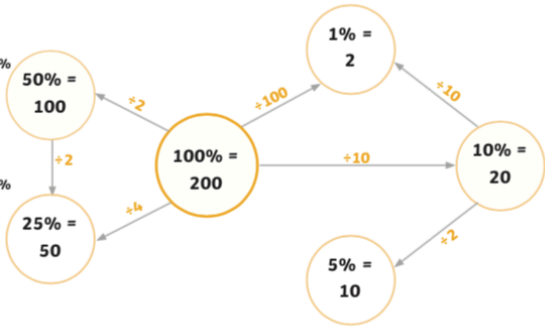
50% = $\frac{1}{2}$ so we can divide by 2	10% = $\frac{1}{10}$ so we can divide by 10	25% = $\frac{1}{4}$ so we can divide by 4	1% = $\frac{1}{100}$ so we can divide by 100

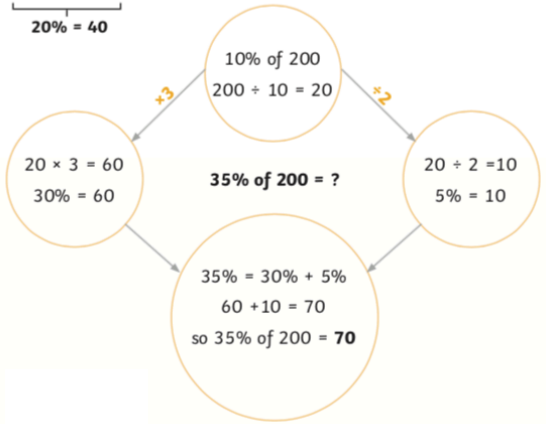


10% = 20



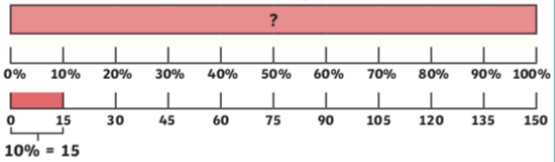
20% = 40





Percentages – Missing Values

Whole value (100%) of bar model = ?



10% = 15

We know 10% = 15 10% × 10 = 100% (the whole) so 15 × 10 = 150