

FOUR OPERATIONS WITH FRACTIONS

Number

Key Concepts

An **improper fraction** is when the numerator is larger than the denominator e.g. $\frac{20}{12}$

Converting from a mixed number into an improper fraction:

$$2 \frac{3}{5} = \frac{(2 \times 5) + 3}{5} = \frac{13}{5}$$

A **reciprocal** is the value that when multiplied by another gives the answer of 1.

Eg. $\frac{1}{8}$ is the reciprocal of 8.
 $\frac{2}{5}$ is the reciprocal of $\frac{5}{2}$

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

$$= \frac{5}{3} + \frac{9}{4} \quad \text{Convert into an improper fraction}$$

$$= \frac{20}{12} + \frac{27}{12} \quad \text{Find a common denominator}$$

$$= \frac{47}{12}$$

$$= 3 \frac{11}{12} \quad \text{Convert back into a mixed number}$$

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

$$= \frac{8}{3} - \frac{5}{4}$$

$$= \frac{32}{12} - \frac{15}{12}$$

$$= \frac{17}{12}$$

$$= 1 \frac{5}{12}$$

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

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

$$= \frac{44}{12}$$

$$= 3 \frac{8}{12}$$

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

$$= \frac{7}{3} \div \frac{8}{5} \quad \text{Find the reciprocal of the second fraction...}$$

$$= \frac{7}{3} \times \frac{5}{8} \quad \text{...and multiply}$$

$$= \frac{35}{24}$$

$$= 1 \frac{11}{24}$$

Examples



71, 73, 74

Key Words

Fraction
 Equivalent
 Reciprocal
 Numerator
 Denominator
 Improper/Top heavy
 Mixed number

Calculate:

1) $1 \frac{2}{3} + 2 \frac{3}{4}$

3) $3 \frac{1}{5} \times 1 \frac{2}{3}$

2) $3 \frac{3}{4} - 1 \frac{1}{3}$

4) $1 \frac{3}{5} \div 2 \frac{7}{10}$

What is the reciprocal of:

5) $\frac{2}{3}$

7) 0.75

6) 9

FRACTIONS, DECIMALS AND PERCENTAGES

Number

Key Concepts

A **fraction** is a numerical quantity that is not a whole number.

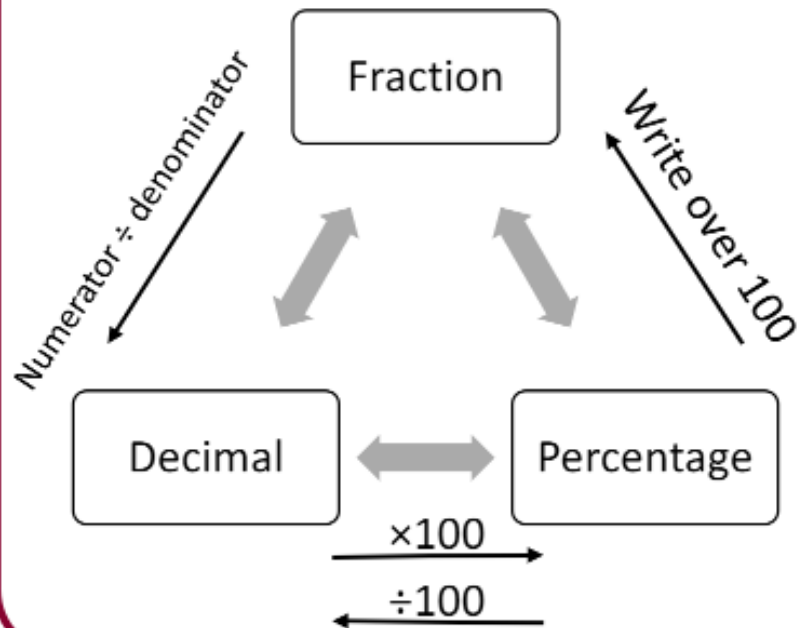
A **decimal** is a number written using a system of counting based on the number 10.

Thousands	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths
8	7	6	5	.	4	3	2

A **percentage** is an amount out of 100.

Examples

Order the following in ascending order:



$\frac{3}{5}$	62%	0.67	$\frac{7}{10}$	0.665
$\times 20 \downarrow$	\downarrow	$\times 100 \downarrow$	$\times 10 \downarrow$	$\times 100 \downarrow$
$\frac{60}{100}$			$\frac{70}{100}$	
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
60%	62%	67%	70%	66.5%
$\frac{3}{5}$	62%	0.665	0.67	$\frac{7}{10}$



84, 85

Key Words

Fraction
Decimal
Percentage
Division
Multiply

- Convert the following into percentages:
a) 0.4 b) 0.08 c) $\frac{6}{20}$ d) $\frac{3}{25}$
- Compare and order the following in ascending order:
 $\frac{3}{4}$ 76% 0.72 $\frac{4}{5}$ 0.706

FRACTIONS

Number

Key Concepts

$$\frac{x}{y} \rightarrow \begin{array}{l} \text{Numerator} \\ \text{Denominator} \end{array}$$

Equivalent fractions have the same value as one another.

Eg. $\frac{1}{4} = \frac{2}{8} = \frac{3}{12}$

Examples

Calculate $\frac{4}{5}$ of 65:

$$65 \div 5 = 13$$

$$13 \times 4 = 52$$

Divide by the denominator

Multiply this by the numerator

$\frac{4}{5}$ of a number is 52, what is the original number?

$$52 \div 4 = 13$$

$$13 \times 5 = 65$$

Divide by the numerator

Multiply this by the denominator

Order these fractions in ascending order:

$\frac{2}{5}$	$\frac{1}{2}$	$\frac{5}{6}$	$\frac{7}{15}$
$\downarrow \times 6$	$\downarrow \times 15$	$\downarrow \times 5$	$\downarrow \times 2$
$\frac{12}{30}$	$\frac{15}{30}$	$\frac{25}{30}$	$\frac{14}{30}$
①	③	④	②

To be able to compare fractions we must have a **common denominator**



25, 70, 72

Key Words

Fraction
Equivalent
Reciprocal
Numerator
Denominator

1) Calculate $\frac{2}{7}$ of 56.

2) $\frac{3}{8}$ of a number is 36, what is the original number?

3) Order the following in ascending order: $\frac{2}{3}$ $\frac{5}{6}$ $\frac{3}{8}$ $\frac{7}{12}$

INTEGERS, ROUNDING AND PLACE VALUE

Number

Key Concepts

Digits are the individual components of a number.

Integers are whole numbers.

Rounding rules:

A value of 5 to 9 rounds the number up.

A value of 0 to 4 keeps the number the same.

Examples

Order the following numbers starting with the smallest:

1) 5, -3, 4, 7, -2
-3, -2, 4, 5, 7

2) 0.067 0.6 0.56 0.65 0.605
 Rewrite 0.067, 0.600, 0.560, 0.650, 0.605
0.067 0.56 0.6 0.605 0.65

Round 3.527 to:

a) 1 decimal place

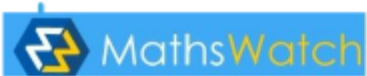
$$3.5\overset{\cdot}{2}7 \rightarrow 3.5$$

b) 2 decimal places

$$3.52\overset{\cdot}{7} \rightarrow 3.53$$

c) 1 significant figure

$$3.\overset{\cdot}{5}27 \rightarrow 4$$



2, 3, 32, 90

Key Words

Integer Even
 Digit Odd
 Decimal place
 Significant figures

A) Order the following numbers starting with the smallest:

1) 6, -2, 0, -5, 3 2) 0.72, 0.7, 0.072, 0.07, 0.702

B) Round the following numbers to the given degree of accuracy

1) 14.1732 (1 d.p.) 2) 0.0568 (2 d.p.) 3) 3418 (1 S.F)

STANDARD FORM Number

Key Concepts

We use standard form to write a very large or a very small number in scientific form.

Must be $\times 10^b$
 b is an integer

$$a \times 10^b$$

Must be $1 \leq a < 10$



83

Write the following in **standard form**:

- 1) $3000 = 3 \times 10^3$
- 2) $4580000 = 4.58 \times 10^6$
- 3) $0.0006 = 6 \times 10^{-4}$
- 4) $0.00845 = 8.45 \times 10^{-3}$

Examples

Calculate the following, write your answer in **standard form**:

1) $(3 \times 10^3) \times (5 \times 10^2)$

$$\left. \begin{array}{l} 3 \times 5 = 15 \\ 10^3 \times 10^2 = 10^5 \end{array} \right\} \begin{array}{l} 15 \times 10^5 \\ = 1.5 \times 10^6 \end{array}$$

2) $(8 \times 10^7) \div (16 \times 10^3)$

$$\left. \begin{array}{l} 8 \div 16 = 0.5 \\ 10^7 \div 10^3 = 10^4 \end{array} \right\} \begin{array}{l} 0.5 \times 10^4 \\ = 5 \times 10^3 \end{array}$$

Key Words

Standard form
Base 10

Links

Science

A) Write the following in standard form:

- 1) 74 000 2) 1 042 000 3) 0.009 4) 0.000 001 24

B) Work out:

- 1) $(5 \times 10^2) \times (2 \times 10^5)$ 2) $(4 \times 10^3) \times (3 \times 10^8)$
 3) $(8 \times 10^6) \div (2 \times 10^5)$ 4) $(4.8 \times 10^2) \div (3 \times 10^4)$