Year 8 Knowledge Organiser

UNDERSTANDING PERCENTAGES and FRACTIONS

Key Concept

FDP equivalence

F	D	P
$\frac{1}{100}$	0.01	1%
$\frac{1}{10}$	0.1	10%
$\frac{1}{5}$	0.2	20%
$\frac{1}{4}$	0.25	25%
$\frac{1}{2}$	0.5	50%
$\frac{3}{4}$	0.75	75%

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Clip Numbers

52-55, 73-83, 97

Key Words

Fraction: A fraction is made up of a numerator (top) and a denominator (bottom).

Integer: Whole number.

Ascending Order: Place in order, smallest to largest.

Descending Order: Place in order, largest to smallest.

Tip

- A larger denominator does not mean a larger fraction.
- To find equivalent fractions multiply/divide the numerator and denominator by the same number.

Examples

Make the denominators the same.

$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{4}$
$\frac{6}{8}$ (4)	$\frac{3}{8}$ (2)	$\frac{4}{8}$ (3)	$\frac{7}{8}$ (5)	$\frac{2}{8}$ (1)
$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$

Convert them all to decimals.

56%	$\frac{3}{4}$	0.871	23%	$\frac{6}{7}$
0.56	0.75	0.871	0.23	0.857...
2	3	5	1	4
23%	56%	$\frac{3}{4}$	$\frac{6}{7}$	0.871

Questions

1) Place these lists in ascending order.

a) $\frac{2}{3}, \frac{3}{4}, \frac{5}{6}, \frac{7}{12}$ b) $\frac{3}{7}, \frac{1}{2}, 0.49, 0.2$ c) $\frac{7}{32}, 25\%, 0.05, \frac{29}{100}$

ANSWERS: 1) $\frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$ 2) $0.2, \frac{3}{7}, 0.49, \frac{1}{2}$ 3) $0.05, \frac{7}{32}, 25\%, \frac{29}{100}$

Year 8 Knowledge Organiser
FRACTIONS & PERCENTAGES AS OPERATORS

Key Concept

Multipliers

Find 15%	$\times 0.15$
Increase by 15%	$\times 1.15$
Decrease by 15%	$\times 0.85$

For **reverse percentage** problems you can divide by the multiplier to find the original amount.

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Clip Numbers

77, 84-89, 96

Key Words

Percentage: Is a proportion that shows a number as parts per hundred.
Fraction: A fraction is made up of a numerator (top) and a denominator (bottom).
Multiplier: A quantity by which a given number is to be multiplied.

Tip

There is a % function on your calculator.

To find 25% of 14 on a calculator:
2, 5, SHIFT, (, ×, 1, 4, =

Examples

Non-Calculator

$$\frac{3}{4} \text{ of } 32 = 32 \div 4 \times 3 = 24$$

$16\% \text{ of } 240$

$10\% = 24$
$5\% = 12$
$1\% = 2.4$

$= 24 + 12 + 2.4$
$= 38.4$

Calculator

Find **32%** of 54.60 = **0.32** × 54.60 = 17.472

Increase 45 by **12%** = 45 × **1.12** = 50.4

Questions

1) Find these fractions of amounts:

a) $\frac{1}{3}$ of 15 a) $\frac{1}{5}$ of 65 a) $\frac{2}{7}$ of 14 a) $\frac{4}{9}$ of 45

2) a) 35% of 140 b) 21% of 360 c) Increase 60 by 15%

ANSWERS: 1) a) 5 b) 13 c) 4 d) 20 2) a) 49 b) 75.6 c) 69

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FRACTIONS, DECIMALS AND PERCENTAGES

Key Concepts

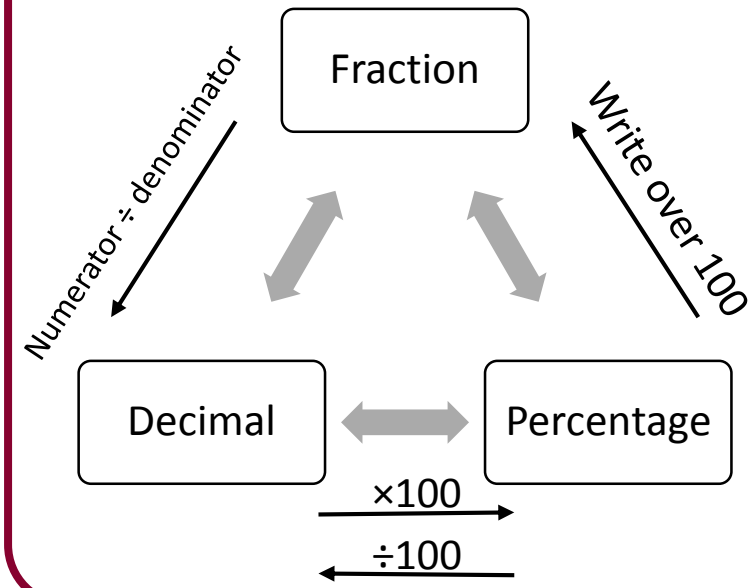
A **fraction** is a numerical quantity that is not a whole number.

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

×20 → $\frac{60}{100}$ → 60%

62% → 62%

×100 → 67%

×10 → $\frac{70}{100}$ → 70%

×100 → 66.5%

$\frac{3}{5}$ 62% 0.665 0.67 $\frac{7}{10}$

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73-76, 82-83

Key Words

Fraction
Decimal
Percentage
Division
Multiply

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

ANSWERS 1a) 40% b) 8% c) 30% d) 12% 2) 0.706 0.72 $\frac{3}{4}$ 76% $\frac{4}{5}$

Year 8 Knowledge Organiser
FRACTIONS

Key Concepts

$\frac{x}{y}$ → Numerator / Denominator

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:

$65 \div 5 = 13$ ← Divide by the denominator

$13 \times 4 = 52$ ← Multiply this by the numerator

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

$52 \div 4 = 13$ ← Divide by the numerator

$13 \times 5 = 65$ ← Multiply this by the denominator

Order these fractions in ascending order:

$\frac{2}{5}$ ×6 → $\frac{12}{30}$ (1)

$\frac{1}{2}$ ×15 → $\frac{15}{30}$ (3)

$\frac{5}{6}$ ×5 → $\frac{25}{30}$ (4)

$\frac{7}{15}$ ×2 → $\frac{14}{30}$ (2)

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

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61, 63-70

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: $\frac{2}{3}$ $\frac{5}{6}$ $\frac{3}{8}$ $\frac{7}{12}$

ANSWERS 1) 16 2) 96 3) $\frac{3}{8}$ $\frac{7}{12}$ $\frac{2}{3}$ $\frac{5}{6}$

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4 OPERATIONS WITH FRACTIONS

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 $\frac{5}{2}$

Examples

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

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

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

$= \frac{47}{12}$

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

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

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

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

$= \frac{17}{12}$

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

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

$= \frac{4}{3} \times \frac{11}{4}$ — ×, ×

$= \frac{44}{12}$

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

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

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

$= \frac{7}{3} \times \frac{5}{8}$ …and multiply

$= \frac{35}{24}$

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

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61, 63-70

Key Words

Fraction
Equivalent
Reciprocal
Numerator
Denominator
Improper/Top heavy
Mixed number

Calculate:

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

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

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

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

What is the reciprocal of:

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

6) 9

7) 0.75

ANSWERS A 1) $4\frac{5}{12}$ 2) $2\frac{5}{12}$ 3) $5\frac{1}{3}$ 4) $\frac{16}{27}$ 5) $\frac{3}{2}$ 6) $\frac{1}{9}$ 7) $\frac{4}{3}$

Year 8 Knowledge Organiser
PERCENTAGES

Key Concepts

Calculating percentages of an amount without a calculator:

10% = divide the value by 10
1% = divide the value by 100

Calculating percentages of an amount with a calculator:

Amount × percentage as a decimal

Calculating percentage increase/decrease:

Amount × (1 ± percentage as a decimal)

Calculating a percentage – non calculator:

Calculate 32% of 500g:

10% → 500 ÷ 10 = 50
30% → 50 × 3 = 150
1% → 500 ÷ 100 = 5
2% → 5 × 2 = 10

32% = 150 + 10 = 160g

Calculating a percentage – calculator:

Calculate 32% of 500g:

$Value \times (percentage \div 100)$
$= 500 \times 0.32$
= 160g

Percentage change:

Examples

A dress is reduced in price by 35% from £80. What is it's **new price**?

$Value \times (1 - percentage\ as\ a\ decimal)$
$= 80 \times (1 - 0.35)$
= £52

A house price appreciates by 8% in a year. It originally costs £120,000, what is the **new value** of the house?

$Value \times (1 + percentage\ as\ a\ decimal)$
$= 120{,}000 \times (1 + 0.08)$
= £129,600

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84-90

Key Words
Percent
Increase/decrease
Appreciate
Depreciate
Multiplier
Divide

1) Write the following as a decimal multiplier: a) 45% b) 3% c) 2.7%
2) Calculate 43% of 600 without using a calculator
3) Calculate 72% of 450 using a calculator
4a) Decrease £500 by 6%
b) Increase 65g by 24%
c) Increase 70m by 8.5%

ANSWERS 1a) 0.45 b) 0.03 c) 0.027 2) 258 3) 324 4a) £470 b) 80.6g c) 75.95m

Year 8 Knowledge Organiser
PERCENTAGES AND INTEREST

Key Concepts

Calculating percentages of an amount without a calculator:

10% = divide the value by 10
1% = divide the value by 100

Per annum is often used in monetary questions meaning **per year.**

Depreciation means that the value of something is going down or reducing.

Examples

Simple interest:

Joe invest £400 into a bank account that pays 3% **simple interest** per annum.
Calculate how much money will be in the bank account after 4 years.

3% = £4 × 3
= £12
4 years = £12 × 4
Interest = £48
Total in bank account = £400 + £48
= £448

Compound interest:

Joe invest £400 into a bank account that pays 3% **compound interest** per annum.
Calculate how much money will be in the bank account after 4 years.

$Value \times (1 \pm percentage\ as\ a\ decimal)^{years}$
$= 400 \times (1 + 0.03)^4$
$= 400 \times (1.03)^4$
= £450.20

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93-94

Key Words
Percent
Depreciate
Interest
Annum
Simple
Compound
Multiplier

1) Calculate a) 32% of 48 b) 18% of 26
2) Kane invests £350 into a bank account that pays out simple interest of 6%. How much will be in the bank account after 3 years?
3) Jane invests £670 into a bank account that pays out 4% compound interest per annum. How much will be in the bank account after 2 years?

ANSWERS A 1a) 15.36 b) 4.68 2) £413 3) £724.67