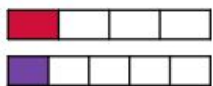


# Year 10 Spring 2 Knowledge Organiser

## Unit 22: Fractions, Decimals and percentages

There are many ways to **compare** the sizes of fractions. Some ways will tell you simply **which one** is larger, others by **how much**.

Comparing numerators or denominators



Denominators:  $\frac{1}{5} < \frac{1}{4}$  so  $\frac{3}{5} < \frac{3}{4}$

Writing in decimal form:

$$\frac{3}{5} = 0.6 = 0.60$$

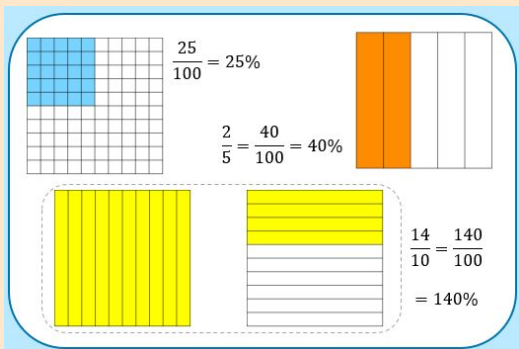
$$\frac{3}{4} = 0.75$$

Writing with a common denominator:

$$\frac{7}{15} = \frac{28}{60}$$

$$\frac{11}{20} = \frac{33}{60}$$

Percentages are another way of writing numbers as fractions with a denominator of 100.



- You can use mental methods to find percentages of amounts.

To find 50%, divide by 2.

To find 25%, divide by 4.

To find 10%, divide by 10.

To find 1%, divide by 100.

- You can find a percentage of an amount by multiplying the quantity by an equivalent decimal or fraction.

To find 47% of an amount, multiply the amount by  $\frac{47}{100}$  or 0.47

### Key Terms:

**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.

**Percentage:** Out of one hundred.

**Decimal:** A decimal is a fraction written in a special form e.g. 0.6.

### You need to be able to:

- Convert between simple fractions, decimals and percentages.
- Convert between fractions and recurring decimals and percentages.
- Compare and order fractions, decimals and percentages by converting.

### Calculations with fractions

- Add or subtract fractions with the same denominator by adding the numerators.
- Add or subtract fractions with different denominators by rewriting them with a common denominator first.
- To multiply fractions, multiply the numerators and then the denominators, and cancel any common factors.
- To divide by a fraction, multiply by its reciprocal.

### Convert Fractions, Decimals and Percents

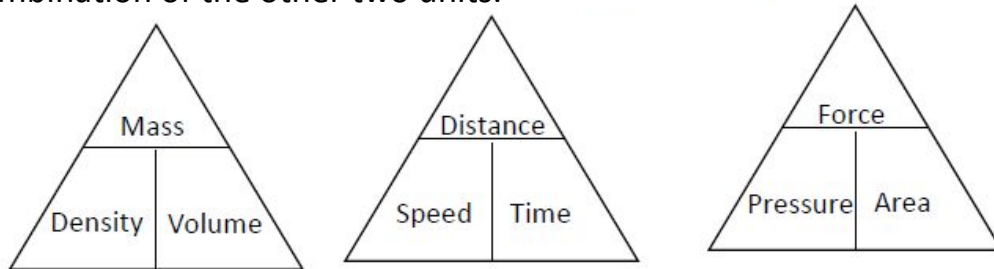


# Year 10 Spring 2 Knowledge Organiser

## Unit 23: Compound Measures

### Compound Measures

Triangles can be used to work out values of compound measures. The value in the bottom left does not have its own unit of measurement, but is measured using a combination of the other two units.

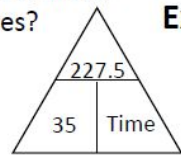


To find the top quantity, multiply the bottom two measures. To find either of the bottom two quantities, divide the top measure by the other bottom measure.

A car is travelling at a speed of 35mph and is scheduled to travel 227.5 miles. How long will this take in hours and minutes?

$$\text{Time} = \frac{\text{distance}}{\text{speed}}$$

$$\text{Time} = \frac{227.5}{35} = 6.5 \text{ hours} = 6 \text{ hours } 30 \text{ minutes}$$

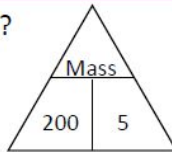


### Examples

A 5m<sup>3</sup> box has a density of 200g/m<sup>3</sup>. What is the mass of the box?

$$\text{Mass} = \text{Density} \times \text{Volume}$$

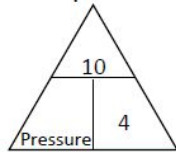
$$\text{Mass} = 200 \times 5 = 1000g$$



10N of force are applied to a block with area 4m<sup>2</sup>. Calculate the pressure.

$$\text{Pressure} = \frac{\text{force}}{\text{area}}$$

$$\text{Pressure} = \frac{10}{4} = 2.5N/m^2$$



## Unit 25: Maps and Bearings

### Unit Rule

A ratio where the first number is a one. The general form of a unit ratio is 1: n. e.g. The ratio 5: 20 can be written as the unit ratio 1: 4.

### Scales

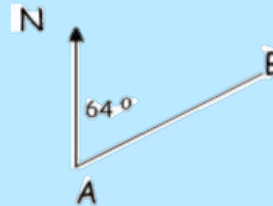
The scale of a map helps us calculate the size and dimensions of features shown on a map AND the distances between different points. Scale is the ratio between real life distances and how many times it has been shrunk to fit it on the map.

**If a map has a scale of 1:50 000 then something that measures 4cm on the map measures 4cm x 50 000 in real life!**

### Bearings

Bearings are used to measure direction from one place to another. To be accurate with bearings you must:

1. Measure from North as 0°
2. Measure clockwise
3. Your answer must have 3 digits (eg. 047°)



The drawing on the left shows that the bearing of B from A is 064°

# Year 10 Spring 2 Knowledge Organiser

## Unit 23: Vectors

### Column Vector

A vector describes movement, and contains information about the distance AND the direction.

$\begin{pmatrix} x \\ y \end{pmatrix}$ 
 → + move right  
    - move left  
 ↘ + move up  
    - move down

### Examples

Adding vectors:

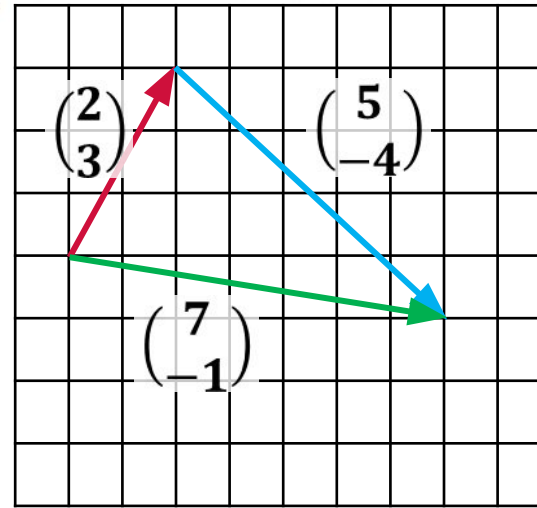
$$\begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} 5 \\ -4 \end{pmatrix} = \begin{pmatrix} 2 + 5 \\ 3 + -4 \end{pmatrix} = \begin{pmatrix} 7 \\ -1 \end{pmatrix}$$

Subtracting vectors:

$$\begin{pmatrix} 3 \\ 9 \end{pmatrix} - \begin{pmatrix} 2 \\ -3 \end{pmatrix} = \begin{pmatrix} 3 - 2 \\ 9 - -3 \end{pmatrix} = \begin{pmatrix} 1 \\ 12 \end{pmatrix}$$

Vectors and scalar multipliers:

$$2 \begin{pmatrix} 8 \\ -3 \end{pmatrix} = \begin{pmatrix} 2 \times 8 \\ 2 \times -3 \end{pmatrix} = \begin{pmatrix} 16 \\ -6 \end{pmatrix}$$



### Key Terms:

**Magnitude:** The length of a vector. Can be calculated using Pythagoras

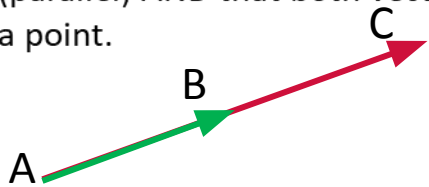
**Vector Notation:** A vector can be written in 3 ways:  $\underline{a}$  or  $\overrightarrow{AB}$  or  $\begin{pmatrix} x \\ y \end{pmatrix}$

**Equal vectors:** If two vectors have the same magnitude and direction, they are equal, regardless of where they are positioned in 2D space.

**Parallel:** Two lines are parallel if, when they are continued infinitely in both directions they will never meet. This means they run in the exact same direction.

### Collinear Vectors

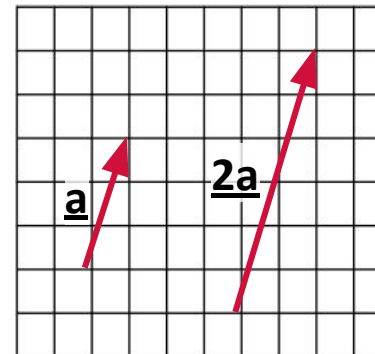
Collinear vectors are vectors that are on the same line. To show that two vectors are collinear, show that one vector is a multiple of the other (parallel) AND that both vectors share a point.





Vector  $\overrightarrow{AC}$  and vector  $\overrightarrow{AB}$  are parallel and both of them share point A so they lie on a straight line.

### Parallel Vectors



Parallel vectors are multiples of each other. Example:  $2a+b$  and  $4a+2b$  are parallel as they are multiples of each other.



# Year 10 Spring 2 Knowledge Organiser

<p><b>Quiz 1</b></p>	<p><b>Quiz 2</b></p>	<p><b>Quiz 3</b></p>
<p><b>Quiz 4</b></p>	<p><b>Quiz 5</b></p>	<p>Rate your performance on:</p> <p></p> <p></p>

# Year 10 Spring 2 Knowledge Organiser

<p><b>Quiz 1</b></p>	<p><b>Quiz 2</b></p>	<p><b>Quiz 3</b></p>
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# Year 10 Spring 2 Knowledge Organiser

Quiz 1




Quiz 2




Quiz 3

Quiz 4

Quiz 5

Rate your performance on:

# Year 10 Spring 2 Knowledge Organiser

Quiz 1


Quiz 2


Quiz 3

Quiz 4

Quiz 5

Rate your performance on:





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Quiz 1


Quiz 2


Quiz 3

Quiz 4

Quiz 5



Rate your performance on:







# Year 10 Spring 2 Knowledge Organiser

<p><b>Quiz 1</b></p>	<p><b>Quiz 2</b></p>	<p><b>Quiz 3</b></p>
<p><b>Quiz 4</b></p>	<p><b>Quiz 5</b></p>	<p>Rate your performance on:</p> <p></p> <p></p>