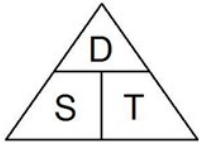## Speed, distance and time calculations

James runs at a speed of 4 miles an hour, he runs for 2 hours 15 minutes, how far does he run?

(Convert time to decimals)

2h15 = 2.25 hours

D = S x T

D = 4 x 2.5

= 10 miles

Metric/imperial conversions

5 miles ≈ 8 kilometres

1 gallon ≈ 4.5 litres

2.2 pounds ≈ 1 kilogram

1 inch ≈ 2.5 centimetres

Metric conversions

1km = 1000m

1m = 100cm

1cm = 10mm

Year 10 foundation topic 14
Multiplicative reasoning

What careers would use these skills?

Finance, car sales, scientists, sports analyst, formula 1 engineers, athletes.

Decimal multipliers

These are used to find a percentage of an amount, a percentage increase and a percentage decrease.

To find a percentage of an amount, convert the percentage to a decimal and multiply it by the amount.

To find a percentage increase

$$\frac{100 + \% \text{ increase}}{100}$$

then multiply it by the amount

To find a percentage decrease

$$\frac{100 - \% \text{ decrease}}{100}$$

then multiply it by the amount

Percentage to decimal conversion

To convert from a percentage to a decimal, divide by 100.

Eg.20% = 0.2

5% = 0.05

12.5% = 0.125

Calculate percentage change

$$\frac{\text{Difference}}{\text{Original}} \times 100\%$$

Eg.
A games console is bought for £200 and sold for £250. What is the percentage change?
The difference is 250 — 200 = 50
% change = $\frac{50}{200}$ x 100

= 25% increase

Repeated percentage change (use decimal multipliers)

Compound interest = Interest paid on the original amount and the accumulated interest

Example A bank pays 5% compound interest a year. Bob invests £3000. How much will he have after 7 years.

3000 x 1.05^7 = £4221.30

Depreciation = a decrease in value of an item over time

Example A car costs £19,000, it depreciates in value by 10% a year, how much is it worth after 6 years?

19000 x 0.9^6 = £10097.38 (remember to round money to 2 decimal places)

Growth and decay problems

Exponential growth = When we multiply a number repeatedly by the same number (≠ 1) , resulting in the number increasing by the same proportion each time. The original amount can grow very quickly in exponential growth.
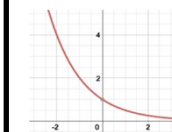
Exponential decay = When we multiply a number repeatedly by the same number (0 < x < 1), resulting in the number decreasing by the same proportion each time. The amount can decrease very quickly.