



Year 7 higher topic 6

Decimals

What careers would use these skills?

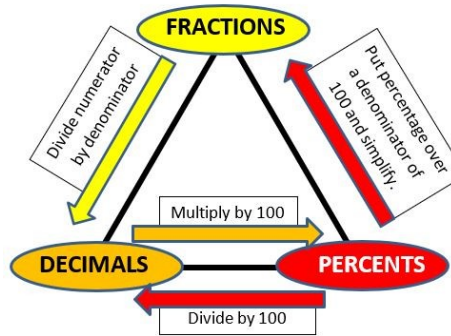
Urban planner, supermarket manager, Formula 1 analyst, sports analyst, professional athlete, anthropologist, journalist, investment banker, accountant, farmer, hairdresser, beautician, police officer, traffic enforcer

Adding and subtracting decimals

ALWAYS ensure that the decimal point is lined up– use place holders to make the numbers have the same amount of digits

$$\begin{array}{r} 1.70 \\ 5.73 \\ \hline 7.43 \\ 1 \end{array} + \begin{array}{r} 2.35 \\ 1.74 \\ \hline 1.61 \\ 2 \end{array}$$

Fractions, decimals, percentages (conversion)



Multiplying decimals

$$6 \times 3.7$$

Ignore the decimal point and multiply...

$$6 \times 37 = 222$$

Count how many decimal places were in the question and put the decimal point back in...

$$6 \times 3.7 = 22.2$$

$$\begin{array}{r} 4.65 \text{ (2 decimal places)} \\ \times 5.3 \text{ (1 decimal place)} \\ \hline 1395 \\ 2350 \\ \hline 24.645 \text{ (3 decimal places)} \end{array}$$

Ordering decimals

- Set up a table with the **decimal point in the same place** for each number.
- Put in each number.
- Fill in the **empty squares with zeros**.
- Compare using the **first column** on the left
- If the digits are equal move to the **next column** to the right until one number wins.

If you want **ascending** order you always pick the smallest first

If you want **descending** order you always pick the largest first

Ones	Decimal Point	Tenths	Hundredths	Thousandths
1	.	5	0	6
1	.	5	6	0
0	.	8	0	0

Rounding decimals

To round a decimal to one decimal place (1d.p.) look at the digit in the second decimal place. If the digit is less than 5, round down. If the digit is 5 or more, round up.

3248 rounded to 2 d.p.

$$\begin{array}{c} 3.248 \\ \uparrow \\ 3.24 \end{array} \quad \begin{array}{c} 3.248 \\ \uparrow \\ 3.25 \end{array} \rightarrow 3.25$$

2nd dp 3.24 Look at the next digit. 8 rounds up - go to 3.25

3.248 rounded to 1 d.p.

$$\begin{array}{c} 3.248 \\ \uparrow \\ 3.2 \end{array} \quad \begin{array}{c} 3.248 \\ \uparrow \\ 3.2 \end{array} \rightarrow 3.2$$

1st dp 3.2 Look at the next digit. 4 stays down - stay at 3.2.

Dividing decimals

To divide decimals by a whole number, ignore the decimal point and divide as if they were whole numbers.

$$\begin{array}{r} 23 \text{ quotient (answer)} \\ \text{divisor } 3 \overline{) 6.9} \text{ dividend} \end{array}$$

Insert the decimal point in the answer exactly above the decimal point in the dividend.

Short Division
(for smaller numbers)

$$13.84 \div 4 =$$

$$\begin{array}{r} 3.46 \\ 4 \overline{) 13.84} \end{array}$$

Long Division
(for larger numbers)

$$343.46 \div 26 =$$

$$\begin{array}{r} 13.21 \\ 26 \overline{) 343.46} \\ \underline{-26} \\ 83 \\ \underline{-78} \\ 54 \\ \underline{-52} \\ 26 \end{array}$$

To divide by a decimal, convert the divisor to a whole number so the number can be divided as shown above.

Multiply the divisor and dividend by 10 (by moving the decimal place to the right) until the divisor is a whole number.

$$235.375 \div 0.25 = 23537.5 \div 25 = 941.5$$

Calculating percentages

To find 10% of an amount, $\div 10$, to find 1% of an amount, $\div 100$

To calculate a percentage of an amount, write the percent as a fraction and multiply by the amount.

$$\frac{\text{percent}}{100} \times \text{amount} =$$

$$11\% \text{ of } 40 = \frac{11}{100} \times 40 = \frac{440}{100} = 4.4$$

Sometimes, it is easier to simplify the fraction before multiplying

$$25\% \text{ of } 160 = \frac{25}{100} \times 160 = \frac{1}{4} \times 160 = \frac{160}{4} = 40$$

$$200\% \text{ of } 35 = \frac{200}{100} \times 35 = \frac{2}{1} \times 35 = \frac{70}{1} = 70$$

Using a calculator to find a percentage (e.g. 25% of 40) you must first divide the **percentage** by 100: $25 \div 100 = 0.25$. You can then multiply this answer by the whole to determine the part: $0.25 \times 40 = 10$

To calculate the cost of an item when a percentage discount (or markdown) is offered, write the percent as a fraction, multiply by the price, then subtract that amount from the original price.

$$\text{discount} = \left(\frac{\text{percent}}{100} \times \text{price} \right) \quad \text{cost} = \text{price} - \text{discount}$$

In a 15% off everything sale, how much would a pair of \$20.00 shoes cost?

$$\text{Discount} = \frac{15}{100} \times 20 = \frac{300}{100} = \$3.00$$

$$\text{Cost} = \$20.00 - \$3.00 = \$17.00$$

The \$20.00 shoes will cost \$17.00.

Proportion - We can use proportions to solve questions involving percentage. The trick is to put what we know into this form:

What is 25% of 160? Multiply across the known corners, then divide by the third number. So $25\% \text{ of } 160 = 40$

$$\begin{array}{c} \text{Part} \times 25 \\ 160 \times 100 \text{ divide} \end{array}$$

$$\text{Part} = (160 \times 25) / 100 = 4000 / 100 = 40$$

$$\frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100}$$