



CLIFTON HALL
SCHOOL · EDINBURGH

Numeracy across the Curriculum

**A guide for all teachers, pupils and
parents.**

Table of Contents

Introduction	3
Rounding	4
Significant Figures	5
Addition and Subtraction	6
Multiplication and Division	7
Negative Numbers	8
Order of Operations (BIDMAS)	9
Fractions	10
Percentages	13
Proportion	16
Ratio	17
Co-ordinates	19
Line Graphs	20
Bar Graphs	21
Histograms	22
Pie Charts	23
Probability	26
Mean, median, mode and range	27
Time Calculations	28
Units	30
Useful mathematical terms	31

Introduction

The Scottish education system is currently undergoing a period of great reform with the introduction of A Curriculum for Excellence. One of the fundamental philosophies of A Curriculum for Excellence is moving away from separate, compartmentalised subjects. Instead links between subjects will be forged to produce a rich, interrelated and coherent curriculum.

With this in mind, A Curriculum for Excellence places great emphasis on the three key areas of Numeracy, Literacy and Health & Wellbeing. These skills should not be seen as subject specific but should be incorporated into lessons across the curriculum.

"All teachers have responsibility for promoting the development of Numeracy."

Building the Curriculum 5

"Numeracy is not only a subject of Mathematics; it is also a life skill which permeates and supports all areas of learning, allowing young people access to the wider curriculum."

Curriculum for Excellence: Numeracy Across Learning

For our pupils at Clifton Hall to gain the maximum benefit from being exposed to Numeracy across the curriculum, the Numeracy topics must be taught in a unified manner. Clifton Hall has therefore produced this booklet for all pupils, parents and staff containing the school's recommended methods for approaching the various Numeracy topics. This should ensure consistency both across the curriculum at school and at home.

Rounding

This includes rounding to:

- The nearest 10
- The nearest 100
- The nearest 1000
- The nearest whole number
- A given number of decimal places

NOTE: We always round up for 5 or above.

Examples:

1. 73 to the nearest 10 is 70
2. 387 to the nearest 10 is 390
3. 344.5 to
 - i. the nearest whole number is 345
 - ii. the nearest 10 is 340
 - iii. the nearest 100 is 300
4. 3.14159 to
 - i. 3 decimal places is 3.142
 - ii. 2 decimal places is 3.14

Significant Figures

Numbers rounded to a given amount of significant figures come up in everyday life.

Example: Suppose 26,351 tickets were sold for a pop concert. The box office would need to use this exact number for their records. Other people may not need such a precise figure.

The band's website might report that 26,400 tickets were sold. This is 26,351 rounded to 3 significant figures (3 s.f.) A newspaper headline might say that 26,000 people attended (rounding to 2 s.f.)

Note that just as in ordinary rounding, you round up for 5 or above.

We can round very small numbers to a given amount of significant figures too.

Example: Round 0.004 827 to a) 1 s.f., b) 2 s.f. and c) 3 s.f.

0.004 827 to 1 s.f. is 0.005

0.004 827 to 2 s.f. is 0.0048

0.004 827 to 3 s.f. is 0.00483

Addition and Subtraction

We...

- promote alternative mental methods where appropriate.
- always line up the decimal points when writing out sums.
- do subtraction using decomposition (as a written method).
- check by addition.

We do not "borrow and pay back", we exchange 10.

WORKED EXAMPLES:

1) Mental strategies for subtraction

- **Counting on:**
e.g. to solve $52 - 38$, count on from 38 until you reach 52.
- **Breaking up the number being subtracted:**
e.g. to solve $52 - 38$, subtract 30 then subtract 8.

2) Lining up the decimal points

The solution to $34 + 47.69$ would be written as follows:

$$47.69$$

$$+34.00$$

$$\underline{\underline{81.69}}$$

1

3) Subtraction using decomposition

$$3 \overset{7}{\cancel{8}} 12$$

$$- \underline{48}$$

$$\underline{\underline{334}}$$

$$\overset{4}{\cancel{5}} \overset{9}{0} 10$$

$$- \underline{63}$$

$$\underline{\underline{437}}$$

Multiplication and Division

Multiplication:

- Always line up the decimal points.
- Work from right to left.
- When multiplying decimals, ignore the decimal point(s) at first. Once the answer is calculated, count the number of digits after the decimal point(s) in the question then insert the decimal point this number of digits from the right in the answer.

Examples:

Basic multiplication

$$\begin{array}{r} 34 \cdot 2 \\ \times 7 \\ \hline 239 \cdot 4 \\ \cdot 1 \end{array}$$

Long multiplication

$$\begin{array}{r} 342 \\ \times 17 \\ \hline 2394 \\ 3420 \\ \hline 6814 \\ \cdot 1 \end{array}$$

Multiply by the 7 first
Multiply by the 10
Add the two numbers together.

Division:

Examples: $48 \div 2$

$$2 \overline{)48} \begin{array}{l} 24 \\ \hline \end{array}$$

$15 \div 8$

$$8 \overline{)15} \begin{array}{l} 1 \text{ r } 7 \\ \hline \end{array}$$

$36 \cdot 84 \div 2$

$$2 \overline{)3684} \begin{array}{l} 1842 \\ \hline \end{array}$$

Note:

- Always work from left to right
- Put the decimal point in as you go along
- This is the sum "36·84 divided by 2" or "2 into 36·84". It is not "2 divided by 36·84"

Long division is not on the curriculum (without a calculator) in Maths until Advanced Higher.

Negative Numbers

A number line can be useful here.

Examples:

- $-6 + 10 = 4$ (when you add, you go up the number line)
- $-6 - 2 = -8$ (when you subtract, you go down the number line)

- $-6 - (-4) = -6 + 4 = -2$ (Subtracting a negative has the same effect as adding)

- $-6 + (-4) = -6 - 4 = -10$ (Adding a negative has the same effect as subtracting)

- $(-6) \times (-4) = +24$ (Negative \times Negative = Positive)
- $(-6) \times 4 = -24$ (Negative \times Positive = Negative)
- $6 \times (-4) = -24$ (Positive \times Negative = Negative)
- $6 \times 4 = 24$ (Positive \times Positive = Positive)

NOTE: If you square a negative number the answer is positive.

E.g. $(-3)^2 = 9$ since $(-3) \times (-3) = 9$. If you type -3^2 into a calculator without the brackets, the calculator will square the 3, get 9 and then put the negative sign in front of it, giving the answer -9. When squaring a negative number on the calculator, you must put the brackets in. This is because most calculators are programmed to use BIDMAS (see next page).

Order of Operations (BIDMAS)

BIDMAS is a mnemonic we use in Maths to enable pupils to know the correct sequence for carrying out mathematical operations. Scientific calculators are programmed to use BIDMAS.

- | | | | |
|----|------------------------|----------|---|
| 1. | <u>B</u> rackets | () | |
| 2. | <u>I</u> ndices | 3^2 | |
| 3. | <u>D</u> ivision | \div | <i>Division and multiplication should be done in the order they appear in the question.</i> |
| | <u>M</u> ultiplication | \times | |
| 4. | <u>A</u> ddition | $+$ | <i>The same applies for addition and subtraction</i> |
| | <u>S</u> ubtraction | $-$ | |

Worked Examples:

$$\begin{aligned} 1) \quad & 2 + 5 \times 6 \\ & = 2 + 30 \\ & = \underline{32} \end{aligned}$$

$$\begin{aligned} 2) \quad & (2 + 4) \times 5 \\ & = 6 \quad \times 5 \\ & = \underline{30} \end{aligned}$$

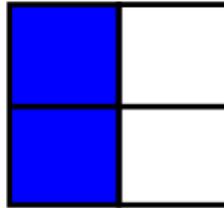
$$\begin{aligned} 3) \quad & 5 + 70 \div 10 \times (1 + 2)^2 - 1 \\ & = 5 + 70 \div 10 \times (3)^2 - 1 \\ & = 5 + 70 \div 10 \times 9 - 1 \\ & = 5 + 7 \times 9 - 1 \\ & = 5 + 63 - 1 \\ & = 68 - 1 \\ & = \underline{67} \end{aligned}$$

Fractions

Equivalent Fractions

An equivalent fraction is one which represents the same amount.

Example: In the following picture you could say $\frac{1}{2}$ or $\frac{2}{4}$ of the shape is shaded. $\frac{1}{2}$ is equivalent to $\frac{2}{4}$.



You can find equivalent fractions by either multiplying or dividing the top and bottom of the fraction by the same number

Examples: Find some equivalent fractions to $\frac{10}{20}$

Dividing top and bottom by 10 gives $\frac{1}{2}$, which is the simplest answer.

Other possible equivalent fractions include:

$\frac{2}{4}$ (dividing top and bottom by 5),

$\frac{5}{10}$ (dividing top and bottom by 2),

$\frac{20}{40}$ (multiplying top and bottom by 2)

$\frac{50}{100}$ (multiplying top and bottom by 5) etc.

Equivalent Decimals and Percentages

It is useful to know the following equivalent decimals and percentages

Fraction	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{2}{3}$
Equivalent percentage	10%	20%	25%	50%	75%	$33\frac{1}{3}\%$	$66\frac{2}{3}\%$
Equivalent decimal	0.10	0.20	0.25	0.50	0.75	0.3333 or . 0.3	0.6667 or . 0.6

Fractions of an Amount

Examples:

1) Find $\frac{1}{5}$ of 70.

$$70 \div 5 = 14 \text{ so } \frac{1}{5} \text{ of } 70 = 14$$

2) Find $\frac{3}{4}$ of 184

$$\text{First find } \frac{1}{4} \text{ of } 184. \quad 184 \div 4 = 46$$

$$\text{Then multiply } 46 \text{ by } 3. \quad 46 \times 3 = 138$$

$$\text{So } \frac{3}{4} \text{ of } 184 = 138.$$

Adding and Subtracting Fractions

You can only add and subtract fractions once the denominators are equal. This can be done by moving to equivalent fractions.

Examples:

$$\begin{aligned} 1) \quad & \frac{1}{5} + \frac{2}{5} \\ & = \frac{3}{5} \end{aligned}$$

$$\begin{aligned} 2) \quad & \frac{1}{5} + \frac{1}{2} \\ & = \frac{2}{10} + \frac{5}{10} \\ & = \frac{7}{10} \end{aligned}$$

$$\begin{aligned} 3) \quad & \frac{1}{2} - \frac{1}{4} \\ & = \frac{2}{4} - \frac{1}{4} \\ & = \frac{1}{4} \end{aligned}$$

Multiplying and Dividing Fractions

To multiply fractions, multiply the top numbers together (numerators) then multiply the bottom numbers together (denominators). Always give the answer in its simplest form.

To divide fractions, turn the second fraction upside down and then multiply instead.

Examples:

$$\begin{aligned} 1) \quad & \frac{2}{5} \times \frac{5}{7} \\ & = \frac{10}{35} \\ & = \frac{2}{7} \end{aligned}$$

$$\begin{aligned} 2) \quad & \frac{3}{4} \div \frac{2}{5} \\ & = \frac{3}{4} \times \frac{5}{2} \\ & = \frac{15}{8} \\ & = 1\frac{7}{8} \end{aligned}$$

Percentages

NOTE: we do not use the percentage button on the calculator because of inconsistency among models. Using the percentage button also promotes a lack of understanding.

Percentage of an amount

Example: Calculate 35% of £300

Non-calculator method

$$25\% \text{ of } \pounds 300 = \pounds 300 \div 4 = \pounds 75$$

$$10\% \text{ of } \pounds 300 = \pounds 300 \div 10 = \pounds 30$$

$$35\% \text{ of } \pounds 300 = \pounds 75 + \pounds 30 = \pounds 105$$

Calculator method

$$\begin{aligned} & \frac{35}{100} \times 300 \\ & = 0.35 \times 300 \\ & = \pounds 105 \end{aligned}$$

NOTE: In non-calculator questions, to find...

- 10%, you divide by 10
- 20% you divide by 5
- 25% you divide by 4
- 50% you divide by 2
- 75%, you divide by 4 and then multiply by 3
- $33\frac{1}{3}\%$, you divide by 3
- $66\frac{2}{3}\%$, you divide by 3 then multiply by 2
- 1%, you divide by 100
- Multiples of 1%, find 1% then multiply by the number necessary e.g. 3%, find 1% then multiply by 3.
- Multiples of 10%, find 10% then multiply by the number necessary e.g. 70%, find 10% then multiply by 7.

Converting a fraction to a percentage

Example: Express three fifths as a percentage

Non-calculator method

$$\frac{3}{5} = \frac{3 \times 20}{5 \times 20} = \frac{60}{100} = 60\%$$

Calculator method

$$\frac{3}{5} \times 100 = 60\%$$

Percentage profit and loss

Examples:

- 1) A car is bought for £5,000 and is sold for £3,500. What is the percentage loss?

$$\text{Loss} = \text{£}5,000 - \text{£}3,500 = \text{£}1,500.$$

$$\text{Percentage loss} = \frac{\text{Loss}}{\text{Original}} \times 100 = \frac{1500}{5000} \times 100 = 30\%$$

- 2) A house is bought for £175,000 and is later sold for £201,250. Express the profit as a percentage.

$$\text{Profit} = \text{£}201,250 - \text{£}175,000 = \text{£}26,250.$$

$$\text{Percentage profit} = \frac{\text{Profit}}{\text{Original}} \times 100 = \frac{26250}{175000} \times 100 = 15\%$$

Percentage increase and decrease

Examples:

1) Increase £450 by 15%.

$$\text{Increase} = 15\% \text{ of } 450 = \frac{15}{100} \times 450 = £62.50$$

$$\text{New total} = £450 + £62.50 = £512.50.$$

2) Decrease 640kg by 20%.

$$\text{Decrease} = 20\% \text{ of } 640\text{kg} = \frac{20}{100} \times 640 = 128\text{kg}$$

$$\text{New total} = 640\text{kg} - 128\text{kg} = 512\text{kg}.$$

Extra - A more sophisticated method

1) Increase £450 by 15%.

$$£450 = 100\%. \text{ Increasing by } 15\% \text{ gives } 100\% + 15\% = 115\%.$$

To write this as a decimal, we divide by 100. $115 \div 100 = 1.15$

$1.15 \times £450 = £512.50$, giving the same answer as the easier method above.

2) Decrease 640kg by 20%.

$$640\text{kg} = 100\%. \text{ Decreasing by } 20\% \text{ gives } 100\% - 20\% = 80\%.$$

To write this as a decimal, we divide by 100. $80 \div 100 = 0.8$

$0.8 \times 640\text{kg} = 512\text{kg}$, giving the same answer as the easier method above.

Proportion

Direct Unitary Method

Example: If 5 bananas cost 80 pence, what will 3 bananas cost?

Solution:

Number of Bananas	Cost in pence
5	80
1	$80 \div 5 = 16$
3	$16 \times 3 = 48$

Therefore 3 bananas will cost 48p.

Inverse Unitary Method

Example: If it takes three men 4 hours to build a garden wall, how long would it take 2 men?

Solution:

Number of men	Time in hours
3	4
1	$4 \times 3 = 12$
2	$12 \div 2 = 6$

It would take 2 men 6 hours to build the wall.

Ratio

Simplifying Ratios

Note: If there are any units involved, these must be the same on both sides of the ratio before it can be simplified.

Examples: Simplify the following ratios

$$\begin{aligned} \text{a) } 6 : 8 \\ = 3 : 4 \end{aligned}$$

$$\begin{aligned} \text{b) } 40\text{cm} : 2\text{m} \\ = 40\text{cm} : 200\text{cm} \\ = 1 \text{ cm} : 5\text{cm} \end{aligned}$$

Unitary Ratios

These always take the format of 1:x

Examples: Simplify the following ratios

$$\begin{aligned} \text{a) } 3:24 \\ = 1 : 8 \end{aligned}$$

$$\begin{aligned} \text{b) } 2:9 \\ = 1 : 4.5 \end{aligned}$$

Sharing in a Given Ratio

Example: Share £45 in the ratio 2:7

Solution:

$$\text{Total number of shares} = 2 + 7 = 9$$

$$\text{Value of 1 share} = £45 \div 9 = £5$$

$$\text{1st share} = 2 \times £5 = £10$$

$$\text{2}^{\text{nd}} \text{ share} = 7 \times £5 = £35$$

$$\text{Check: } £10 + £35 = £45$$

Equivalent Ratios

Example: Purple paint is made by mixing red and blue paint in the ratio 2:3.
How many tins of blue paint would you need if you had 8 tins of red paint?

Solution: red paint : blue paint

$$\begin{array}{rcc} \times 4 & 2 & : & 3 \\ & 8 & : & 12 \end{array}$$

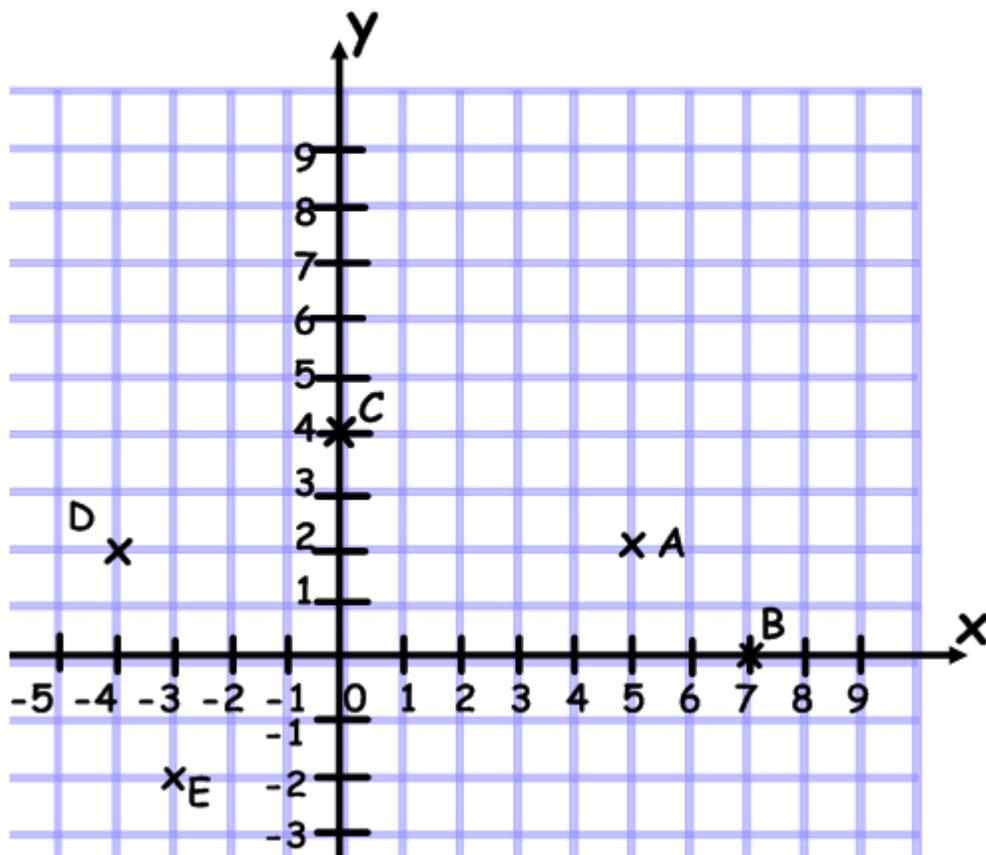
Therefore 12 tins of blue paint will be needed.

Co-ordinates

Note - To avoid errors and promote best practice we recommend:

- Diagrams should be drawn in pencil
- Number the lines not the spaces.
- Axes must have markers so position of numbers can be clearly seen
- Axes should be labeled with an x and a y.
- Co-ordinate points should be marked on the grid with a cross not a dot.

Worked Example: Plot the points $A(5,2)$, $B(7,0)$, $C(0,4)$, $D(-4,2)$, $E(-3,-2)$



Line Graphs

Key points on best practice for drawing line graphs:

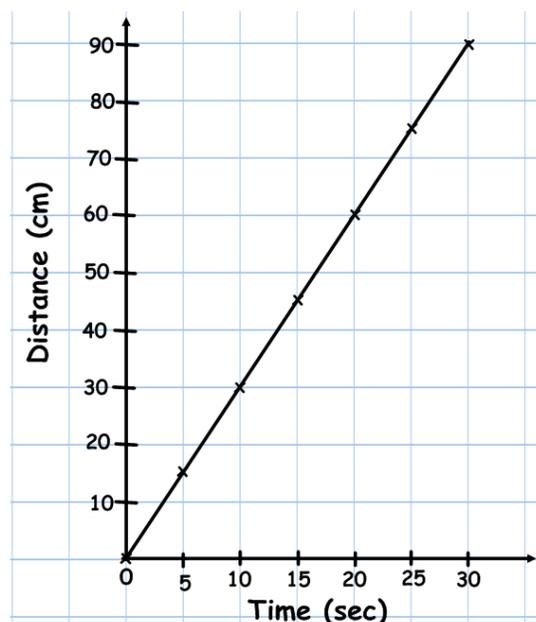
- Use a sharpened pencil and a ruler
- Choose an appropriate scale for the axes to fit the paper
- Label the axes
- Give the graph a title
- Number the lines not the spaces
- Put markers on the axes so the position of each number is clear
- Plot the points neatly using a cross not a dot

Worked Example:

The distance a gas travels over time has been recorded in the table below. Show this information in a line graph.

Time (s)	0	5	10	15	20	25	30
Distance (cm)	0	15	30	45	60	75	90

Distance a gas travels



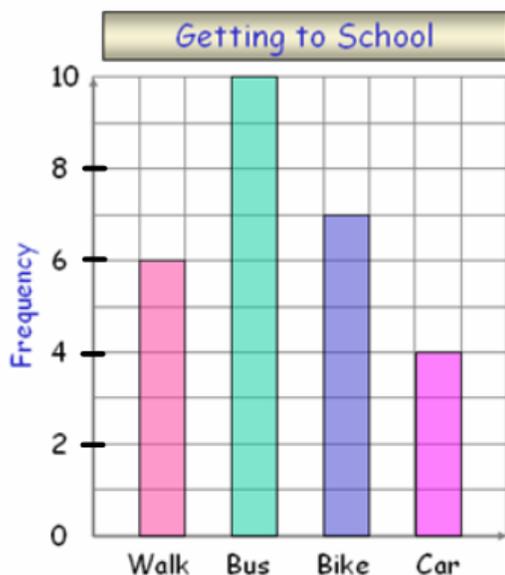
Bar Graphs

Bar graphs are used to display frequency data. They can be used to display discrete numerical information e.g. shoe size as well as written information e.g. eye colour. For continuous numerical data, histograms are used instead (see next page).

Key points on best practice for drawing bar graphs:

- Use a pencil
- Give the graph a title
- Label the axes
- Label the bars in the centre of each bar
- Each bar has an equal width
- Mark the frequency (up the side) on the lines not the spaces
- The frequency axis must have markers so the position of the numbers can be clearly seen
- **Make sure there are equal spaces between the bars.**

Examples:

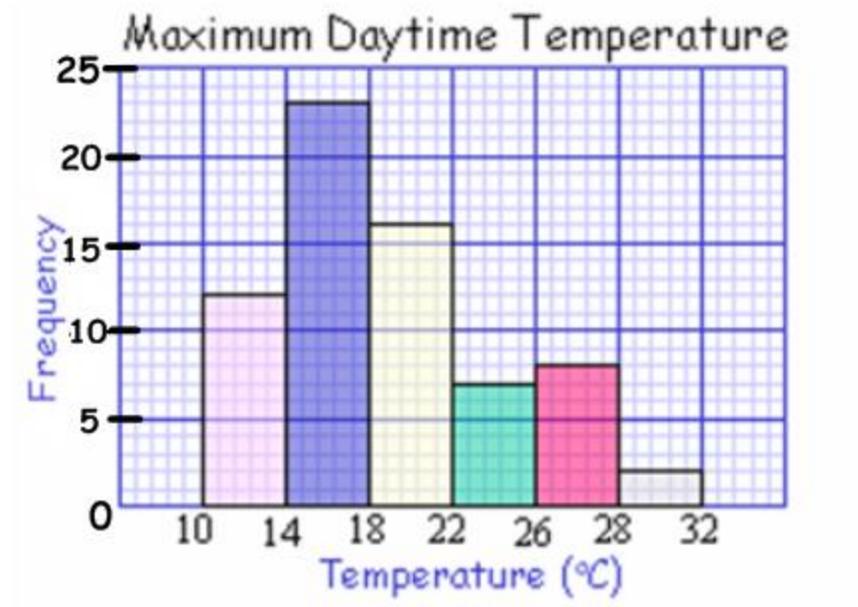


Histograms

Key points on best practice for drawing histograms:

- Use a pencil
- Give the graph a title
- Label the axes
- Label the bars in the left hand side of each bar
- Mark the frequency (up the side) on the lines not the spaces
- The frequency axis must have markers so the position of the numbers can be clearly seen
- **Make sure there are NO spaces between the bars.**

Example:



Pie Charts

Interpreting pie charts

Example 1: A group of 200 children were asked to choose their favourite colour from the list green, red, blue and yellow. The results are shown in the pie chart below. How many children chose each colour?

There are 10 equal segments in the pie chart.
1 segment = $200 \div 10 = 20$ children

Green = 4 segments = $4 \times 20 = 80$ children

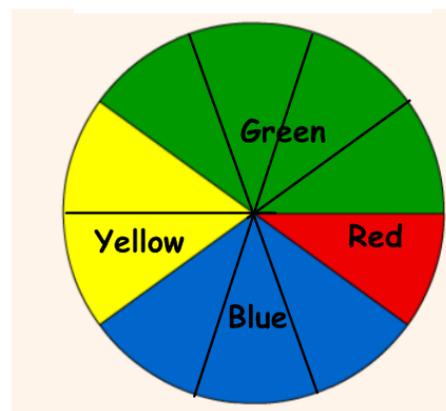
Red = 1 segment = 20 children

Blue = 3 segments = $3 \times 20 = 60$ children

Yellow = 2 segments = $2 \times 20 = 40$ children

Check: $80 + 20 + 60 + 40 = 200$ children

Favourite Colour



Example 2: In a survey, 300 people were asked to indicate which one of five sports they liked best. The information is displayed in the pie chart. Calculate the number of people who chose each sport.

Football: 33% of 300 = $0.33 \times 300 = 99$

Rugby: 24% of 300 = $0.24 \times 300 = 72$

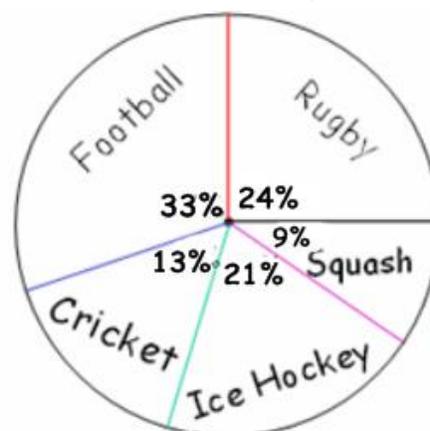
Squash: 9% of 300 = $0.09 \times 300 = 27$

Ice Hockey: 21% of 300 = $0.21 \times 300 = 63$

Cricket: 13% of 300 = $0.13 \times 300 = 39$

Check: $99 + 72 + 27 + 63 + 39 = 300$ people

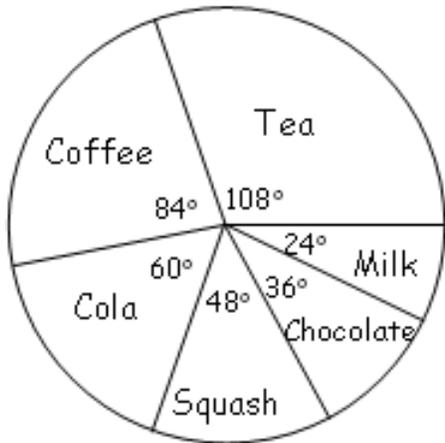
Favourite Sport



Note: A calculator would be allowed for this question. For pie charts with easier percentages, use the non-calculator method shown on page 13.

Example 3: A drinks machine dispensed 540 drinks on a Monday. The information is displayed in the pie chart. Calculate the number of each drink sold.

Drinks sold on a Monday



$$\text{Tea sold} = \frac{108}{360} \times 540 = 162$$

$$\text{Coffee sold} = \frac{84}{360} \times 540 = 126$$

$$\text{Cola sold} = \frac{60}{360} \times 540 = 90$$

$$\text{Squash sold} = \frac{48}{360} \times 540 = 72$$

$$\text{Chocolate sold} = \frac{36}{360} \times 540 = 54$$

$$\text{Milk sold} = \frac{24}{360} \times 540 = 36$$

Check: $162 + 126 + 90 + 72 + 54 + 36 = 540$ drinks sold

Constructing pie charts

Key points on best practice for drawing pie charts:

- Use a pencil
- Label all the slices and include a key if necessary
- Give the pie chart a title
- Remember there are 360° in a circle. If your calculated angles should add to 359° due to rounding, always add the missing one degree to the largest slice (therefore having the least influence on the results).

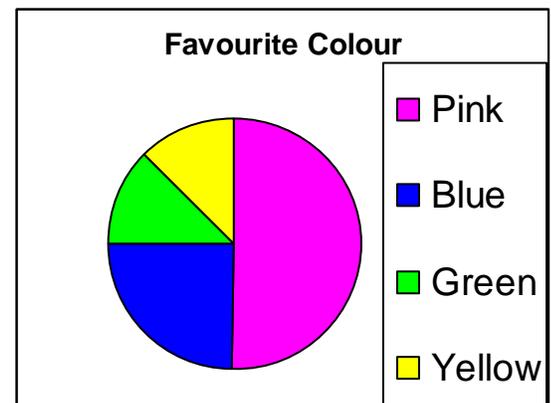
Example 1: 32 children were asked to pick their favourite colour. $\frac{1}{2}$ said pink, $\frac{1}{4}$ said blue, $\frac{1}{8}$ said green and $\frac{1}{8}$ said yellow. Draw a pie chart to illustrate the data.

$$\text{Pink: } \frac{1}{2} \text{ of } 360^\circ = 180^\circ$$

$$\text{Blue: } \frac{1}{4} \text{ of } 360^\circ = 90^\circ$$

$$\text{Green and Yellow: } \frac{1}{8} \text{ of } 360^\circ = 45^\circ$$

Check: $180 + 90 + 45 + 45 = 360^\circ$



Example 2: 40% of pupils travel to school by bus, 20% by car, 35% walk and 5% cycle. Draw a pie chart to illustrate the data.

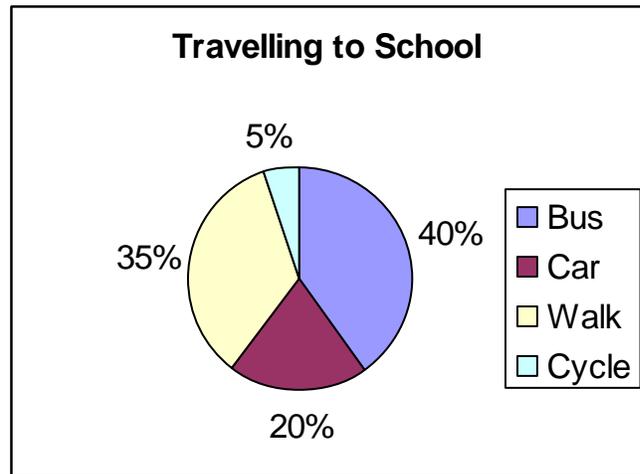
Calculate the angle for each sector, using the fact that 10% of 360 = 36

$$\begin{aligned} \text{Bus} &= 40\% \text{ of } 360^\circ \\ &= 4 \times 10\% = 4 \times 36^\circ = \underline{144^\circ} \end{aligned}$$

$$\begin{aligned} \text{Car} &= 20\% \text{ of } 360^\circ \\ &= 2 \times 10\% = 2 \times 36^\circ = \underline{72^\circ} \end{aligned}$$

$$\begin{aligned} \text{Walk} &= 35\% \text{ of } 360^\circ \\ &= 3 \cdot 5 \times 10\% = 3 \cdot 5 \times 36^\circ = \underline{126^\circ} \end{aligned}$$

$$\begin{aligned} \text{Cycle} &= 5 \text{ of } 360^\circ \\ &= \frac{1}{2} \times 10\% = \frac{1}{2} \times 36^\circ = \underline{18^\circ} \end{aligned}$$



(Check: $144 + 72 + 126 + 18 = 360^\circ$)

Note: For more complicated percentages, use the calculator method shown on page 12.

Example 3: The information in the table shows sales of ice-cream from an ice-cream van one Saturday afternoon in the summer. Display the information in a pie chart.

Ice-cream Sales	
Vanilla	13
Banana	22
Chocolate	28
Strawberry	57

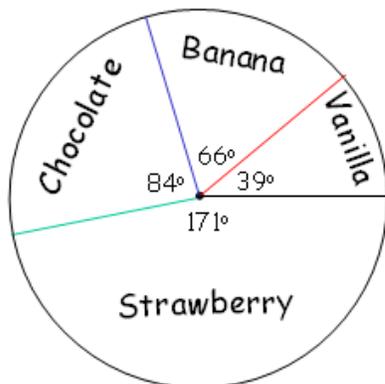
$$\text{Vanilla} = \frac{13}{120} \times 360^\circ = 39^\circ$$

$$\text{Banana} = \frac{22}{120} \times 360^\circ = 66^\circ$$

$$\text{Chocolate} = \frac{28}{120} \times 360^\circ = 84^\circ$$

$$\text{Strawberry} = \frac{57}{120} \times 360^\circ = 171^\circ$$

Check: $39 + 66 + 84 + 171 = 360^\circ$



Ice cream flavours sold

Probability

Probability is the study of chance. We look at the likelihood of various possible outcomes.

Probability is always calculated as a fraction using the formula:

$$P(\text{event}) = \frac{\text{number of favourable outcomes}}{\text{Total number of possible outcomes}}$$



Examples: An ordinary die is thrown.

1) Probability of throwing a 2 is $P(2) = \frac{1}{6}$. (There is one 2 out of 6 possible outcomes.)

2) Probability of throwing a 4 or less is

$$\begin{aligned} P(\leq 4) &= \frac{4}{6} \\ &= \frac{2}{3} \end{aligned}$$

There are four favourable outcomes out of six possible outcomes.

Note: Fractions are always given in their simplest form.

Mean, Median, Mode and Range

Worked Example 1:

The results of a survey of the number of movies pupils downloaded from the internet last week were:

1, 2, 2, 2, 2, 3, 3, 3, 4

$$\text{Mean} = \frac{\text{All the numbers added together}}{9} = \frac{18}{9} = 2$$

Median = middle number in the **ordered** list* = 2

Mode = most common number = 2

Range = highest number - lowest number = 4 - 1 = 3

* If there is an even number of data entries, then the median is halfway between the middle two.

Worked Example 2:

The results of a survey of the number of songs pupils downloaded from the internet last week were:

3, 3, 4, 4, 4, 5, 6, 6, 7, 8

$$\text{Mean} = \frac{\text{All the numbers added together}}{10} = \frac{50}{10} = 5$$

$$\text{Median} = \frac{4+5}{2} = \frac{9}{2} = 4.5 \quad (\text{middle falls between the 4 and the 5})$$

Mode = most common number = 4

Range = highest number - lowest number = 8 - 3 = 5

Time Calculations

Converting between the 12 and 24 hour clock

Note:

- 12 noon = 1200 hours
- 12 midnight = 0000 hours
- 12 hour clock times must have a.m. or p.m.
- 24 hour clock times always have four digits

Examples:

Quarter past one in the afternoon is written as 1:15pm or 1315 hours. **Note that 13:15 hours is wrong. Do not put the ":" in.**

Quarter past one in the morning is written as 1:15am or 0115 hours.

Moving between hours and minutes

Example: Change 24 minutes into hours

$$24 \text{ minutes} = \frac{24}{60} \text{ hour} = 0.4 \text{ hour}$$

Example: Change 0.7 hour into minutes

$$0.7 \text{ hour} = 0.7 \times 60 \text{ minutes} = 42 \text{ minutes}$$

Time Intervals

To calculate the duration in hours and minutes between two times we **always** use a **timeline**.

We do not use subtraction

Example 1: How long is it from 0755 hours to 1048 hours?

0755 -----→ 0800-----→1000-----→1048
5 mins + 2 hours + 48 mins

Total time = 2 hours and 53 minutes.

Example 2: How long is it from 0835 hours to 1145 hours?

0835 -----→ 0900-----→1100-----→1045
25 mins + 2 hours + 45 mins

Total time = 2 hours and 70 minutes
 = 3 hours and 10 minutes

Units

Weight

1000 mg = 1 g

1000 g = 1 kg

1000 kg = 1 tonne

Length

10 mm = 1 cm

100 cm = 1 m

1000 mm = 1 m

1000 m = 1 km

Volume (liquid)

1000 ml = 1 litre

NOTE: 1 ml = 1 cm³ and 1000 cm³ = 1 litre

Time

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

52 weeks = 1 year

365 days = 1 year

366 days = 1 leap year

12 months = 1 year

Useful mathematical terms

a.m.	(ante meridiem) Any time in the morning (between 12 midnight and 12 noon).
axis	A line along the base or edge of the graph. The plural is axes.
calculate	Find the answer to a problem. It does not mean you have to use a calculator.
data	A collection of information (may include facts, numbers or measurements).
denominator	The bottom number in a fraction.
difference	The result of a subtraction calculation.
digit	A written symbol for any of the ten numerals from 0 - 9.
divisor	A number used to divide another. In the equation $15 \div 3 = 5$, 3 is the divisor and 15 is the dividend.
evaluate	To work out the answer.
even	An integer that is divisible by 2 with no remainder. Even numbers end with 0, 2, 4, 6, or 8.
factor	A number which divides exactly into another number leaving no remainder. Example: the factors of 15 are 1, 3, 5, 15.
frequency	How often something happens. In a set of data, it is the number of times a number or category occurs.
greater than (>)	Is bigger or more than. Example: 10 is greater than 6 can be written $10 > 6$.
integer	Any positive or negative whole number or zero.
least	The lowest number in a group (minimum).
less than (<)	Is smaller or lower than. Example: 15 is less than 21 can be written $15 < 21$
maximum	The largest or highest number in a group.
mean	The average of a set of numbers.

median	It is the middle number of a set of data which is written in order from lowest to highest.
minimum	The smallest or lowest number in a group.
mode	It is the most frequent number or category.
multiple	A number which can be divided by a particular number, leaving no remainder. Example: Some of the multiples of 3 are 6, 9, 12, 15, 18 etc.
negative number	A number less than zero. Shown by a negative sign. Example: -6 is a negative number.
numerator	The top number in a fraction.
odd number	An integer which is not divisible by 2. Odd numbers end in a 1, 3, 5, 7, or 9.
operations	The four basic mathematical operations are addition, subtraction, multiplication and division.
order of operations	The order in which the mathematical operations should be done (BIDMAS).
p.m.	(post meridiem) Any time in the afternoon or evening (between 12 noon and 12 midnight).
prime number	A number which has exactly 2 factors (i.e. it can only be divided by itself and 1). Note: 1 is not a prime number as it only has 1 factor.
product	The result of a multiplication calculation.
quotient	The result of a division calculation.
remainder	The amount left over when dividing a number.
sum	The result of an addition calculation.
total	The result of an addition calculation.