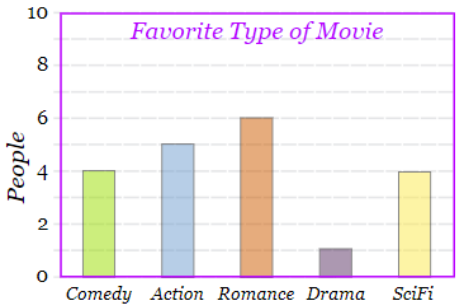
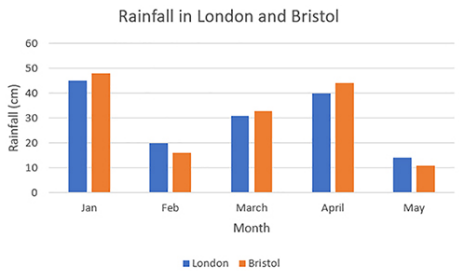
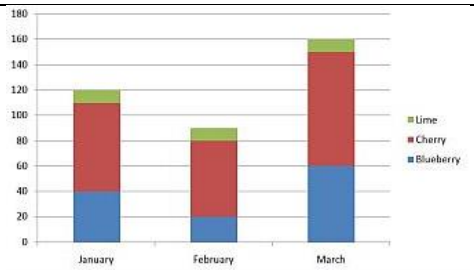
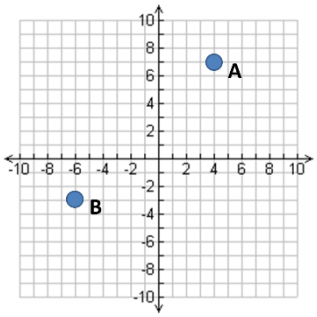
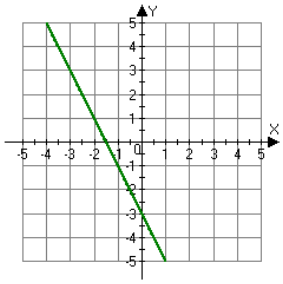
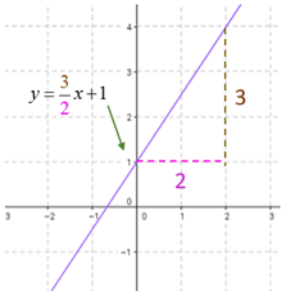
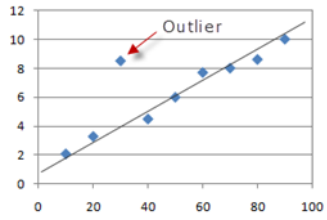
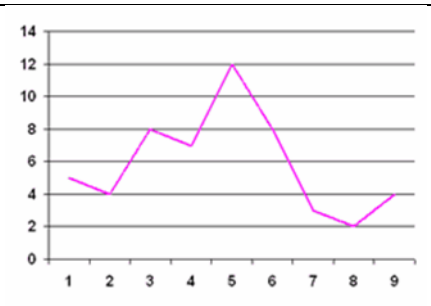
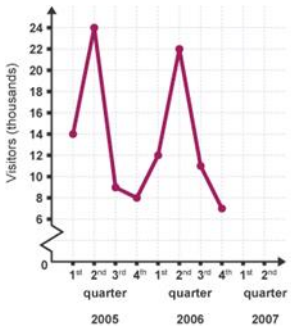
Year 8 Mathematics Developing Term 2

Statistics

1.	Qualitative data	Data decribed by words.
2.	Quantitative data	Data that is in number form that can be discrete or continuous.
3.	Discrete data	Data that can be counted and has a finite number of possible values.
4.	Continuous data	Data that can be measured and has an infinite number of possible values within a range.
5.	Bar chart	A chart to display discrete data where the height of the bar shows the frequency. 
6.	Dual bar chart	A bar chart used to compare data sets where bars are drawn next to each other to compare heights. 
7.	Composite bar chart	A bar chart where bars are split to show the different quantities within each bar.

		
8.	Coordinates	Written in **pairs**. The **first** term is the **x-coordinate** (movement **across**). The **second** term is the **y-coordinate** (movement **up or down**)  A: (4,7) B: (-6,-3)
9.	Linear Graph	**Straight line** graph. The general equation of a linear graph is $y = mx + c$ where m **is the gradient** and c **is the y-intercept**. The **equation** of a linear graph can contain an **x-term**, a **y-term** and a **number**. Example:  Other examples: $x = y$ $y = 4$ $x = -2$ $y = 2x - 7$ $y + x = 10$ $2y - 4x = 12$
10.	Plotting Linear Graphs	Method 1: **Table of Values** Construct a table of values to calculate coordinates. | x	-3	-2	-1	0	1	2	3
---	---	---	---	---	---	---	---
y= x +3	0	1	2	3	4	5	6	

		Method 2: **Gradient-Intercept Method** (use when the equation is in the form $y = mx + c$) 1. Plots the y-intercept 2. Using the gradient, plot a second point. 3. Draw a line through the two points plotted.  Method 3: **Cover-Up Method** (use when the equation is in the form $ax + by = c$) 1. Cover the x term and solve the resulting equation. Plot this on the $x - axis$. 2. Cover the y term and solve the resulting equation. Plot this on the $y - axis$. 3. Draw a line through the two points plotted.  $2x + 4y = 8$
11.	Outlier	A value that '**lies outside**' most of the other values in a set of data. An outlier is **much smaller or much larger** than the other values in a set of data. 
12.	Line Graph	A graph that uses **points connected by straight lines** to show how data changes in values. This can be used for **time series data**, which is a series of data points spaced over uniform time intervals in **time order**.

		
13.	Time-Series graph	A time-series graph plots frequencies (vertical) axis against time (horizontal). It is used to spot trends over time. Time could be: weeks, months, quarters (3 months), years. 
Expressions and equations		
1.	Expression	A mathematical statement written using **symbols**, **numbers** or **letters**. 3x + 2 or $5y^2$
2.	Simplifying Expressions	**Collect 'like terms'.** Be careful with negatives. x^2 and x are not like terms. $2x + 3y + 4x - 5y + 3 = 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
3.	x times x	The answer is x^2 not $2x$. Squaring is multiplying by itself, not by 2.
4.	$p \times p \times p$	The answer is p^3 not $3p$ If p=2, then p^3=2x2x2=8, not 2x3=6

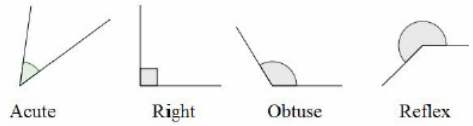
5.	$p + p + p$	The answer is 3p not p^3 If p=2, then 2+2+2=6, not $2^3 = 8$
6.	Equation	A statement showing that **two expressions are equal** **$2y - 17 = 15$**
7.	Expand	To expand a bracket, **multiply** each term **in the bracket** by the expression **outside** the bracket. $$3(m + 7) = 3x + 21$$
8.	Solve	To find the **answer**/value of something **Use inverse operations** on both sides of the equation (balancing method) until you find the value for the letter. Solve $2x - 3 = 7$ Add 3 on both sides $$2x = 10$$ Divide by 2 on both sides $$x = 5$$
9.	Inverse	**Opposite** The inverse of addition is subtraction. The inverse of multiplication is division.
10.	Substitution	**Replace letters with numbers**. Be careful of $5x^2$. You need to square first, then multiply by 5. $a = 3, b = 2\ and\ c = 5$. Find: 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$

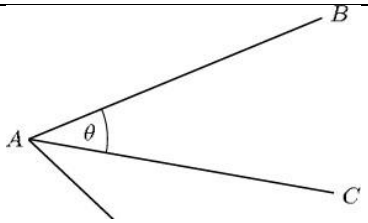
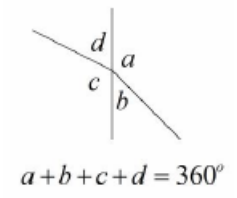
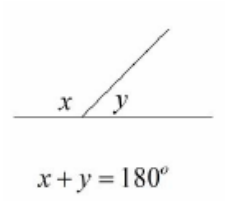
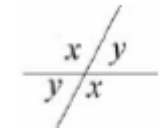
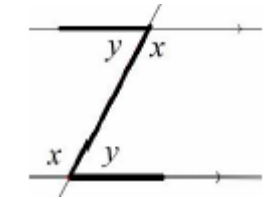
Kettering Science Academy Maths

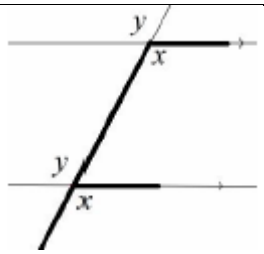
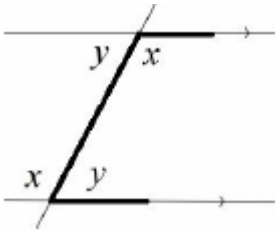
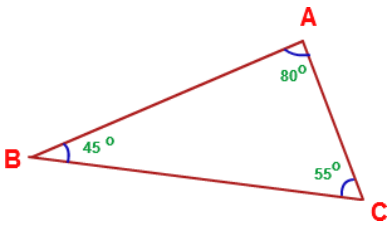
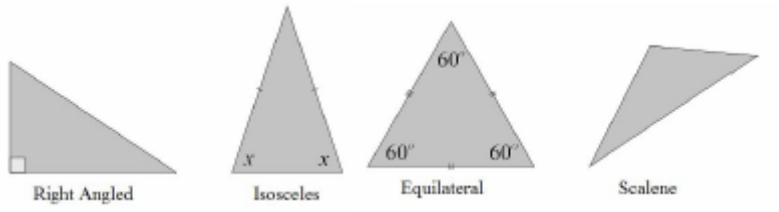
Year 8 Mathematics Developing Term 3

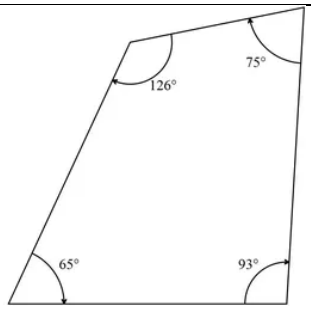
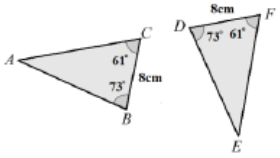
Decimal calculations

1.	Addition	To find the sum or total of two or more numbers.
2.	Subtraction	To find the difference between two numbers.
3.	Multiplication	Repeated addition of a number. Also called 'product'
4.	Division	The process of calculating the number of times one number is contained in another.
5.	Ascending order	A set of numbers arranged from smallest to biggest.
6.	Descending order	A set of numbers arranged from biggest to smallest.
7.	Decimal	A number with a **decimal point** in it. Can be positive or negative. $3.7, 0.94, -24.07$
8.	Recurring Decimal	A decimal number that has **digits that repeat forever**. The part that repeats is usually shown by placing a dot above the digit that repeats, or dots over the first and last digit of the repeating pattern. $\frac{1}{3} = 0.333\ldots = 0.\dot{3}$ $\frac{1}{7} = 0.142857142857\ldots = 0.\dot{1}42857\dot{7}$ $\frac{77}{600} = 0.128333\ldots = 0.128\dot{3}$
9.	Rounding	To make a number simpler but keep its value close to what it was. If the **digit to the right** of the rounding digit is **less than 5, round down**. If the **digit to the right** of the rounding digit is **5 or more, round up**.

		74 rounded to the nearest ten is 70, because 74 is closer to 70 than 80. 152,879 rounded to the nearest thousand is 153,000.
10.	Decimal Place	The **position** of a digit to the **right of a decimal point**. In the number 0.372, the 7 is in the second decimal place. 0.372 rounded to two decimal places is 0.37, because the 2 tells us to round down. Careful with money - don't write £27.4, instead write £27.40
11.	Significant Figure	The significant figures of a number are the digits which **carry meaning** (ie. are significant) to the size of the number. The **first significant figure** of a number **cannot be zero**. In a number with a decimal, trailing zeros are not significant. In the number 0.00821, the first significant figure is the 8. In the number 2.740, the 0 is not a significant figure. 0.00821 rounded to 2 significant figures is 0.0082. 19357 rounded to 3 significant figures is 19400. We need to include the two zeros at the end to keep the digits in the same place value columns.
Angles		
1.	Types of Angles	**Acute angles** are less than 90°. **Right angles** are exactly 90°. **Obtuse angles** are greater than 90° but less than 180°. **Reflex angles** are greater than 180° but less than 360°. 
2.	Angle Notation	Can use **one lower-case** letters, eg. θ or x Can use **three upper-case** letters, eg. BAC

		
3.	Angles at a Point	**Angles around a point add up to 360°.**  $a+b+c+d=360^o$
4.	Angles on a Straight Line	**Angles around a point on a straight line add up to 180°.**  $x+y=180^o$
5.	Opposite Angles	**Vertically opposite angles are equal.** 
6.	Alternate Angles	**Alternate angles are equal**. They look like Z angles, but never say this in the exam. 
7.	Corresponding Angles	**Corresponding angles are equal.** They look like F angles, but never say this in the exam.

		
8.	Co-Interior Angles	**Co-Interior angles add up to 180°.** They look like C angles, but never say this in the exam. 
9.	Angles in a Triangle	**Angles in a triangle add up to 180°.** 
10.	Types of Triangles	**Right Angle** Triangles have a **90°** angle in. **Isosceles** Triangles have **2 equal sides** and **2 equal base angles.** **Equilateral** Triangles have **3 equal sides** and **3 equal angles (60°).** **Scalene** Triangles have **different sides** and **different angles.** **Base angles in an isosceles triangle are equal.** 
11.	Angles in a Quadrilateral	**Angles in a quadrilateral add up to 360°.**

		
12.	Congruent Triangles	4 ways of proving that two triangles are congruent: 1. **SSS** (Side, Side, Side) 2. **RHS** (Right angle, Hypotenuse, Side) 3. **SAS** (Side, Angle, Side) 4. **ASA** (Angle, Side, Angle) or **AAS** <u>ASS does not prove congruency.</u>  $BC = DF$ $\angle ABC = \angle EDF$ $\angle ACB = \angle EFD$ $\therefore$ The two triangles are congruent by AAS.