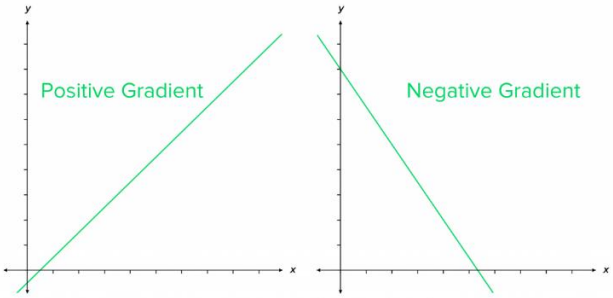
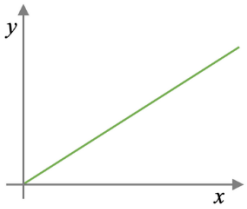
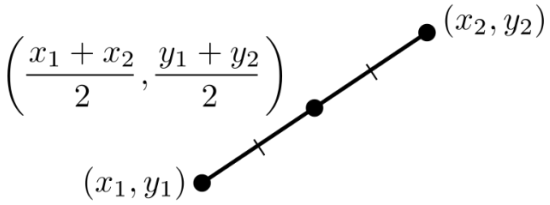
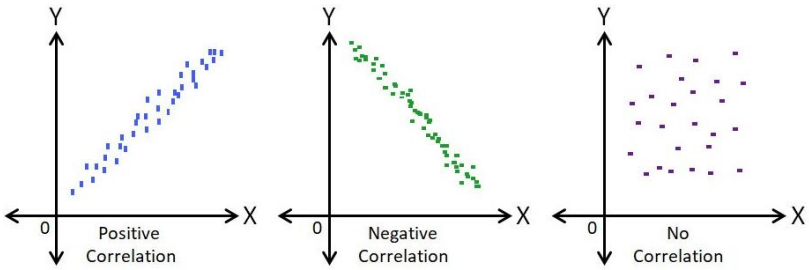
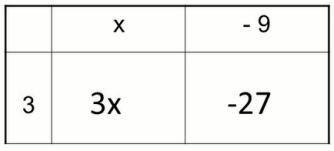
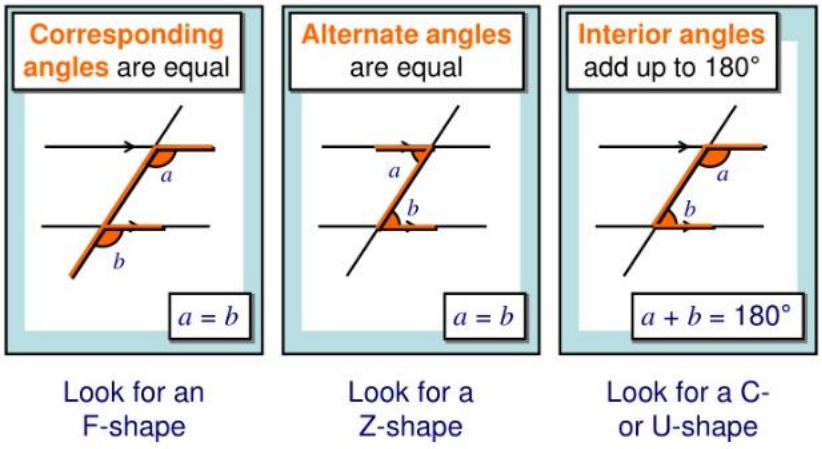
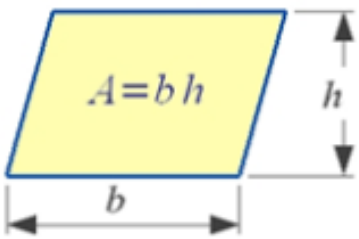
KEY KNOWLEDGE FOR YEAR 9

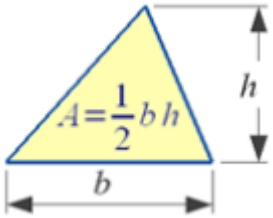
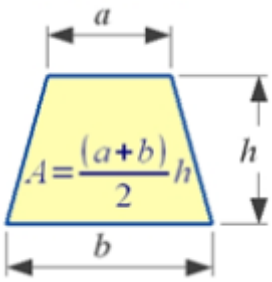
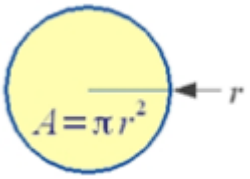
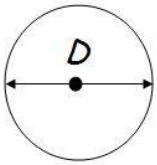
(LEARN THESE KEY FACTS FROM PREVIOUS YEARS)

1.	A **ratio** is the relationship between two or more numbers that are separated by a colon 2 : 3 
2.	**π** (or **pi**) is a constant that is the ratio of a circle's circumference to its diameter (approximately 3.14)
3.	The general form of the equation for a straight line is **y = mx + c**
4.	In y = mx + c, **m** represents the **gradient** (the steepness of the line)
5.	In y = mx + c, **c** represents the **y-intercept** (where the line crosses the y-axis)
6.	A **negative gradient** represents a line going "down-hill" 
7.	**Direct proportion**; as one amount increases, another amount increases at the same rate
8.	Direct proportion can be written in the form **y = kx** where **k** is the constant of proportionality (similar to a scale factor, **k** is also the gradient of the line)
9.	A direct proportion graph is a **straight line** that passes through the **origin (0,0)** 
10.	**Similar** shapes in maths are enlargements of each other, their lengths are in direct proportion. (Angles remain the same in similar shapes)
11.	A **scale factor** tells us what multiplier has been used to enlarge a shape (remember enlargements can get smaller too, with scale factors between 0 and 1)
12.	A **map scale** is often written in the form 50 000:1, this means 1 cm on the map is equivalent to 50 000cm in real life.
13.	To **multiply fractions** together, multiply the numerators together and the denominators together.
14.	To **divide fractions** together, use **KFC**. **Keep** the first fraction the same, **Flip** the second fraction over, **Change** the sign to a multiply, then work it out. 
15.	A **reciprocal** is 1 divided by the number given, or when given as a fraction the numerator and denominator switch places.

Know

16.	The **midpoint** of a line segment is the exact middle of the line. 
17.	We use a **scatter graph** to see if two things have a relationship.
18.	**Correlation** tells us what that relationship might be, they can show either: 
19.	**Continuous** data can take any value, often it will be a measurement.
20.	**Discrete** data can only take certain values, like shoe sizes.
21.	**Qualitative** data use words instead of numbers, like someone's favourite colour.
22.	The **Product rule** find the total number of possible combinations of items from different groups. If one group has *m* items in it, and another group has *n* items in it, the total number of possible combinations is *m* x *n*.
23.	A **formula** is a rule written using symbols that represents different amounts. For example, the area of a triangle can be found with the formula A = $\frac{bh}{2}$
24.	An **expression** is a collection of algebraic terms that are being added or subtracted together.
25.	An **equation** shows that two things are equal.
26.	An **identity** is true no matter what values are chosen. For example, 3(x + 5) ≡ 3x + 15. ≡ is the mathematical symbol for an identity.
27.	To **expand** an expression means to multiply out the brackets. Expand the following expression 3(x - 9)  Final Ans: 3x -27
28.	To **factorise** an expression is the reverse of expanding. So factorising 3x-27 gives 3(x-9). For it to be fully factorised we must have the highest common factor in front of the bracket.
29.	**Inequalities…** Greater than $>$ Greater than or equal to $\geq$ Less than $<$ Less than or equal to $\leq$ Not equal to $\neq$

30.	A **sequence** is a set of numbers that follow a rule to get from one number to the next.
31.	The **n^{th} term** is an algebraic rule that enables us to find any term in a sequence.
32.	Laws of indices, multiplying: $a^m \times a^n = a^{m+n}$
33.	Laws of indices, dividing: $a^m \div a^n = a^{m-n}$
34.	Laws of indices, powers of powers: $(a^m)^n = a^{mn}$
35.	**Percentage multipliers** use decimal equivalents of percentages and multiplication to calculate amounts. For example, the percentage multiplier for 63% is x0.63
36.	When calculating a **percentage increase** add the percent to 100 and change it to a decimal, then multiply. For example, to increase by 15% do 100+15=115, 115% as a decimal is 1.15, so multiply the amount by 1.15
37.	When calculating a **percentage decrease** subtract the percent from 100 and change it to a decimal, then multiply. For example, to decrease by 15% do 100-15=85, 85% as a decimal is 0.85, so multiply the amount by 0.85
38.	To find an original amount after a percentage change we need to find the **reverse percentage**. This means we **divide by the multiplier.** For example, to find the original amount after it was increased by 15%, we divide our answer by 1.15
39.	A number written in **standard form** is a number written between 1 and 10 multiplied by 10 to an appropriate power. We use standard form to represent very large or very small numbers. For example, $0.00032 = 3.2 \times 10^{-4}$, $320000 = 3.2 \times 10^5$
40.	A **negative power** represents the **reciprocal** of a number (i.e. when we flip the second fraction when dividing fractions)
41.	When dealing with a **fractional power**, the denominator tells us what root to take of the number, and the numerator tells us what power to take, i.e. $x^{\frac{m}{n}} = \left(\sqrt[n]{x}\right)^m$ or $\sqrt[n]{(x^m)}$
42.	An **error interval** describes the range of values an answer must be between. For example, a number rounded to the nearest 10 is 100, the error interval for that number is $95 \leq x < 105$
43.	**Angles on parallel lines…**  Look for an F-shape Look for a Z-shape Look for a C- or U-shape
44.	**Area** of a **parallelogram**… 

45.	**Area** of a **triangle**… 
46.	**Area** of a **trapezium**… 
47.	**Area** of a **circle**… 
48.	**Circumference** of a **circle**…  $C = \pi D$
49.	The **range** is the largest number subtract the smallest number.
50.	The **mode** is the most common number.
51.	The **median** is the middle number, when put in order.
52.	The **mean** is the total of all the numbers divided by the amount of numbers.