YEAR 8 MATHS - HIGHER – SPRING 2

1) Algebra – Solving Equations

Rule: the main rule when solving equations is 'Do the same thing to both sides of the equal sign'. Look at the two examples.

$$2n + 3 = 15$$
$$(-3) \quad (-3)$$
$$2n = 12$$
$$(\div2) \quad (\div2)$$
$$n = 6$$

$$3n - 5 = 16$$
$$(+5) \quad (+5)$$
$$3n = 21$$
$$(\div3) \quad (\div3)$$
$$n = 7$$

Equations with brackets:

$$3(2x + 1) = 15$$
$$6x + 3 = 15$$
$$(-3) \quad (-3)$$
$$6x = 12$$
$$(\div6) \quad (\div6)$$
$$x = 2$$

Multiply out the bracket then solve as above.

Letters on both sides:

$$2n + 3 = n + 7$$
$$(-n) \quad (-n)$$
$$n + 3 = 7$$
$$(-3) \quad (-3)$$
$$n = 4$$

Cancel out the letter on the right, by adding or subtraction, then solve as normal.

2) Handling Data - Probability

Events occurring or not occurring: If the probability of an event occurring is 'p' then the chance of it not occurring is '1-p'. For example, if the chance of a 5 on a dice is $\frac{1}{6}$, and the probability of not getting a 5 is $1-\frac{1}{6} = \frac{5}{6}$.

Experimental probability: is calculated from an experiment, e.g. throwing 2 coins 100 times and counting the times we get two heads.

$$\text{Experimental probability} = \frac{\text{number of trials in which event occurs}}{\text{total number of trials made}}$$

Listing outcomes: a list of all the things that can happen when an experiment has 2 events (e.g. throwing 2 coins gives HH, HT, TH, TT).

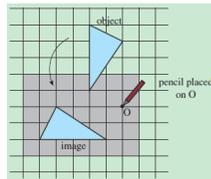## 3) Shape – Reflection and Rotation

Mathematical reflection: imagine a line of symmetry which acts like a double-sided mirror. Reflections can be checked with tracing paper.
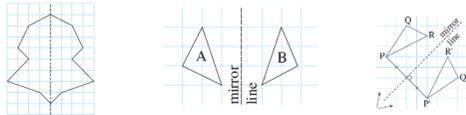
Take extra care with reflections across diagonal lines. Keep the distances each side of the line equal.

Rotation: is the maths word for turning. 3 things are needed to fully describe a rotation – an angle, the direction (clockwise or anticlockwise) and the centre of rotation.

Rotate the triangle through 90° anticlockwise about the point O.

The diagram on the right shows how tracing paper may be used.


4) Shape – Combined Transformations

As well as reflections and rotations, the two other types of transformation are (i) translation (moving left/right up/down) and enlargement (making the shape bigger or smaller).

In advanced questions we might use a combination of transformations to move a shape where we want to.

Examples:
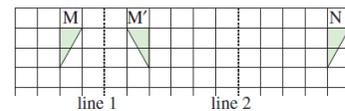
Triangle M is reflected in line 1 onto triangle M'. Then triangle M' is reflected in line 2 onto triangle N.
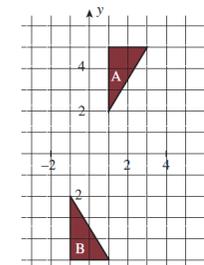
Triangle A can be reflected in the x-axis then translated 2 spaces left to reach triangle B.