

## YEAR 9

## Autumn Term 1: Quadratics & Probability



**NB: YEAR 9 HOMEWORK MAY ALSO INCLUDE RETRIEVAL OF KNOWLEDGE THAT WAS TAUGHT IN YEAR 7 AND YEAR 8**

### **Quadratics**

#### **Key Vocabulary**

Collect	To bring all the same terms together
Divide	To share equally
Equal	Having the same value
Expand	To get rid of the brackets by multiplying them out
Factor	When a number, or polynomial in algebra, can be expressed as the product of two numbers or polynomials, these are factors of the first. Examples: 1, 2, 3, 4, 6 and 12 are all factors of 12 because $12 = 1 \times 12 = 2 \times 6 = 3 \times 4$ ; $(x - 1)$ and $(x + 4)$ are factors of $(x^2 + 3x - 4)$ because $(x - 1)(x + 4) = (x^2 + 3x - 4)$
Factor Pairs	Factor Pair: A pair of factors that can be multiplied to make a target number. 2 and 12 are a factor pair for 24, as are 3 and 8. Multiple: A whole number that can be divided by a given whole number factor. 24 is a multiple of 8, because 8 is a factor of 24.
Factorise	To take the highest common factor out of the terms and to place them into brackets
FOIL	A way of expanding brackets. First, Outside, Inside, Last.
Grid	A way of expanding brackets
HCF	The highest common factor is the largest whole number which is shared by given numbers.
Like	Terms whose variables and indices are the same
Multiply	To make a number or term bigger by the same amount each time
Negative	Lower than 0
Parabola	A symmetrical open plane curve formed when plotting a quadratic equation on a graph
Product	The result of multiplying one number by another. Example: The product of 2 and 3 is 6 since $2 \times 3 = 6$ .
Quadratic	An expression or equation which has a term with the power of 2. This will be shown in the formula of $ax^2 + bx + c$
Recognise	To be able to identify something
Roots	The parts of a quadratic curve where it crosses the x-axis
Simplify	To write into simpler form
Sketch	To draw
Solve	To produce an answer
Sum	The result of one or more additions.
Term	Individual variables in an equation or expression
Turning point	Where the curve is in a quadratic graph

Unlike	Algebraic terms which do not have the same coefficients or cannot be raised to the same power
Value	The amount something is worth
Variable	A symbol for a value we do not know yet
Zero-property	When multiplying anything by 0 the result is always 0

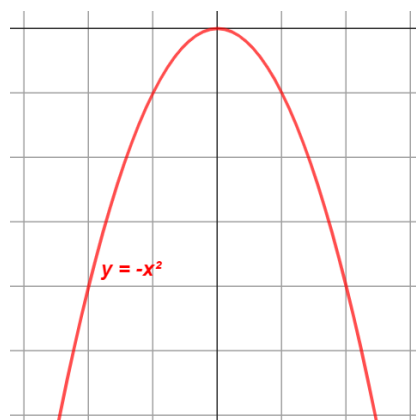
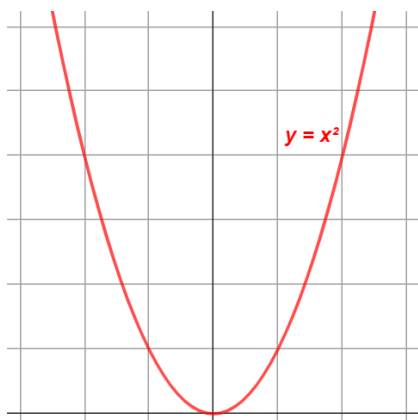
## Probability

### Key Vocabulary

Probability	The Likelihood of an event happening
Certain	It will happen
Impossible	It can not happen
Chance	The likelihood that a particular outcome will occur
Likely	A good chance of something happening
Even	Of equal chance
Events	The outcomes or set of outcomes from an experiment
Outcomes	The results of an experiment
Mutually Exclusive	One event cannot occur at the same time as the other e.g. flipping a head and tail at the same time
Independent	An event that can happen on its own and not determined by another
Expression	Terms put together but has no value
Equation	Terms put together which equal something
Inequality	The relationship between two values that are not equal
Venn Diagram	Diagram that uses circles to show relationships between groups of data
Either	One or the other
Sample Space	The collection of all possible outcomes
Trials	The experiment itself

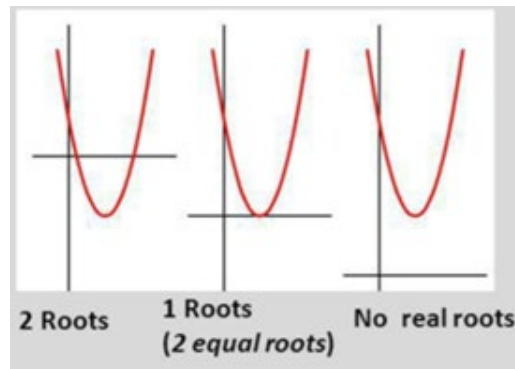
## Retrieval Questions

- 1) Sketch the curve of a)  $y = x^2$  b)  $y = -x^2$

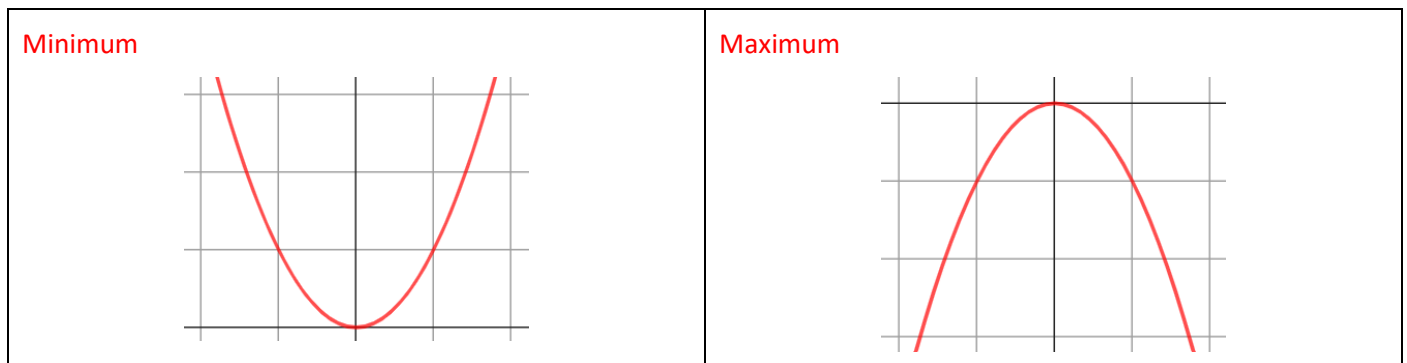


- What is a binomial expression? **An expression with only 2 terms e.g.  $4x + 3$**
- What is a trinomial expression? **An expression with 3 terms e.g.  $x^2 + 5x + 2$**
- What method is effective in expanding double brackets? **The grid method.**
- What is a quadratic expression? **An expression where the highest power of the variable is 2 (squared) e.g.  $x^2 + 3x + 5$**
- What type of expression is  $x^2 - 9$ ? **Difference Of Two Squares (DOTS). These expressions can be quickly factorised to  $(x + 3)(x - 3)$**

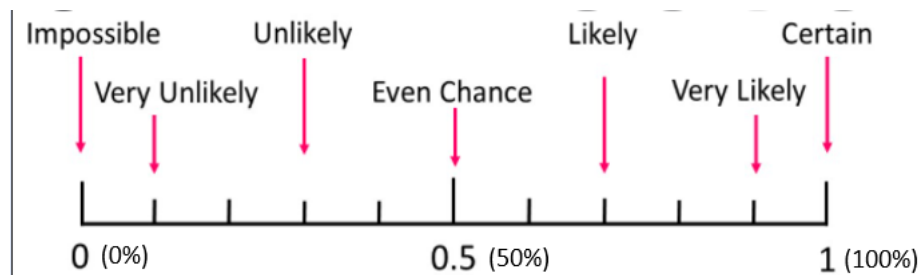
7) In terms of roots what are the 3 possible outcomes for a quadratic curve?



8) What are the two possible turning points for a quadratic graph?



9) Show the key points on a probability scale in terms of words and numbers:



10) What is the basic equation for simple probability?  $P(\text{event}) = \frac{\text{The number of ways the event can occur}}{\text{The total number of possible outcomes}}$

11) What forms can we write numerical probabilities? **Fraction, Decimal or Percentage.**

12) For mutually exclusive events, how what you calculate the probability of one OR the other happening?  
 $P(A \text{ or } B) = P(A) + P(B)$

13) What is the sum of all mutually independent outcomes? **1**

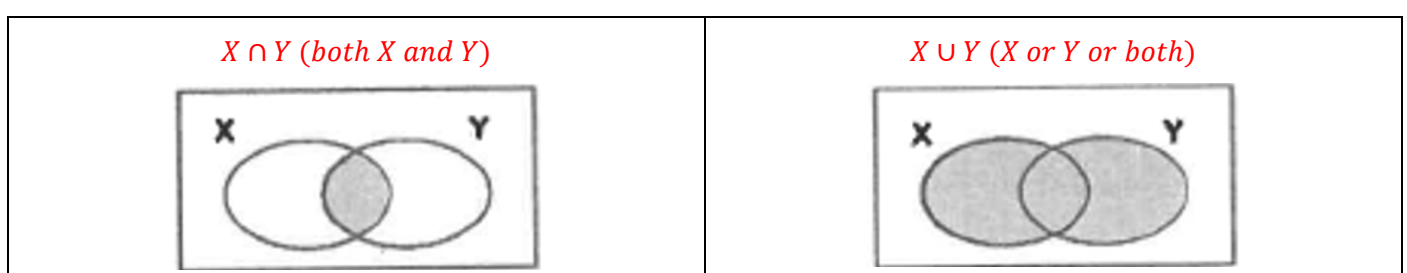
14) What is the probability of two independent events happening together?  $P(A \text{ and } B) = P(A) \times P(B)$

15) What does  $P(A \cup B)$  mean? **The probability of A or B or both happening.**

16) What does  $P(A \cap B)$  mean? **The probability of both A and B happening together.**

17) What diagrams can commonly be used to solve probability problems? **Two-way table, venn diagrams, sample space diagrams.**

18) What do the shaded areas of these venn diagrams show:



## **Homework**

- Homework will be set each week.
- Tasks will alternate between online tasks using Sparx Maths and retrieval practice revising the key words and variations on the retrieval questions shown above.
- All tasks will be focused on reinforcing the learning to date in Key Stage 3.

## **Additional Opportunities**

If you wish to further develop your skills and knowledge for Key Stage 3 maths, you can use the following links:

<https://www.thenational.academy/teachers/programmes/maths-secondary-ks3/units>