Monday 16th May 2016

Probability

Mutually exclusive events:

Mutually exclusive events cannot happen at the same time. For example, the events that a number picked from 1~10 is a multiple of 3 or a factor of 20 are mutually exclusive. Suppose you win a prize if the number picked is either a multiple of 3 or a factor of 20. The probability of winning is $\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$. With a mutually exclusive event, the probability of events A or B is found by adding the probabilities of A and B.

Independent events:

The throwing of 2 dice are independent events. This means that the outcomes of one event are not affected in any way by the outcome of the other event. If two events are independent, the probability that they both happen is found by multiplying their probabilities.

Quadratic expressions and equations

Solving quadratics by factorising:

To solve a quadratic equation, you must have it equal to zero. Look for two numbers that add together to give the number in front of the x term and multiply together to give the number term. Be careful of signs. There are 2 solutions to a quadratic equation.

e.g Solve the equation $(x+2)(x-3) = 84$

Multiply out the brackets

$x^2 - 3x + 2x - 6 = 84$

Simplify

$x^2 - x - 6 = 84$

Rearrange to get 0 on one side

$x^2 - x - 90 = 0$

Factorise

$(x-10)(x+9) = 0$

So $x = 10$ OR -9

Special cases:

- Difference of two squares: $x^2 - a^2 = (x-a)(x+a)$

  e.g $x^2 - 16 = (x-4)(x+4)$

- common factor

  e.g $x^2 + 3x = x(x+3)$

Solving quadratics using the quadratic formula:

If a quadratic formula is in the form $ax^2 + bx + c = 0$, we can use the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to find the answer.

e.g solve $3x^2 - 8x + 2 = 0$

$a = 3$, $b = -8$, $c = 2$