Quadratic Formula

Given a general quadratic equation $ax^2 + bx + c = 0$, the solutions are given by

$$x = \frac{-b \pm \sqrt{b^2 - (4ac)}}{2a}.$$

You will find easier to work out the $b^2 - (4ac)$ by itself and then put this value into the formula. Remember also that we *always, always, always* get the quadratic equation equal to zero.

Nice Formula Questions

Use the quadratic formula to solve the following quadratics. You should find they are nice answers (fractions and/or integers).

1. $x^2 - 6x + 8 = 0$. $\boxed{x = 4 \text{ or } x = 2}$

2. $2x^2 + x - 3 = 0$. $\boxed{x = -\frac{3}{2} \text{ or } x = 1}$

3. $-4x^2 + 11x - 6 = 0$. $\boxed{x = 2 \text{ or } x = \frac{3}{4}}$

4. $10x^2 + 11x - 6 = 0$. $\boxed{x = -\frac{3}{2} \text{ or } x = \frac{2}{5}}$

5. $9x^2 - 12x + 4 = 0$. $\boxed{x = \frac{2}{3} \text{ repeated}}$

Nasty Formula Questions

Use the formula to solve the following quadratics. You should find they are nasty (long decimal) answers. Give your answers to 3 significant figures.

1. $2x^2 - 3x - 7 = 0$. $\boxed{x = 2.765\ldots \text{ or } x = -1.265\ldots}$

2. $x^2 + 6x - 10 = 0$. $\boxed{x = -7.358\ldots \text{ or } x = 1.358\ldots}$

3. $-2x^2 + 2x + 7 = 0$. $\boxed{x = 2.436\ldots \text{ or } x = -1.436\ldots}$

4. $2x^2 - 3x - 7 = 2x - 1$. $\boxed{x = 3.386\ldots \text{ or } x = -0.886\ldots}$

5. $x^2 + 1 = 4x$.

6. $2x^2 + 7x = 5$.

7. $x^2 - 50 = 0$.

8. $4x^2 = x + 2$.

9. $3z^2 = 2 - 8z$. $\boxed{z = -2.90 \text{ or } z = 0.230}$

Factorising Simple Quadratics

Factorise the following quadratics. For example $x^2 + 4x - 12 = (x - 2)(x + 6)$. You are looking for two numbers that sum to 4 and multiply to -12; i.e. 6 and -2.

1. $x^2 + 5x - 24$. $\boxed{(x + 8)(x - 3)}$

2. $x^2 + 7x + 10$. $\boxed{(x + 5)(x + 2)}$

3. $x^2 - 15x + 56$. $\boxed{(x - 8)(x - 7)}$

4. $x^2 - 6x - 40$. $\boxed{(x-10)(x+4)}$

5. $x^2 - 81$. $\boxed{(x-9)(x+9)}$

6. $x^2 - 5x - 14$. $\boxed{(x-7)(x+2)}$

7. $x^2 + 3x - 154$. $\boxed{(x+14)(x-11)}$

8. $2x^2 - 6x - 36 = x^2 - x$. $\boxed{(x-9)(x+4)}$

Solving Simple Quadratics by Factorising

Solve the following equations by factorising. For example if you are given $x^2 + x - 6 = 0$, this factorises to $(x-2)(x+3) = 0$ so the solutions are $x = -3$ or $x = 2$.

1. $(x+4)(x-2) = 0$. $\boxed{x = -4 \text{ or } x = 2}$

2. $x^2 - 8x + 7 = 0$. $\boxed{x = 7 \text{ or } x = 1}$

3. $x^2 - 3x - 28 = 0$. $\boxed{x = 7 \text{ or } x = -4}$

4. $2x^2 + x + 3 = (x-1)^2$. $\boxed{x = -2 \text{ or } x = -1}$