Learning Enhancement Team

University of East Anglia
STUDENT SUPPORT SERVICE

Worksheet: Solving Quadratic Equations using the Quadratic Formula

If you find a quadratic equation difficult to factorise, you can use the quadratic formula to solve the equation. The quadratic equation must look like $ax^2+bx+c=0$ and you may have to manipulate the equation to make it look like this. If your equation does look like this then the solutions are given by the formula:

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

Solving Quadratic Equations using the Quadratic Formula study guide

Model Answers to this Sheet

1.

Solve the following quadratic equations using the quadratic formula. For those with an asterisk (*), you can also find the solutions by factorisation. Solve these quadratics equations both ways and contrast the benefits of choosing one method over another.

In some cases, you might need to rearranged the equation to the form $ax^2+bx+c=0$ before using the formula.

(a*) $x^2+7x+12=0$

(b) $x^2+7x+11=0$

(c) $x^2-13x+11=0$

(d*) $10-3x-x^2=0$

(e) $4x^2=4x+1$

(f*) $-4x^2-5x=1$

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

(h*) $2x^2=18$

(i) $6x^2-3x=0$

(j) $4\left(x^2+4x-\frac{1}{4}\right)=-3$

(k) $x^2=104$

(l) A bit more challenging:
$2\left(2x-\frac{1}{3}x^2\right)+x+6=\frac{1}{3}x^2$

2.

Find the discriminant of these equations and use it to decide the number and type of roots each has. Use this information to determine how many times the corresponding quadratic function cut the *x*-axis. Find the value of the real roots when possible.

(a) $3x^2 - x + 6 = 0$

(b) $x^2 + 2x + 1 = 0$

(c) $-x^2 + 6x - 25 = 0$

(d) $0 = 15 - 3x + 4x^2$

(e) $9 - 9x^2 = 3 - 3x$

(f) $x^2 = 3x + 10$

(g) $\dfrac{x-3}{x} = x$

(h) $\dfrac{1}{x-4} = \dfrac{x}{4-x}$