

## PRACTICE 3.6 – The Quadratic Formula and the Discriminant

\* It is not necessary that you complete all problems below.

If you understand a concept, move on to the next problem. Manage your time.

\* Full, worked solutions can be found in the folder linked on the Course Website ☺

### Exercise 3U

1 Use the quadratic formula to find the roots of each equation:

a  $x^2 + 4x - 2 = 0$

b  $3x^2 - 8x + 5 = 0$

c  $2x^2 - 5x - 2 = 0$

2 Solve each equation using the quadratic formula:

a  $x^2 + 3x = 9$

b  $3x^2 = 4x + 2$

c  $2 + 2x - x^2 = 0$

d  $3x^2 + 4x = -10$

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

f  $9 - \frac{9}{x} = 2x$

g  $\frac{x+3}{x-1} = \frac{2x}{x+1}$

**Completed during the lesson.**

3 Use the quadratic formula to find the zeros of each function:

a  $y = 6x^2 + 5x - 6$

b  $y = 2x^2 - 4x + 1$

c  $y = -x^2 + 2x + 4$

4 Let  $f(x) = 2x^2 - 4x + c$ . The  $y$ -intercept of the graph  $y = f(x)$  is  $(0, -2)$ .

**Completed during the lesson.**

a Write down the value of  $c$ .

b Find the vertex of the graph  $y = f(x)$ .

c The  $x$ -intercepts of the graph  $y = f(x)$  are  $(r + \sqrt{s}, 0)$  and  $(r - \sqrt{s}, 0)$ . Find the value of  $r$  and of  $s$ .

### Exercise 3V

1 Use your GDC to sketch the following graphs. Find the value of the discriminant, and then state the nature of the roots of each equation.

a  $x^2 - 5x + 9 = 0$

b  $6x^2 + 7x - 3 = 0$

c  $x^2 - 4x + 15 = 0$

d  $3x^2 + 4x = 8$

e  $x^2 - 4x + 4 = 0$

f  $5x^2 = x - 10$

2 For each equation, find the value(s) of  $k$  such that the equation has two distinct real roots.

a  $x^2 + 3x + k = 0$

b  $kx^2 + 20x + 5 = 0$

3 For each equation, find the value(s) of  $p$  such that the equation has two equal real roots.

a  $x^2 + 5x + p = 0$

b  $3x^2 - 12x + p = 0$

c  $2x^2 - 2px + 4 = 0$

d  $x^2 - 3px - 2p = 0$

4 For each equation, find the value(s) of  $m$  such that the equation has no real roots.

a  $x^2 - 2x + m = 0$

b  $3mx^2 - 6x + 1 = 0$

c  $x^2 + 5x + m - 2 = 0$

**Completed during the lesson.**

