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 $\left(r + \sqrt{s}, 0\right)$ and $\left(r - \sqrt{s}, 0\right)$. 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.