

NOTES: SECONDARY 2 HONORS
QUADRATIC FORMULA (5.3D/5.3E)

STARTER

1. What is the standard form of a quadratic expression?	2. Simplify $x = \frac{-4 \pm \sqrt{36}}{2}$	3. Simplify $x = \frac{-4 \pm \sqrt{-36}}{2}$
4. Simplify $x = \frac{12 \pm \sqrt{-18}}{6}$	5. Solve the quadratic by completing the square. $0 = -3x^2 - 9x + 2$	

So far we have discussed how to solve a quadratic formula by factoring or complete the square. There is one more method we can use. The quadratic formula allows us to solve any quadratic formula.

DERIVE THE QUADRATIC FORMULA:

Example: Solve the quadratic equation and identify the solutions as real or imaginary.

1. $3x^2 + 5x - 4 = 0$

2. $2x^2 - 3 = x$

3. $1 + 10x = -25x^2$

4. $2x^2 + 12x + 20 = 0$

What do you know about the solution of a quadratic equation.....

- if the value under the square root sign (*discriminant*) is negative?
- if the value under the square root sign (*discriminant*) is positive?
- if the value under the square root sign (*discriminant*) is zero?

Vocabulary:

- The _____ tells us about the nature of the solutions for a quadratic equation. The _____ is the value under the square root sign of the formula.

If $b^2 - 4ac > 0$,	then there are two Real solutions to a quadratic equation, which means the parabola crosses the x-axis twice.
If $b^2 - 4ac = 0$,	then there is one Real solution to a quadratic equation, which means the vertex is on the x-axis.
If $b^2 - 4ac < 0$,	then there are no Real, but two Imaginary solutions to a quadratic equation, which means the parabola does NOT cross the x-axis.

Example: Calculate the discriminant for each quadratic and describe the nature of the roots. Find the zeros.

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

2. $9x^2 + 12x + 13 = 0$