**m² = math minute**

*Episode 8: Quadratic Formula*

**Quadratic Equation:** \( ax^2 + bx + c = 0 \) where a,b,c are constants.

**Quadratic Formula:** \( X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)

“Negative b plus or minus the square root of b² minus 4ac, all over 2a”

\[
x^2 - x - 12 = 0
\]

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors of -12: ±1, ±2, ±3, ±4, ±6, ±12</td>
<td>( (1)x^2 + (-1)x + (-12) = 0 )</td>
</tr>
<tr>
<td>(-4)(3) = 12 and -4 + 3 = -1</td>
<td>( a = 1 \quad b = -1 \quad c = -12 )</td>
</tr>
<tr>
<td>( (x - 4)(x + 3) = x^2 - x - 12 )</td>
<td>( \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-12)}}{2(1)} = \frac{1 \pm \sqrt{49}}{2} )</td>
</tr>
<tr>
<td>( x = 4 ) and ( x = -3 )</td>
<td>( x = \frac{1 + \sqrt{49}}{2} = \frac{1 + 7}{2} = \frac{8}{2} = 4 )</td>
</tr>
<tr>
<td>( x = \frac{1 - \sqrt{49}}{2} = \frac{1 - 7}{2} = \frac{-6}{2} = -3 )</td>
<td>( x = 4 ) and ( x = -3 )</td>
</tr>
</tbody>
</table>

**Can you solve it?**

\[
x^2 + \frac{7}{10}x + \frac{3}{50} = 0
\]

\( a = 1 \quad b = \frac{7}{10} \quad c = \frac{3}{50} \)

Solutions: \( x = -\frac{3}{10} \) and \( x = -\frac{1}{10} \)

**Discriminant**

\( D = b^2 - 4ac \)

- If \( D > 0 \) – Two x-value Solutions
- If \( D = 0 \) – One x-value Solution
- If \( D < 0 \) – No Real Solutions