

THE GUESSING METHOD

Example: $1x^2 + 6 = 0$

The **first term** is $1x^2$, the **middle term** is $+ 5x$, and the **last term** is $+ 6$.

Guess at the factors of the **first term**: $x \cdot x$.

Guess at the factors of the **last term**: $2 \cdot 3$.

Now write the factors for the **last terms** like this: $(x - 2)(x - 3)$.

From the FOIL, you want the "O" and the "I" to add/subtract [depending on the sign of the **last term**: (+) add and (-) subtract] to equal the **middle term**.

$$\begin{array}{r} + 2x \\ + 3x \\ \hline 5x \text{ (middle term)} \end{array}$$

therefore :

$$(x + 2)(x + 3) = 0$$

$$x + 2 = 0 \text{ or } x + 3 = 0$$

$$x = -2 \text{ or } x = -3$$

Guessing Method Examples :

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

$$\begin{array}{r} (x - 1)(x - 3) \\ + 3x \\ + 1x \\ \hline = 4x \text{ (middle term)} \end{array}$$

$$(x + 3)(x + 1) = 0$$

$$x + 3 = 0 \text{ or } x + 1 = 0$$

$$x = -3 \text{ or } x = -1$$

2. $a^2 + 8a - 20 = 0$

We have three choices :

$$\begin{array}{ccc} (a - 1)(a - 20) & (a - 2)(a - 10) & (a - 4)(a - 5) \\ 20a & 10a & 5a \\ \frac{1a}{19a} & \frac{2a}{8a} & \frac{4a}{1a} \end{array}$$

Notice that we are looking for the difference (the **last term** above is negative "-20").

$+ 8a$ is what we need ($+10a - 2a = +8a$).

$$(a - 2)(a + 10) = 0$$

$$a - 2 = 0 \text{ or } a + 10 = 0$$

$$a = 2 \text{ or } a = -10$$

3. $x^2 - 2x - 24$

Now we have four choices :

$$\begin{array}{cccc} (x-1)(x-24) & (x-2)(x-12) & (x-3)(x-8) & (x-4)(x-6) \\ 24x & 12x & 8x & 6x \\ \frac{1x}{23x} & \frac{2x}{10x} & \frac{3x}{5x} & \frac{4x}{2x} \end{array}$$

Notice that we are looking for the difference (the **last term** above is negative "-24").

-2x is what we need (-6x + 4x = -2x), so :

$$(x-6)(x+4) = 0$$

$$x-6 = 0 \text{ or } x+4 = 0$$

$$x = 6 \text{ or } x = -4$$

4. $3x^2 - 6x - 72 = 0$

Look at all the combinations we have:

$$\begin{array}{cccccc} (3x-1)(1x-72) & (3x-2)(1x-36) & (3x-3)(1x-24) & (3x-4)(1x-18) & (3x-6)(1x-12) & (3x-8)(1x-9) \\ (1x-1)(3x-72) & (1x-2)(3x-36) & (1x-3)(3x-24) & (1x-4)(3x-18) & (1x-6)(3x-12) & (1x-8)(3x-9) \end{array}$$

Unfortunately, we have to try them all. Fortunately, we can simplify the equation:

$$3(x^2 - 2x - 24) = 0$$

$$3(x-6)(x+4) = 0 \quad (\text{See problem \#3.})$$

$$x = 6 \text{ or } x = -4$$