

GUIDED NOTES (MODEL NOTES)

Factoring trinomials, which have 3 terms, means to rewrite the polynomial as a product of two binomials, which each have 2 terms.

$$\underbrace{x^2 + bx + c}_{\text{trinomial}} = \underbrace{(x + \underline{\quad})(x + \underline{\quad})}_{2 \text{ binomials}}$$

Tips for Factoring

- What you are multiplying to is the value of c.
- What you are adding/subtracting to is the value of b.

Examples

1) Factor the trinomial: $x^2 + 7x + 12$

Step 1: Identify b and c : $b = \underline{7}$ and $c = \underline{12}$.

Step 2: List the factor pairs that multiply to c : $\pm 1 \cdot 12, \pm 2 \cdot 6, \pm 3 \cdot 4$

Step 3: Find the factor pair that multiplies to c and adds/subtracts to b : +3 and +4.

Step 4: Plug the factors into the binomials: $x^2 + 7x + 12 = (x + \underline{3})(x + \underline{4})$

2) Factor the trinomial: $x^2 + x - 12$

Step 1: Identify b and c : $b = \underline{1}$ and $c = \underline{-12}$.

Step 2: List the factor pairs that multiply to c : $\pm 1 \cdot 12, \pm 2 \cdot 6, \pm 3 \cdot 4$

Step 3: Find the factor pair that multiplies to c and adds/subtracts to b : -3 and +4.

Step 4: Plug the factors into the binomials: $x^2 + x - 12 = (x \underline{- 3})(x \underline{+ 4})$



Factor each of the following trinomials, then check your work by expanding your binomials.

3) $x^2 + 9x + 20$

$$b = 9 \text{ and } c = 20$$

$$\text{factor pairs: } \pm 1 \cdot 20, \pm 2 \cdot 10, \pm 4 \cdot 5$$

$$x^2 + 9x + 20 = (x + 4)(x + 5)$$

$$\text{Check: } (x + 4)(x + 5) = x^2 + 5x + 4x + 20 = x^2 + 9x + 20$$

4) $x^2 - 8x - 20$

$$b = -8 \text{ and } c = -20$$

$$\text{factor pairs: } \pm 1 \cdot 20, \pm 2 \cdot 10, \pm 4 \cdot 5$$

$$x^2 - 8x - 20 = (x + 2)(x - 10)$$

$$\text{Check: } (x + 2)(x - 10) = x^2 - 10x + 2x - 20 = x^2 - 8x - 20$$