Special Factoring

Example

\[ a^2 - b^2 = (a - b)(a + b) \]

Factor
\[ 4x^2 - 25 \]

1. Notice both terms are perfect squares.
   \[ 4x^2 = (2x)^2 \text{ and } 25 = 5^2 \]

2. So,
   \[ (2x)^2 - 5^2 \]

3. Factor:
   \[ (2x - 5)(2x + 5) \]

Perfect Square Trinomials

Ex. p. 546 #30

Factor
\[ 16b^2 + 8b + 1 \]

1. Notice:
   \[ 16b^2 = (4b)^2 \text{ and } 1 = 1^2 \]

2. Try
   \[ (4b + 1)(4b + 1) \]

16b^2 + 8b + 1

Form \( ax^2 + bx + c \)

* Use the ac method.
* Then grouping.
* Look for factors of \( a \cdot c \) that add up to \( b \).

Ex. p. 546, #3

Factor
\[ 2y^2 + 7y + 3 \]

1. \( a = 2, b = 7, c = 3 \)
2. \( a \cdot c = 6 \rightarrow \text{look for factors of } 6 \text{ that add up to } 7 \)
3. \( 1 \cdot 6 = 1 + 6 = 7 \)
4. Rewrite middle term:
   \[ 2y^2 + 6y + 1y + 3 \]
5. Group:
   \[ 2y(y + 3) + 1(y + 3) \]
6. Factor:
   \[ (2y + 1)(y + 3) \]

Form \( ax^2 + bx + c \)

* Use the double bubble.

Ex. p. 532 #2

Factor
\[ x^2 + 5x + 6 \]

1. \( a = 1, b = 5, c = 6 \)
2. Look for factors of 6 that add up to 5
3. 2 add up to 5
4. Group:
   \[ 2x(x + 3) \]
5. Factor:
   \[ (x + 2)(x + 3) \]

Ex. p. 532 #22

Factor
\[ p^2 + 2p - 35 \]

1. \( a = 1, b = 2, c = -35 \)
2. Try:
   \[ 5 \rightarrow 7 \rightarrow 5(-7) = -35 \]
3. Group:
   \[ (p - 5)(p + 7) \]

Check by FOIL or distribute
\[ (x - 5)(y - 2) = xy - 5y - 2x + 10 \]