Examples

1. \(40x^2 - 31xy - 35y^2\)

Solution:

\[
\begin{array}{c|c}
-56 & 25 \\
\hline
-31 & \\
\end{array}
\]

\[\Rightarrow \text{Thus, } 25 \text{ and } -56 \text{ are the two numbers that multiply to } 40 \cdot -35 \text{ and that add up to } -31.\]

Grouping Method:

Rewrite \(40x^2 - 31xy - 35y^2\) as \(40x^2 - 56xy + 25xy - 35y^2\) and factor by grouping:

\[
(40x^2 - 56xy) + (25xy - 35y^2) = 8x(5x - 7y) + 5y(5x - 7y) = (5x - 7y)(8x + 5y)
\]

2. \(54m^2 - 93mn + 40n^2\)

\[
\begin{array}{c|c}
-48 & -45 \\
\hline
-93 & \\
\end{array}
\]

\[\Rightarrow \text{Thus, } -48 \text{ and } -45 \text{ are the two numbers that multiply to } 54 \cdot 40 \text{ and that add up to } -93.\]

Bottoms – Up Method:

\[
\begin{array}{l}
\frac{-48}{54} = \frac{-8}{9} \Rightarrow (9m - 8n) \text{ is one factor} \\
\frac{-45}{54} = \frac{-5}{6} \Rightarrow (6m - 5n) \text{ is the other factor}
\end{array}
\]

Thus, \(54m^2 - 93mn + 40n^2 = (9m - 8n)(6m - 5n)\).
Intermediate Algebra
Skill Builder # PF – 7
Factoring Two-Variable Quadratic Trinomials with Leading Coefficient Different from 1
Any Method

Factor the given quadratic trinomial.

1. \(12x^2 - xy - 63y^2\)

2. \(18x^2 - 45xy - 8y^2\)

3. \(56y^2 - 81xy + 28x^2\)

4. \(48y^2 + 2xy - 63x^2\)

5. \(32n^2 + 92np + 45p^2\)

6. \(30p^2 + 31pm - 44m^2\)

7. \(96a^2 - 44ab - 35b^2\)

8. \(56b^2 - 109ab + 44a^2\)
Intermediate Algebra
Skill Builder # PF – 7
Factoring Two-Variable Quadratic Trinomials with Leading Coefficient Different from 1
Any Method

Answers
1. \((4x + 9y)(3x - 7y)\)  
2. \((6x + y)(3x - 8y)\)  
3. \((7y - 4x)(8y - 7x)\)  
4. \((6y + 7x)(8y - 9x)\)  
5. \((8n + 5p)(4n + 9p)\)  
6. \((5p - 4m)(6p + 11m)\)  
7. \((12a + 5b)(8a - 7b)\)  
8. \((8b - 11a)(7b - 4a)\)

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