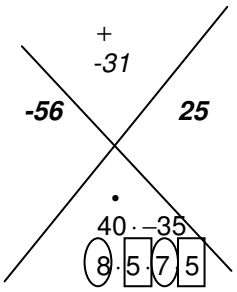
Intermediate Algebra
Skill Builder # PF – 7
Factoring Two-Variable Quadratic Trinomials with Leading Coefficient Different from 1
Any Method

Examples

1. $40x^2 - 31xy - 35y^2$

Solution:



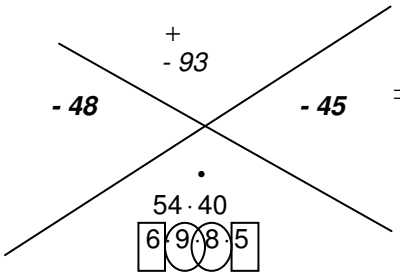
$\Rightarrow$ Thus, 25 and -56 are the two numbers that multiply to $40 \cdot -35$ and that add up to – 31.

Grouping Method:

Rewrite $40x^2 - 31xy - 35y^2$ as $40x^2 - \mathbf{56xy} + \mathbf{25xy} - 35y^2$ and factor by grouping:

$$\begin{aligned} &\left(40x^2 - 56xy\right) + \left(25xy - 35y^2\right) \\ &= 8x(5x - 7y) + 5y(5x - 7y) \\ &= (5x - 7y)(8x + 5y) \end{aligned}$$

2. $54m^2 - 93mn + 40n^2$



$\Rightarrow$ Thus, -48 and – 45 are the two numbers that multiply to $54 \cdot 40$ and that add up to – 93 .

Bottoms – Up Method:

$$-\frac{48}{54} = -\frac{8}{9} \Rightarrow (9m - 8n) \text{ is one factor}$$

$$-\frac{45}{54} = -\frac{5}{6} \Rightarrow (6m - 5n) \text{ is the other factor}$$

Thus, $54m^2 - 93mn + 40n^2 = (9m - 8n)(6m - 5n)$.

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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. $56b^2 - 109ab + 44a^2$

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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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