# Factoring Using Guess and Check

## (when $A = 1$)

1. Factor out all common factors, if there are any.
2. Identify $A$, $B$, and $C$ -- ($Ax^2 + Bx + C$).
3. Use this method if $A = 1$.
4. List all factors of $C$. These are the choices for the second term in your factors.
5. If $A$ and $C$ are the same sign, then both factors have the same sign as $B$.
6. If $A$ and $C$ are opposite signs, then the factors also have opposite signs.
7. Check each set of factors by multiplying the factors.
8. The correct factors are the ones that have the correct middle term.

**Example 1:** $x^2 - 3x - 10$

$A = 1$, $B = -3$, $C = -10$ Step 2

$A = 1$ Step 3

$10 = 1 \cdot -10$ $10 = 2 \cdot -5$ Step 4

$10 = -1 \cdot 10$ $10 = -2 \cdot 5$

$A$ and $C$ are opposite signs Step 6

| **Guess** | **Check** | |
|---|---|---|
| $(x-1)(x+10)$ | $= x^2 + 9x - 10$ | Step 7 |
| $(x+1)(x-10)$ | $= x^2 - 9x - 10$ | |
| $(x-2)(x+5)$ | $= x^2 + 3x - 10$ | |
| $(\boldsymbol{x+2})(\boldsymbol{x-5})$ | $= x^2 - \boldsymbol{3x} - 10$ | |

$(\boldsymbol{x+2})(\boldsymbol{x-5})$ Step 8 Answer

**Example 2:** $x^2 - 8x + 15$

$A = 1$, $B = -8$, $C = 15$ Step 2

$A = 1$ Step 3

$15 = 1 \cdot 15$ $15 = 3 \cdot 5$ Step 4

$A$ and $C$ are both positive (same sign) Step 5

| **Guess** | **Check** | |
|---|---|---|
| $(x+1)(x+15)$ | $= x^2 + 16x + 15$ | Step 7 |
| $(x-1)(x-15)$ | $= x^2 - 16x + 15$ | |
| $(x+3)(x+5)$ | $= x^2 + 8x + 15$ | |
| $(\boldsymbol{x-3})(\boldsymbol{x-5})$ | $= x^2 - \boldsymbol{8x} + 15$ | |

$(\boldsymbol{x-3})(\boldsymbol{x-5})$ Step 8 Answer

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# Factoring Using Guess and Check

## (when $A \neq 1$)

1. Factor out all common factors, if there are any.
2. Identify *A*, *B*, and *C* -- ($Ax^2 + Bx + C$).
3. List all factors of *A*. These are the choices for the first term in your factors.
4. List all factors of *C*. These are the choices for the second term in your factors.
5. If *A* and *C* are the same sign, then both factors have the same sign as *B*.
6. If *A* and *C* are opposite signs, then the factors also have opposite signs.
7. Check each set of factors by multiplying the factors.
8. The correct factors are the ones that have the correct middle term.

**Example 1:** $2x^2 + x - 3$

$A$ =2, $B$ = 1, $C$ = -3 Step 2

$2 = 2 \cdot 1$ Step 3

$-3 = 1 \cdot -3$ $-3 = -1 \cdot 3$ Step 4

*A* and *C* are opposite signs Step 6

| **Guess** | **Check** |
|---|---|
| $(2x-1)(x+3)$ | $= 2x^2 + 5x - 3$ |
| $(2x+1)(x-3)$ | $= 2x^2 - 5x - 3$ |
| $(2x-3)(x+1)$ | $= 2x^2 - x - 3$ |
| $(\mathbf{2x+3})(\mathbf{x-1})$ | $= 2x^2 + \mathbf{x} - 3$ |

Step 7

$(\mathbf{2x+3})(\mathbf{x-1})$ Step 8 Answer

**Example 2:** $\mathbf{6}x^2 + 2x - 4$

Common Factor = 2 Step 1
$2(3x^2 + x - 2)$

$A$ = 3, $B$ = 1, $C$ = -2 Step 2

$3 = 3 \cdot 1$ Step 3

$-2 = 2 \cdot -1$ $-2 = -2 \cdot 1$ Step 4

*A* and *C* are opposite signs Step 6

Step 7

| **Guess** | **Check** |
|---|---|
| $(3x+1)(x-2)$ | $= 3x^2 - 5x - 2$ |
| $(3x+2)(x-1)$ | $= 3x^2 - x - 2$ |

| **Guess** | **Check** |
|---|---|
| $(3x-1)(x+2)$ | $= 3x^2 + 5x - 2$ |
| $(3x-2)(x+1)$ | $= 3x^2 + x - 2$ |

$(3x-2)(x+1)$ Step 8 Answer

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