

Factoring is the inverse of multiplying

Factoring out a GCF: **Always try this first**

<p>EXAMPLE 1: Factor $\frac{2x}{2} + \frac{42y}{2}$</p> $2(x + 21y)$	<p>EXAMPLE 2: Factor $\frac{4x^4}{4x^3} + \frac{24x^3}{4x^3}$</p> $4x^3(x + 6)$
<p>EXAMPLE 3: Factor $\frac{8a^2b}{2ab} - \frac{6ab^2}{2ab}$</p> $2ab(4a - 3b)$	<p>EXAMPLE 4: Factor $\frac{20x^2y^2}{4xy} - \frac{4xy}{4xy}$</p> $4xy(5xy - 1)$

Factoring Trinomials

Method: 😊 Smile 😊

Always try to factor out a GCF first!

<p>EXAMPLE 9: Factor $3y^2 + 4y - 15$</p> $\frac{3}{\begin{matrix} 1 \cdot 3 \\ 3 \cdot 1 \end{matrix}} \quad \frac{15}{\begin{matrix} 1 \cdot 15 \\ 3 \cdot 5 \end{matrix}}$ $(3y - 5)(y + 3)$	<p>EXAMPLE 10: Factor $2x^2 - 7x + 3$</p> $\frac{2}{\begin{matrix} 1 \cdot 2 \end{matrix}} \quad \frac{3}{\begin{matrix} 1 \cdot 3 \end{matrix}}$ $(2x - 1)(x - 3)$
<p>EXAMPLE 11: ^{1st term neg} factor out a ⁻¹</p> <p>Factor $-5m^2 + 6m - 1$</p> $-1(5m^2 - 6m + 1)$ $-1(5m - 1)(m - 1)$ $-1(5m - 1)(m - 1)$	<p>EXAMPLE 12:</p> <p>Factor $-3k^2 - k + 2$</p> $-1(3k^2 + k - 2)$ $-1(3k - 2)(k + 1)$ $-1(3k - 2)(k + 1)$

When $a = 1$, they are easier

<p>EXAMPLE 5: Factor $x^2 + 11x + 18$</p> <p>$(x+2)(x+9)$</p> <p>$\frac{18}{1 \cdot 18}$ $\frac{2 \cdot 9}{3 \cdot 6}$</p> <p>$(x+2)(x+9)$</p>	<p>EXAMPLE 6: Factor $m^2 + 9m + 14$</p> <p>$(m+2)(m+7)$</p> <p>$\frac{14}{1 \cdot 14}$ $\frac{2 \cdot 7}{2 \cdot 7}$</p>
<p>EXAMPLE 7: Factor $y^2 - 6y + 8$</p> <p>$(y-2)(y-4)$</p> <p>$\frac{8}{1 \cdot 8}$ $\frac{2 \cdot 4}{2 \cdot 4}$</p>	<p>EXAMPLE 8: Factor $w^2 + 2w - 15$</p> <p>$(w-3)(w+5)$</p> <p>$\frac{15}{1 \cdot 15}$ $\frac{3 \cdot 5}{3 \cdot 5}$</p>

GUIDED PRACTICE for Example 1

Factor the trinomial.

2. $a^2 + 7a + 10$
 $(a+5)(a+2)$

3. $t^2 + 9t + 14$
 $(t+7)(t+2)$

4. $-2y^2 - 5y - 3$

$-1(2y^2 + 5y + 3)$

$-1(2y+3)(y+1)$

$\frac{3}{1 \cdot 3}$
 $\frac{3 \cdot 1}{3 \cdot 1}$

5. ~~$5y^2 + 6y + 1$~~

$-1(2y+3)(y+1)$

Factoring by Grouping - 3 GCF's

EXAMPLE 20:

Factor $5x(x-2) + 7(x-2)$

$$(x-2)(5x+7)$$

EXAMPLE 22:

Factor $3y^2(y-2) + 4(2-y)$

$$(y-2)(3y^2-4)$$

EXAMPLE 21:

Factor $-9m(m+3) - 5(m+3)$

$$-(m+3)(9m+5)$$

EXAMPLE 23:

Factor $2d(d-5) - 3(5-d)$

$$(d-5)(2d+3)$$

EXAMPLE 24:

Factor $x^3 + 2x^2 + 8x + 16$

$$(x+2)(x^2+8)$$

EXAMPLE 25:

Factor $x^3 - 10 - 5x + 2x^2$

$$(x+2)(x^2-5)$$

Homework:

