

# L5 Factoring Trinomials $a=1$

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## Lesson 5 Factoring Trinomials

### Factoring Trinomials

**Trinomial:** a polynomial containing three terms

Form:  $ax^2 + bx + c$ , where  $a = 1$

In order to factor we can determine our factors using PSF

- Product ( $a \cdot c$ )  $1 \cdot 6$
- Sum ( $b$ )  $5$
- Factors of the product ( $a$ )( $c$ )  
(that have a sum of  $b$ )

#### Example 1

Factor.

a)  $x^2 - 2x - 8$

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

$P$  -8      $a=1$       $b=-2$       $c=-8$   
 $S$  -2  
 $F$  2, -4      $(x-4)(x+2)$

← binomial factors

b)  $x^2 - 12x + 35$

$$(x-7)(x-5)$$

$P$  35  
 $S$  -12  
 $F$  -5, -7

ie.  $x^2 + 5x + 6$

$$(x+2)(x+3)$$

$P$  6

$S$  5

$F$  3, 2

Use multiplication to check

$$(x+2)(x+3)$$

$$x^2 + 3x + 2x + 6$$

$$x^2 + 5x + 6$$

$$2, -4 \quad 2 + (-4) = -2$$

~~$$-2, 4 \quad -2 + 4 = 2$$~~

~~$$-5, 7 \quad -5 + 7 = 2$$~~

$$-5, -7 \quad -5 + (-7) = -12$$

c)  $x^2 + 1x - 12$

$$\begin{array}{l} P -12 \\ S 1 \\ F 4, -3 \end{array} \quad (x-3)(x+4)$$

$$\begin{array}{l} 4, -3 \\ 4 + (-3) = 1 \end{array}$$

d)  $n^2 + 10n + 25$

$$\begin{array}{l} P 25 \\ S 10 \\ F 5, 5 \end{array} \quad \begin{array}{l} (n+5)(n+5) \\ \text{or} \\ (n+5)^2 \end{array}$$

← Perfect square trinomial

$$\begin{array}{l} \text{Try} \\ x^2 + 25x + 24 \\ x^2 - 10x + 25 \end{array} \quad \begin{array}{l} (x+24)(x+1) \\ (x-5)(x-5) \\ \text{or} \\ (x-5)^2 \end{array}$$

e)  $x^4 + 11x^2 + 24$

$$\begin{array}{l} P 24 \\ S 11 \\ F 3, 8 \end{array} \quad (x^2+8)(x^2+3)$$

**Example 3****Factoring a Trinomial Written in Ascending Order**

Factor.

$-24 - 5d + d^2$

$$\text{rewrite } d^2 - 5d - 24$$

$$\begin{array}{l} P -24 \\ S -5 \\ F -8, 3 \end{array} \quad (d+3)(d-8)$$

$$\begin{array}{l} \text{Try} \\ x^2 + x - 72 \\ (x+9)(x-8) \end{array}$$

$$\begin{array}{l} P -72 \\ S 1 \\ F -8, 9 \end{array}$$

$$\begin{array}{l} 4 - 5x + x^2 \\ x^2 - 5x + 4 \end{array}$$

$$\begin{array}{l} P 4 \\ S -5 \\ F -4, -1 \end{array} \quad (x-1)(x-4)$$

S -5  
F -4, -1

**Example 4****Factoring a Trinomial with a Common Factor**

Factor.

a.)  $\frac{2x^2}{2} - \frac{4x}{2} - \frac{30}{2}$

$2(x^2 - 2x - 15)$

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

P -15

S -2

F 3, -5

3, -5  
adds to -2

b.)  $\frac{-5h^2}{-5} - \frac{20h}{-5} + \frac{60}{-5}$

$-5(h^2 + 4h - 12)$

$-5(h+6)(h-2)$

P -12

S 4

F -2, 6

mult to (-12)  
-2, 6  
add to 4