# L4 Factoring Trinomials a=1

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# Lesson 4 Factoring Trinomials

## Factoring Trinomials

**Trinomial:** a polynomial containing three terms

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

ie. $1x^2 + 5x + 6$
$(x+3)(x+2)$

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 $b$)

P $6$
S $5$
F $2, 3$

**Example 1**
Factor.

a) $1x^2 - 2x - 8$

$(x+2)(x-4)$

$ax^2 + bx + c$
$x^2 + (-2)x + (-8)$
$a=1$ $b=-2$ $c=-8$

P $-8$
S $-2$
F $-4, 2$

$-4, 2$
P $(-4)(2) = -8$
S $(-4)+2 = -2$

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

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

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

* can check using multiplication

$(x-5)(x-7)$
$x^2 - 7x - 5x + 35$
$x^2 - 12x + 35$

~~7, 5~~ 12
$-7, -5$ $-12$ ✓

c) $x^2 + x - 12$

P -12
S 1
F 4, -3

$(x-3)(x+4)$

| | Sum |
|---|---|
| -1, 12 | 11 |
| -2, 6 | 4 |
| -3, 4 | 1 |

d) $n^2 + 10n + 25$ ← Perfect square trinomial

P 25
S 10
F 5, 5

$(n+5)(n+5)$
or
$(n+5)^2$ ← same factor twice

Try
$x^2 - 7x + 10$ $(x-5)(x-2)$
$x^2 - x - 42$ $(x-7)(x+6)$

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

P 24
S 11
F 8, 3

$(x^2+3)(x^2+8)$

**Example 3**
**Factoring a Trinomial Written in Ascending Order**
Factor.
$-24 - 5d + d^2$

rewrite
$d^2 - 5d - 24$

P -24
S -5
F -8, 3

$(d+3)(d-8)$

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

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

GCF first !!

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

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

P -15
S -2
F -5, 3

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

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

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

P -12
S 4
F 6, -2