

**Objectives:**

- Students will be able to factor quadratics with a leading coefficient of 1.

**Vocabulary:**

$$ax^2 + bx + c \quad a=1$$

- **Factoring quadratic trinomials of the form:**  $x^2 + bx + c$ 
  - Trial and Error Method

Consider:  $(x + m)(x + n)$

$$= x^2 + xn + xm + m \cdot n$$

$$= x^2 + (m + n)x + mn$$

→ Often the polynomials we need to factor take this form.

→ So all we need to do is find two numbers that add up to the coefficient on the 'x' term and multiply to the constant.

**Distribution:**

1.  $(x + 3)(x + 4)$

$$\begin{aligned} &= x^2 + 4x + 3x + (3 \cdot 4) \\ &= x^2 + (4+3)x + 3 \cdot 4 \\ &= \boxed{x^2 + 7x + 12} \end{aligned}$$

2.  $(x - 4)(x + 8)$

$$\begin{aligned} &= x^2 + 8x - 4x + (-4 \cdot 8) \\ &= x^2 + (8-4)x + (-4 \cdot 8) \\ &= \boxed{x^2 + 4x - 32} \end{aligned}$$

**Example Set 1:** Factor each quadratic trinomial.

1.  $x^2 + 7x + 12$

$$\begin{aligned} &= \boxed{x^2 + 3x + 4x + 12} \quad \begin{array}{r} 12 \\ 1, 12 \\ 2, 6 \\ \boxed{3, 4} \end{array} \\ &= x(x+3) + 4(x+3) \\ &= \boxed{(x+3)(x+4)} \end{aligned}$$

2.  $2x^2 + 8x - 64$

$$\begin{aligned} &= 2(x^2 + 4x - 32) \quad \begin{array}{r} -32 \\ -1, 32 \\ 1, -32 \\ -2, 16 \\ 2, -16 \\ \boxed{-4, 8} \\ 4, -8 \end{array} \\ &= 2(x^2 - 4x + 8x - 32) \\ &= 2[x(x-4) + 8(x-4)] \\ &= \boxed{2(x-4)(x+8)} \end{aligned}$$

3.  $x^2 - 3x + 2$

$$\begin{aligned} &= \boxed{x^2 - x - 2x + 2} \quad \begin{array}{r} 2 \\ 1, 2 \\ \boxed{-1, -2} \end{array} \\ &= x(x-1) - 2(x-1) \\ &= \boxed{(x-1)(x-2)} \end{aligned}$$

4.  $x^2 - x - 20$

$$\begin{aligned} &= \boxed{x^2 - 5x + 4x - 20} \quad \begin{array}{r} -20 \\ -1, 20 \\ 1, -20 \\ \boxed{-5, 4} \\ 5, -4 \\ -2, 10 \\ 2, -10 \end{array} \\ &= x(x-5) + 4(x-5) \\ &= \boxed{(x-5)(x+4)} \end{aligned}$$

Checking your work:

$$\begin{aligned} &(x-1)(x-2) \\ &x^2 - 2x - x + 2 \\ &x^2 - 3x + 2 \checkmark \end{aligned}$$

Checking your work:

$$\begin{aligned} &x^2 + 4x - 5x - 20 \\ &x^2 - 1x - 20 \checkmark \end{aligned}$$

## 6.3 - In Class Practice

Date \_\_\_\_\_ Period \_\_\_\_\_

Factor each completely.

1)  $n^2 - 17n + 70$

$(n - 10)(n - 7)$

2)  $n^2 - 5n$

$n(n - 5)$

3)  $r^2 + 4r - 21$

$(r - 3)(r + 7)$

4)  $x^2 + 12x + 32$

$(x + 8)(x + 4)$

5)  $x^2 - x - 20$

$(x - 5)(x + 4)$

6)  $m^2 - 3m + 2$

$(m - 2)(m - 1)$

7)  $m^2 + 3m - 70$

$(m - 7)(m + 10)$

8)  $m^2 + m - 30$

$(m - 5)(m + 6)$

9)  $n^2 + 7n - 30$

$(n + 10)(n - 3)$

10)  $r^2 - 2r$

$r(r - 2)$

11)  $x^2 - 8x$

$x(x - 8)$

12)  $b^2 - 5b - 36$

$(b - 9)(b + 4)$

13)  $4k^2 + 36k + 72$

$4(k + 6)(k + 3)$

14)  $3n^2 + 21n$

$3n(n + 7)$

15)  $3p^2 - 45p + 150$

$3(p - 10)(p - 5)$

16)  $4v^2 + 64v + 252$

$4(v + 9)(v + 7)$

17)  $6p^2 + 24p$

$6p(p + 4)$

18)  $2a^2 + 14a + 12$

$2(a + 1)(a + 6)$

19)  $p^2 - 3p - 4$

$(p - 4)(p + 1)$

20)  $4k^2 + 4k - 288$

$4(k - 8)(k + 9)$