8-6 Study Guide
Solving $x^2 + bx + c = 0$

Factor $x^2 + bx + c$ To factor a trinomial of the form $x^2 + bx + c$, find two integers, m and p, whose sum is equal to b and whose product is equal to c.

Factoring $x^2 + bx + c$	$x^2 + bx + c = (x + m)(x + p)$, where $m + p = b$ and $mp = c$

Example 1: Factor each polynomial.

a. $x^2 + 7x + 10$

In this trinomial, $b = 7$ and $c = 10$.

Factors of 10	Sum of Factors
1, 10	11
2, 5	7

Since $2 + 5 = 7$ and $2 \cdot 5 = 10$, let $m = 2$ and $p = 5$.

$x^2 + 7x + 10 = (x + 5)(x + 2)$

b. $x^2 - 8x + 7$

In this trinomial, $b = -8$ and $c = 7$. Notice that $m + p$ is negative and mp is positive, so m and p are both negative.

Since $-7 + (-1) = -8$ and $(-7)(-1) = 7$, $m = -7$ and $p = -1$.

$x^2 - 8x + 7 = (x - 7)(x - 1)$

Example 2 : Factor $x^2 + 6x - 16$.

In this trinomial, $b = 6$ and $c = -16$. This means $m + p$ is positive and mp is negative. Make a list of the factors of -16, where one factor of each pair is positive.

Factors of –16	Sum of Factors
1, –16	–15
–1, 16	15
2, –8	–6
–2, 8	6

Therefore, $m = -2$ and $p = 8$.

$x^2 + 6x - 16 = (x - 2)(x + 8)$

Exercises

Factor each polynomial.

1. $x^2 + 4x + 3$

2. $m^2 + 12m + 32$

3. $r^2 - 3r + 2$

4. $x^2 - x - 6$

5. $x^2 - 4x - 21$

6. $x^2 - 22x + 121$

7. $t^2 - 4t - 12$

8. $p^2 - 16p + 64$

9. $9 - 10x + x^2$

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

11. $a^2 + 8a - 9$

12. $y^2 - 7y - 8$

13. $x^2 - 2x - 3$

14. $y^2 + 14y + 13$

15. $m^2 + 9m + 20$

16. $x^2 + 12x + 20$

17. $a^2 - 14a + 24$

18. $18 + 11y + y^2$

19. $x^2 + 2xy + y^2$

20. $a^2 - 4ab + 4b^2$

21. $x^2 + 6xy - 7y^2$

8-6 Study Guide *(continued)*
Solving $x^2 + bx + c = 0$

Solve Equations by Factoring Factoring and the Zero Product Property can be used to solve many equations of the form $x^2 + bx + c = 0$.

Example : Solve $x^2 + 6x = 7$. Check your solutions.

$x^2 + 6x = 7$	Original equation
$x^2 + 6x - 7 = 0$	Rewrite equation so that one side equals 0.
$(x - 1)(x + 7) = 0$	Factor.
$x - 1 = 0$ or $x + 7 = 0$	Zero Product Property
$x = 1$ $\quad$ $x = -7$	Solve each equation.

Since $1^2 + 6(1) = 7$ and $(-7)^2 + 6(-7) = 7$, the solution set is $\{1, -7\}$.

Exercises

Solve each equation. Check the solutions.

1. $x^2 - 4x + 3 = 0$ **2.** $y^2 - 5y + 4 = 0$ **3.** $m^2 + 10m + 9 = 0$

4. $x^2 = x + 2$ **5.** $x^2 - 4x = 5$ **6.** $x^2 - 12x + 36 = 0$

7. $t^2 - 8 = -7t$ **8.** $p^2 = 9p - 14$ **9.** $-9 - 8x + x^2 = 0$

10. $x^2 + 6 = 5x$ **11.** $a^2 = 11a - 18$ **12.** $y^2 - 8y + 15 = 0$

13. $x^2 = 24 - 10x$ **14.** $a^2 - 18a = -72$ **15.** $b^2 = 10b - 16$