**8-7 Study Guide and Intervention**

***Solving ax2* + *bx* + *c* = 0**

**Factor + *bx* + *c*** To factor a trinomial of the form + *bx* + *c*, find two integers, *m* and *p* whose product is equal to *ac* and whose sum is equal to *b*. If there are no integers that satisfy these requirements, the polynomial is called a **prime polynomial**.

**Example 1: Factor 2 + 15*x* + 18.**

In this example, *a* = 2, *b* = 15, and *c* = 18. You need to find two numbers that have a sum of 15 and a product of 2 ⋅ 18 or 36. Make a list of the factors of 36 and look for

the pair of factors with a sum of 15.

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| **Factors of 36** | **Sum of Factors** |
| 1, 36 | 37 |
| 2, 18 | 20 |
| 3, 12 | 15 |

Use the pattern *a* + *mx* + *px* + *c*, with *a* = 2, *m* = 3,

*p* = 12, and *c* = 18.

2 + 15*x* + 18 = 2 + 3*x* + 12*x* + 18

= (2 + 3*x*) + (12*x* + 18)

= *x*(2*x* + 3) + 6(2*x* + 3)

= (*x* + 6)(2*x* + 3)

Therefore, 2 + 15*x* + 18 = (*x* + 6)(2*x* + 3).

**Example 2: Factor 3 – 3*x* – 18.**

Note that the GCF of the terms 3, 3*x*, and 18 is 3.   
First factor out this GCF. 3 – 3*x* – 18 = 3( – *x* – 6).

Now factor – *x* – 6. Since *a* = 1, find the two factors   
of –6 with a sum of –1.

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| **Factors of –6** | **Sum of Factors** |
| 1, –6 | –5 |
| –1, 6 | 5 |
| –2, 3 | 1 |
| 2, –3 | –1 |

Now use the pattern (*x* + *m*)(*x* + *p*) with *m* = 2 and *p* = –3.

– *x* – 6 = (*x* + 2)(*x* – 3)

The complete factorization is

3 – 3*x* – 18 = 3(*x* + 2)(*x* – 3).

**Exercises**

**Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.**

**1.** 2 – 3*x* – 2 **2.** 3 – 8*m* – 3 **3.** 16 – 8*r* + 1

**4.** 6 + 5*x* – 6 **5.** 3 + 2*x* – 8 **6.** 18 – 27*x* – 5

**7.** 2 + 5*a* + 3 **8.** 18 + 9*y* – 5 **9.** –4 + 19*t* – 21

**10.** 8 – 4*x* – 24 **11.** 28 + 60*p* – 25 **12.** 48 + 22*x* – 15

**13.** 3 – 6*y* – 24 **14.** 4 + 26*x* – 48 **15.** 8 – 44*m* + 48

**16.** 6 – 7*x* + 18 **17.** 2 – 14*a* + 18 **18.** 18 + 11*y* + 2

**8-7 Study Guide and Intervention** *(continued)*

***Solving ax*2 + *bx* + *c* = 0**

**Solve Equations by Factoring** Factoring and the Zero Product Property can be used to solve some equations of the form *a* + *bx* + *c* = 0.

**Example: Solve 12 + 3*x* = 2 – 2*x*. Check your solutions.**

12 + 3*x* = 2 – 2*x* Original equation

12 + 5*x* – 2 = 0 Rewrite equation so that one side equals 0.

(3*x* + 2)(4*x* – 1) = 0 Factor the left side.

3*x* + 2 = 0 or 4*x* – 1 = 0 Zero Product Property

*x* = – *x* = Solve each equation.

The solution set is .

Since 12 + 3 = 2 – 2 and 12+ 3 = 2 – 2 , the solutions check.

**Exercises**

**Solve each equation. Check the solutions.**

**1.** 8 + 2*x* – 3 = 0 **2.** 3 – 2*n* – 5 = 0 **3.** 2 – 13*d* – 7 = 0

**4.** 4 = *x* + 3 **5.** 3 – 13*x* = 10 **6.** 6 – 11*x* – 10 = 0

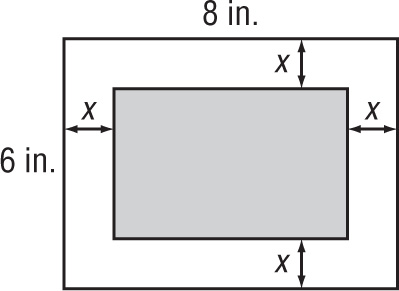
**7.** 2 – 40 = –11*k* **8.** 2 = –21*p* – 40 **9.** –7 – 18*x* + 9 = 0

**10.** 12 – 15 = – 8*x* **11.** 7 = –65*a* – 18 **12.** 16 – 2*y* – 3 = 0

**13.** 8 + 5*x* = 3 + 7*x* **14.** 4 – 18*a* + 5 = 15 **15.** 3 – 18*b* = 10*b* – 49

**16.** The difference of the squares of two consecutive odd integers is 24. Find the integers.

**17. GEOMETRY** The length of a Charlotte, North Carolina, conservatory garden is 20 yards greater than its width.   
The area is 300 square yards. What are the dimensions?



**18. GEOMETRY** A rectangle with an area of 24 square inches is formed by cutting strips of equal width from a rectangular piece of paper. Find the dimensions of the new rectangle if the original rectangle measures 8 inches by 6 inches.