

Factoring Trinomials: $ax^2 + bx + c$

(Pages 440–444)

You can also use the FOIL method to help factor trinomials in which the coefficient of x^2 is a number other than 1.

EXAMPLEFactor $6x^2 - 22x - 8$.

First, check for a GCF.

 $6x^2 - 22x - 8 = 2(3x^2 - 11x - 4)$ The GCF of the terms is 2. Use the Distributive Property.Now factor $3x^2 - 11x - 4$. $3x^2$ is the product of the **F**irst terms, and -4 is the product of the **L**ast terms.

$$3x^2 - 11x - 4 = (3x + \blacksquare)(x + \blacksquare)$$

Find integers whose product is -4 . Try factor pairs of -4 until the sum of the products of the **O**uter and **I**nner terms is $-11x$.

Try -1 and 4 . $(3x - 1)(x + 4) = 3x^2 + 12x - x - 4$
 $= 3x^2 + 11x - 4$ $11x$ is not the correct middle term.

Try 1 and -4 $(3x + 1)(x - 4) = 3x^2 - 12x + x - 4$
 $= 3x^2 - 11x - 4$ $-11x$ is the correct middle term.

Therefore, $6x^2 - 22x - 8 = 2(3x + 1)(x - 4)$.**PRACTICE**

Factor each trinomial. If the trinomial cannot be factored, write prime.

- | | | |
|----------------------|------------------------|-----------------------|
| 1. $2y^2 + 11y + 15$ | 2. $4n^2 + 3n - 7$ | 3. $6k^2 + 4k - 2$ |
| 4. $7w^2 - 11w + 4$ | 5. $3b^2 - 10b - 25$ | 6. $5n^2 - 22n + 8$ |
| 7. $3a^2 - 8a - 3$ | 8. $4m^2 + 2m - 5$ | 9. $8y^2 + 13y + 5$ |
| 10. $2x^2 + x - 6$ | 11. $10h^2 - 34h + 12$ | 12. $3n^2 - 5n - 8$ |
| 13. $2x^2 + 3x - 20$ | 14. $9x^2 - 18x + 5$ | 15. $20x^2 + 17x + 3$ |
| 16. $8g^2 - 4g - 12$ | 17. $8y^2 - 14y - 4$ | 18. $6m^2 - m - 15$ |

19. **Geometry** The area of a rectangle is $(6x^2 + 7x + 2)$ square inches. Find binomial expressions to represent the dimensions of this rectangle.



20. **Standardized Test Practice** Factor the trinomial $3x^2 - 13x - 10$.

A $(3x + 10)(x - 1)$ **B** $(3x - 1)(x + 10)$ **C** $(3x - 5)(x + 2)$ **D** $(3x + 2)(x - 5)$

Answers: 1. $(2y + 5)(y + 3)$ 2. $(4n + 7)(n - 1)$ 3. $2(3k - 1)(k + 1)$ 4. $(7w - 4)(w - 1)$ 5. $(3b + 5)(b - 5)$ 6. $(5n - 2)(n - 4)$ 7. $(3a + 1)(a - 3)$ 8. prime 9. $(8y + 5)(y + 1)$ 10. $(2x - 3)(x + 2)$ 11. $2(5h - 2)(h - 3)$ 12. $(3n - 8)(n + 1)$ 13. $(2x - 5)(x + 4)$ 14. $(3x - 1)(3x - 5)$ 15. $(4x + 1)(5x + 3)$ 16. $(4g + 4)(2g - 3)$ 17. $2(4y + 1)(y - 2)$ 18. $(2m + 3)(3m - 5)$ 19. $3x + 2$ by $2x + 1$ 20. D