

Factor each polynomial over the integers.

Examples: a.  $8x^3 - y^3$

b.  $3x^4 - 3x^2 - 36$

Solutions: a.  $8x^3 - y^3$

$$(2x)^3 - (y)^3$$

$$(2x - y)((2x)^2 + (2x)(y) + (y)^2)$$

$$(2x - y)(4x^2 + 2xy + y^2)$$

b.  $3x^4 - 3x^2 - 36$

$$3(x^4 - x^2 - 12)$$

$$3(x^2 + 3)(x^2 - 4)$$

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

1.  $8 + y^3$  \_\_\_\_\_

2.  $1 - 27x^3$  \_\_\_\_\_

3.  $x^3 - 27$  \_\_\_\_\_

4.  $x^3 - 1000$  \_\_\_\_\_

5.  $64h^3 - k^3$  \_\_\_\_\_

6.  $n^3 + 1$  \_\_\_\_\_

7.  $1 + 64a^9$  \_\_\_\_\_

8.  $3x^2y - 48y$  \_\_\_\_\_

9.  $125 - 8a^3$  \_\_\_\_\_

10.  $300 - 75x^2$  \_\_\_\_\_

11.  $3 - 16x - 12x^2$  \_\_\_\_\_

12.  $28x^5 - 63x^3$  \_\_\_\_\_

13.  $5a^3 - 20a^2 + 15a$  \_\_\_\_\_

14.  $-6b^3 - 18b^2 + 60b$  \_\_\_\_\_

15.  $-18x^4 - 12x^3 - 2x^2$  \_\_\_\_\_

16.  $4a^2x - 48ax + 144x$  \_\_\_\_\_

17.  $16b^4 - a^4$  \_\_\_\_\_

18.  $2x^4 - 16x^2 - 18$  \_\_\_\_\_

19.  $3c^4 + 30c^2 + 72$  \_\_\_\_\_

20.  $5x^4 + 135x$  \_\_\_\_\_

21.  $16x^2 + 4xy - 6y^2$  \_\_\_\_\_

## 6-5 FACTORING QUADRATIC TRINOMIALS

(Pages 201-203)

*Factor each polynomial over the integers.*

Examples: a.  $x^2 - 2x - 35$

b.  $2x^6 - 7x^3 + 3$

Solutions: a.  $x^2 - 2x - 35$   
 $(x + 5)(x - 7)$

b.  $2x^6 - 7x^3 + 3$   
 $(2x^3 - 1)(x^3 - 3)$

- |                         |       |                           |       |
|-------------------------|-------|---------------------------|-------|
| 1. $y^2 + 8y + 12$      | _____ | 2. $a^2 - 10a + 21$       | _____ |
| 3. $x^2 + 3x - 18$      | _____ | 4. $c^2 - 6c - 16$        | _____ |
| 5. $a^2 - 11a + 30$     | _____ | 6. $x^2 - 10x + 9$        | _____ |
| 7. $2x^2 - 7x + 3$      | _____ | 8. $3y^2 + 5y + 2$        | _____ |
| 9. $5b^2 + 13b + 6$     | _____ | 10. $2a^2 + a - 1$        | _____ |
| 11. $4x^2 + 8x + 3$     | _____ | 12. $3x^2 - 13x + 4$      | _____ |
| 13. $h^2 + 8h + 15$     | _____ | 14. $2n^2 + n - 3$        | _____ |
| 15. $7a^2 + 2a - 5$     | _____ | 16. $x^2 - 4x - 21$       | _____ |
| 17. $y^2 - 12y + 27$    | _____ | 18. $6x^2 - 5x - 1$       | _____ |
| 19. $a^2 + 9a - 10$     | _____ | 20. $x^6 - 3x^3y - 10y^2$ | _____ |
| 21. $2h^4 - 9h^2 + 7$   | _____ | 22. $3b^2 + 11b + 10$     | _____ |
| 23. $n^4 - n^2b - 6b^2$ | _____ | 24. $c^2 - 7cd + 12d^2$   | _____ |
| 25. $8x^2 + 18x + 9$    | _____ | 26. $9a^2 + 6a - 8$       | _____ |
| 27. $9x^2 - 26x - 3$    | _____ | 28. $6a^6 + a^3 - 12$     | _____ |
| 29. $15 - 2x - x^2$     | _____ | 30. $6 - 13d + 2d^2$      | _____ |

Factor each polynomial over the integers.  
For Exercises 1-6, one factor is written for you.

Examples: a.  $3x^4 - 30x^2$                       b.  $4x(x + 2) - 7(x + 2)$

Solutions: a.  $3x^2(x^2 - 10)$                       b.  $(x + 2)(4x - 7)$

- |                               |                                 |                        |                                  |
|-------------------------------|---------------------------------|------------------------|----------------------------------|
| 1. $32x^3 - 48x^2$            | $\frac{16x^2}{\text{_____}}$    | 2. $20a^3b + 5a^2$     | $\frac{5a^2}{\text{_____}}$      |
| 3. $1 - a^2b^2$               | $\frac{(1 + ab)}{\text{_____}}$ | 4. $4y^3 + 28y^2$      | $\frac{(y + 7)}{\text{_____}}$   |
| 5. $6a^2b + 3ab^2$            | $\frac{3ab}{\text{_____}}$      | 6. $x^4 + 3x^2 + 2$    | $\frac{(x^2 + 1)}{\text{_____}}$ |
| 7. $7y^2 + 21y + 21$          | $\text{_____}$                  | 8. $16h^2 + 8h + 1$    | $\text{_____}$                   |
| 9. $9n^2 + 30n + 25$          | $\text{_____}$                  | 10. $k^2 - 81$         | $\text{_____}$                   |
| 11. $16x^2 - 9y^2$            | $\text{_____}$                  | 12. $9k^2 - h^2$       | $\text{_____}$                   |
| 13. $16c^2 + 24c + 9$         | $\text{_____}$                  | 14. $a^2 + 20a + 100$  | $\text{_____}$                   |
| 15. $4x^{10} - 9$             | $\text{_____}$                  | 16. $4x^2 - 4xy + y^2$ | $\text{_____}$                   |
| 17. $9h^3k + 6h^2k^2 - 3h^2k$ | $\text{_____}$                  |                        |                                  |
| 18. $3a(2a + 1) - 5(2a + 1)$  | $\text{_____}$                  |                        |                                  |
| 19. $5ab - 20b - 7a + 28$     | $\text{_____}$                  |                        |                                  |
| 20. $xy + 6y + 5x + 30$       | $\text{_____}$                  |                        |                                  |
| 21. $1 - 4a^6$                | $\text{_____}$                  |                        |                                  |
| 22. $a(h^2 + 7) - b(h^2 + 7)$ | $\text{_____}$                  |                        |                                  |
| 23. $x^3 + 5x^2 + 4x + 20$    | $\text{_____}$                  |                        |                                  |
| 24. $144a^2 - 25b^2c^4$       | $\text{_____}$                  |                        |                                  |
| 25. $x^3 - 4x^2 + 2x - 8$     | $\text{_____}$                  |                        |                                  |

6-3 MULTIPLICATION OF POLYNOMIALS

(Pages 193-196)

Find each product.

Examples: a.  $(-5x^2y)^2(3xy^4)$

b.  $(2x + 5)(x - 6)$

Solutions: a.  $(-3x^2y)^2(3xy^4)$

b.  $(2x + 5)(x - 6)$

$(9x^4y^2)(3xy^4)$

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

$27x^5y^6$

$2x^2 - 7x - 30$

1.  $(-8ab^3)(5a^2b^3)$  \_\_\_\_\_

2.  $16x^2y^3(-3xy^7)$  \_\_\_\_\_

3.  $(2xy)^3(-4x^2)$  \_\_\_\_\_

4.  $5a^2b(-3ab)^2$  \_\_\_\_\_

5.  $(6hk)^2(-2k^2)^3$  \_\_\_\_\_

6.  $(x^5y^7)^2(-x^4y)^5$  \_\_\_\_\_

7.  $(-3x^2)(5y^3)(-4xy)$  \_\_\_\_\_

8.  $8xy^4(-x^7)(-2y^4)$  \_\_\_\_\_

9.  $-5ab(8a - 3b)$  \_\_\_\_\_

10.  $2x(9x^3 - 7x + 1)$  \_\_\_\_\_

11.  $(x - 6)(x - 7)$  \_\_\_\_\_

12.  $(2x + 1)(x + 6)$  \_\_\_\_\_

13.  $(4y + 1)(4y - 1)$  \_\_\_\_\_

14.  $(a + 9)(2a - 11)$  \_\_\_\_\_

15.  $(3c - 2)(5c - 4)$  \_\_\_\_\_

16.  $(2 - 5y)(2 + 5y)$  \_\_\_\_\_

17.  $(2x - y)(3x + 4y)$  \_\_\_\_\_

18.  $(a - 7b)(9a - 2b)$  \_\_\_\_\_

19.  $(x - 5)^2$  \_\_\_\_\_

20.  $(c + d)^2$  \_\_\_\_\_

21.  $(4y + 3)^2$  \_\_\_\_\_

22.  $(7a - 1)^2$  \_\_\_\_\_

23.  $3(8x - 1)(8x + 1)$  \_\_\_\_\_

24.  $2x(x - 7)(2x - 3)$  \_\_\_\_\_

25.  $-7x(a - 6)(4a + 1)$  \_\_\_\_\_

26.  $-11(3h - 5k)(h + k)$  \_\_\_\_\_

27.  $(2x^2 + 7)(3x + 5)$  \_\_\_\_\_

28.  $(y^2 - 9y + 1)(y - 9)$  \_\_\_\_\_