# 8-2 **Exercises**

HIDED DDACTICE

	U	JIDED PRACING				
AMPLE	1 Fac	tor each polynomial. Ch	eck y	our answer.		A
p. 531	1.	$15a - 5a^2$	2.	$10g^3 - 3g$		
	3.	-35x + 42	4.	$-4x^2 - 6x$		
	5.	$12h^4 + 8h^2 - 6h$	6.	$3x^2 - 9x + 3$		
	7.	$9m^2 + m$	8.	$14n^3 + 7n + 7n^2$		
	9.	$36f + 18f^2 + 3$	10.	$-15b^2 + 7b$		A PROPERTY
AMPLE	2 11.	Physics A model rocke	et is f	ired vertically into		
p. 532		the air at 320 ft/s. The ex gives the rocket's height Factor this expression.	xpres after	$\frac{16t^2 + 320t}{t \text{ seconds.}}$		
AMPLE	3 Fac	tor each expression.				
p. 533	<b>L</b> 12.	5(m-2)-m(m-2)	13.	2b(b+3) + 5(b+3)	14.	4(x-3) - x(y+2)
AMPLE	4 Fac	tor each polynomial by g	group	ing. Check your answer.		
p. 533	15.	$x^3 + 4x^2 + 2x + 8$	16.	$6x^3 + 4x^2 + 3x + 2$	17.	$4b^3 - 6b^2 + 10b - 15$
	18.	$2m^3 + 4m^2 + 6m + 12$	19.	$7r^3 - 35r^2 + 6r - 30$	20.	$10a^3 + 4a^2 + 5a + 2$
AMPLE	<b>5</b> 21.	$2r^2 - 6r + 12 - 4r$	22.	$6b^2 - 3b + 4 - 8b$	23.	$14q^2 - 21q + 6 - 4q$
p. 534	24.	$3r - r^2 + 2r - 6$	25.	$2m^3 - 6m^2 + 9 - 3m$	26.	$6a^3 - 9a^2 - 12 + 8a$
	AMPLE p. 531 AMPLE p. 532 AMPLE p. 533 AMPLE p. 533	AMPLE 1 Fac   p. 531 1.   g. 531 1.   3. 5.   7. 9.   AMPLE 2   AMPLE 2   p. 532 11.   p. 532 12.   AMPLE 3 Fac   p. 533 12.   AMPLE 4 Fac   p. 533 15.   AMPLE 5 21.   p. 534 24.	AMPLE 1 Factor each polynomial. Characterization   p. 531 1. $15a - 5a^2$ 3. $-35x + 42$ 5. $12h^4 + 8h^2 - 6h$ 7. $9m^2 + m$ 9. $36f + 18f^2 + 3$ AMPLE 2   p. 532 11. Physics A model rocket the air at 320 ft/s. The expression.   p. 533 11. Physics A model rocket the air at 320 ft/s. The expression.   p. 533 12. $5(m - 2) - m(m - 2)$ AMPLE 3   p. 533 12. $5(m - 2) - m(m - 2)$ AMPLE 4   p. 533 15. $x^3 + 4x^2 + 2x + 8$ 18. $2m^3 + 4m^2 + 6m + 12$ AMPLE 5   19. 534 21. $2r^2 - 6r + 12 - 4r$ p. 534 24. $3r - r^2 + 2r - 6$	AMPLE 1 Factor each polynomial. Check y   p. 531 1. $15a - 5a^2$ 2.   3. $-35x + 42$ 4.   5. $12h^4 + 8h^2 - 6h$ 6.   7. $9m^2 + m$ 8.   9. $36f + 18f^2 + 3$ 10.   AMPLE 2   p. 532 11. Physics A model rocket is f   p. 532 11. Physics A model rocket is f   p. 533 12. $5(m - 2) - m(m - 2)$ 13.   AMPLE 3   p. 533 12. $5(m - 2) - m(m - 2)$ 13.   AMPLE 4 Factor each expression.   p. 533 12. $5(m - 2) - m(m - 2)$ 13.   AMPLE 4 Factor each polynomial by group   p. 533 15. $x^3 + 4x^2 + 2x + 8$ 16.   18. $2m^3 + 4m^2 + 6m + 12$ 19.   AMPLE 5 21. $2r^2 - 6r + 12 - 4r$ 22.   p. 534 24. $3r - r^2 + 2r - 6$ 25.	AMPLE1Factor each polynomial. Check your answer.p. 5311. $15a - 5a^2$ 2. $10g^3 - 3g$ 3. $-35x + 42$ 4. $-4x^2 - 6x$ 5. $12h^4 + 8h^2 - 6h$ 6. $3x^2 - 9x + 3$ 7. $9m^2 + m$ 8. $14n^3 + 7n + 7n^2$ 9. $36f + 18f^2 + 3$ 10. $-15b^2 + 7b$ AMPLE2p. 53211. Physics A model rocket is fired vertically into the air at 320 ft/s. The expression $-16t^2 + 320t$ gives the rocket's height after t seconds. Factor this expression.p. 533Factor each expression.p. 53312. $5(m-2) - m(m-2)$ 13. $2b(b+3) + 5(b+3)$ AMPLE4p. 533Factor each polynomial by grouping. Check your answer.p. 53315. $x^3 + 4x^2 + 2x + 8$ 16. $6x^3 + 4x^2 + 3x + 2$ 18. $2m^3 + 4m^2 + 6m + 12$ 19. $7r^3 - 35r^2 + 6r - 30$ AMPLE521. $2r^2 - 6r + 12 - 4r$ 22. $6b^2 - 3b + 4 - 8b$ p. 53424. $3r - r^2 + 2r - 6$ 25. $2m^3 - 6m^2 + 9 - 3m$	AMPLE1Factor each polynomial. Check your answer.p. 5311. $15a - 5a^2$ 2. $10g^3 - 3g$ 3. $-35x + 42$ 4. $-4x^2 - 6x$ 5. $12h^4 + 8h^2 - 6h$ 6. $3x^2 - 9x + 3$ 7. $9m^2 + m$ 8. $14n^3 + 7n + 7n^2$ 9. $36f + 18f^2 + 3$ 10. $-15b^2 + 7b$ AMPLE211. Physics A model rocket is fired vertically into the air at 320 ft/s. The expression $-16t^2 + 320t$ gives the rocket's height after t seconds. Factor this expression.p. 532Factor each expression. p. 533p. 53312. $5(m-2) - m(m-2)$ 13. $2b(b+3) + 5(b+3)$ 14.AMPLEFactor each polynomial by grouping. Check your answer. $p. 533$ p. 53315. $x^3 + 4x^2 + 2x + 8$ 16. $6x^3 + 4x^2 + 3x + 2$ 17. $18. 2m^3 + 4m^2 + 6m + 12$ 19. $7r^3 - 35r^2 + 6r - 30$ 20.AMPLE21. $2r^2 - 6r + 12 - 4r$ 22. $6b^2 - 3b + 4 - 8b$ 23.p. 53424. $3r - r^2 + 2r - 6$ 25. $2m^3 - 6m^2 + 9 - 3m$ 26.

#### PRACTICE AND PROBLEM SOLVING Factor each polynomial. Check your answer. **Independent Practice**

F J		
<b>27.</b> $9y^2 + 45y$	<b>28.</b> $36d^3 + 24$	<b>29.</b> $-14x^4 + 5x^2$
<b>30.</b> $-15f - 10f^2$	<b>31.</b> $-4d^4 + d^3 - 3d^2$	<b>32.</b> $14x^3 + 63x^2 - 7x$
<b>33.</b> $21c^2 + 14c$	<b>34.</b> $33d^3 + 22d + 11$	<b>35.</b> $-5g^3 - 15g^2$

**36. Finance** After *t* years, the amount of money in a savings account that earns simple interest is P + Prt, where P is the starting amount and r is the yearly interest rate. Factor this expression.

### Factor each expression.

37.	6a(a-2) - 5b(b+4)	<b>38.</b> $-4x(x+2) + 9(x+2)$	<b>39.</b> $6y(y-7) + (y-7)$
40.	a(x-3) + 2b(x-3)	<b>41.</b> $-3(2+b) + 4b(b+2)$	<b>42.</b> $5(3x-2) + x(3x-2)$

## Factor each polynomial by grouping. Check your answer.

43.	$2a^3 - 8a^2 + 3a - 12$	<b>44.</b> $x^3 + 3x^2 + 5x + 15$	<b>45.</b> $6x^3 + 18x^2 + x + 3$
46.	$7x^3 + 2x^2 + 28x + 8$	<b>47.</b> $n^3 - 2n^2 + 5n - 10$	<b>48.</b> $10b^3 - 16b^2 + 25b - 40$
49.	$2m^3 - 2m^2 + 3 - 3m$	<b>50.</b> $2d^3 - d^2 - 3 + 6d$	<b>51.</b> $6f^3 - 8f^2 + 20 - 15f$
52.	$5k^2 - k^3 + 3k - 15$	<b>53.</b> $b^3 - 2b - 8 + 4b^2$	<b>54.</b> $20 - 15x - 6x^2 + 8x$

For See Exercises Example 27-35 1 36 2 37-42 3 43-48 4 49-54 5

**Extra Practice** Skills Practice p. S18 Application Practice p. S35

#### 8-2 Factoring by GCF 535

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Fill in the missing part of each factorization.

**55.** 
$$16v + 12v^2 = 4v(4 + 10)$$
**56.**  $15x - 25x^2 = 5x(3 - 10)$ **57.**  $-16k^3 - 24k^2 = -8k^2(10 + 3)$ **58.**  $-x - 10 = -1(10 + 10)$ 

Copy and complete the table.

	Polynomial	Number of Terms	Name	Completely Factored Form
	3y + 3x + 9	3	trinomial	3(y + x + 3)
59.	$x^{2} + 5x$			
60.	28c <sup>2</sup> – 49c			
61.	$a^4 + a^3 + a^2$			-
62.	$36 + 99r - 40r^2 - 110r^3$			-

**63. Personal Finance** The final amount of money earned by a certificate of deposit (CD) after *n* years can be represented by the expression  $Px^n$ , where *P* is the original amount contributed and *x* is the interest rate.

Year	Amount of CD
2004	\$100.00
2005	\$200.00
2006	\$400.00

Justin's aunt purchased CDs to help him pay for college. The table shows the amount of the CD she

purchased each year. In 2007, she will pay \$800.00 directly to the college.

- **a.** Write expressions for the value of the CDs purchased in 2004, 2005, and 2006 when Justin starts college in 2007.
- **b.** Write a polynomial to represent the total value of the CDs purchased in 2004, 2005, and 2006 plus the amount paid to the college in 2007.
- **c.** Factor the polynomial in part **c** by grouping. Evaluate the factored form of the polynomial when the interest rate is 1.09.



- **65.** Critical Thinking Show two methods of factoring the expression 3a 3b 4a + 4b.
- **66. Geometry** The area of the triangle is represented by the expression  $\frac{1}{2}(x^3 2x + 2x^2 4)$ . The height of the triangle is x + 2. Write an expression for the base of the triangle. (*Hint:* The formula for the area of a triangle is  $A = \frac{1}{2}bh$ .)





**67. Write About It** Explain how you know when two binomials are opposites.

**68.** This problem will prepare you for the Multi-Step Test Prep on page 556.

- **a.** The Multiplication Property of Zero states that the product of any number and 0 is 0. What must be true about either *a* or *b* to make ab = 0?
- **b.** A toy car's distance in feet from the starting point is given by the equation d = t(3 t). Explain why t(3 t) = 0 means that either t = 0 or (3 t) = 0.
- **c.** When d = 0, the car is at the starting point. Use the fact that t = 0 or (3 t) = 0 when d = 0 to find the two times when the car is at the starting point.