

TEKS A.4.A



LESSON

8-2

**Practice B****Factoring by GCF****Factor each polynomial. Check your answer.**

1.  $8c^2 + 7c$

2.  $3n^3 + 12n^2$

3.  $15x^5 - 18x$

4.  $-8s^4 + 20t^3 - 28$

5.  $6n^6 + 18n^4 - 24n$

6.  $-5m^4 - 5m^3 + 5m^2$

7. A ball is hit vertically into the air using a paddle at a speed of 32 ft/sec. The expression  $-16t^2 + 32t$  gives the ball's height after  $t$  seconds. Factor this expression.

8. The area of Margo's laptop computer screen is  $12x^2 + 3x$  in<sup>2</sup>. Factor this polynomial to find expressions for the dimensions of her computer screen.

**Factor each expression.**

9.  $3m(m + 5) + 4(m + 5)$

10.  $16b(b - 3) + (b - 3)$

**Factor each polynomial by grouping.**

11.  $2x^3 + 8x^2 + 3x + 12$

12.  $4n^3 + 3n^2 + 4n + 3$

13.  $10d^2 - 6d + 35d - 21$

14.  $12n^3 - 15n^2 - 8n + 10$

15.  $5b^4 - 15b^3 + 3 - b$

16.  $t^3 - 5t^2 + 10 - 2t$

**LESSON Practice A**  
**8-2 Factoring by GCF**

Factor each polynomial. Check your answer.

1.  $x^2 + 5x$       2.  $5m^3 + 45$       3.  $15y^3 + 20y^5 - 10$   
 $x(x + 5)$        $5(m^3 + 9)$        $5(3y^3 + 4y^5 - 2)$

4.  $10y^2 + 12y^3$       5.  $-12t^5 + 6t$       6.  $6x^4 + 15x^3 + 3x^2$   
 $2y^2(5 + 6y)$        $6t(-2t^4 + 1)$        $3x^2(2x^2 + 5x + 1)$

7. A golf ball is hit upward at a speed of 40 m/s. The expression  $-5t^2 + 40t$  gives the approximate height of the ball after  $t$  seconds. Factor this expression.  
 $5t(-t + 8)$

8. The area of the Hillen family's television screen is  $3x^2 + 24x$  in<sup>2</sup>. Factor this polynomial to find expressions for the dimensions of their TV screen.  
 $3x$  and  $x + 8$

Factor out the common binomial factor in each expression.

9.  $4d(d + 2) + 9(d + 2)$       10.  $12(x - 5) + 7x(x - 5)$   
 $(d + 2)(4d + 9)$        $(x - 5)(12 + 7x)$

Factor each polynomial by grouping.

11.  $n^3 + 3n^2 + 4n + 12$       12.  $2x^3 + 5x^2 + 2x + 5$   
 $(n^3 + 3n^2) + (4n + 12)$        $(2x^3 + 5x^2) + (2x + 5)$   
 $n^2(n + 3) + 4(n + 3)$        $(2x + 5)(x^2 + 1)$   
 $(n + 3)(n^2 + 4)$

Factor each polynomial by grouping and using opposites.

13.  $2y^3 - 4y^2 + 6 - 3y$       14.  $4m^3 - 12m^2 + 15 - 5m$   
 $(2y^3 - 4y^2) + (6 - 3y)$        $(4m^3 - 12m^2) + (15 - 5m)$   
 $2y^2(y - 2) + 3(2 - y)$        $4m^2(m - 3) + 5(3 - m)$   
 $2y^2(y - 2) + 3(-1)(y - 2)$        $4m^2(m - 3) - 5(m - 3)$   
 $2y^2(y - 2) - 3(y - 2)$        $(m - 3)(4m^2 - 5)$   
 $(y - 2)(2y^2 - 3)$

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**LESSON Practice B**  
**8-2 Factoring by GCF**

Factor each polynomial. Check your answer.

1.  $8c^2 + 7c$       2.  $3n^3 + 12n^2$       3.  $15x^5 - 18x$   
 $c(8c + 7)$        $3n^2(n + 4)$        $3x(5x^4 - 6)$

4.  $-8s^4 + 20t^3 - 28$       5.  $6n^5 + 18n^4 - 24n$       6.  $-5m^4 - 5m^3 + 5m^2$   
 $4(-2s^4 + 5t^3 - 7)$        $6n(n^5 + 3n^4 - 4)$        $5m^2(-m^2 - m + 1)$

7. A ball is hit vertically into the air using a paddle at a speed of 32 ft/sec. The expression  $-16t^2 + 32t$  gives the ball's height after  $t$  seconds. Factor this expression.  
 $16t(-t + 2)$

8. The area of Margo's laptop computer screen is  $12x^2 + 3x$  in<sup>2</sup>. Factor this polynomial to find expressions for the dimensions of her computer screen.  
 $3x$  and  $4x + 1$

Factor each expression.

9.  $3m(m + 5) + 4(m + 5)$       10.  $16b(b - 3) + (b - 3)$   
 $(m + 5)(3m + 4)$        $(b - 3)(16b + 1)$

Factor each polynomial by grouping.

11.  $2x^3 + 8x^2 + 3x + 12$       12.  $4n^3 + 3n^2 + 4n + 3$   
 $(2x^3 + 8x^2) + (3x + 12)$        $(4n^3 + 3n^2) + (4n + 3)$   
 $(2x^2 + 8x) + (3x + 12)$        $(4n^2 + 3n) + (4n + 3)$   
 $(2x + 4)(x + 3)$        $(4n + 3)(n^2 + 1)$

13.  $10d^2 - 6d + 35d - 21$       14.  $12n^3 - 15n^2 - 8n + 10$   
 $(10d^2 - 6d) + (35d - 21)$        $(12n^3 - 15n^2) + (-8n + 10)$   
 $2d(5d - 3) + 7(5d - 3)$        $(3n^2 - 5n) + (-8n + 10)$   
 $(5d - 3)(2d + 7)$        $(3n - 5)(n^2 - 2)$

15.  $5b^4 - 15b^3 + 3 - b$       16.  $t^3 - 5t^2 + 10 - 2t$   
 $(5b^4 - 15b^3) + (3 - b)$        $(t^3 - 5t^2) + (10 - 2t)$   
 $5b^3(b - 3) + (3 - b)$        $t^2(t - 5) + 2(5 - t)$   
 $(b - 3)(5b^3 - 1)$        $(t^2 - 2)(t - 5)$

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**LESSON Practice C**  
**8-2 Factoring by GCF**

Factor each polynomial. Check your answer.

1.  $8x^4 - 12x^2$       2.  $-12ab^3 + 20b$       3.  $16m^2 - 2n^3 + 30m$   
 $4x^2(2x^2 - 3)$        $4b(-3ab^2 + 5)$        $2(8m^2 - n^3 + 15m)$

4.  $27j^4 - 72j^3 + 9j$       5.  $-5x^5 + 35x^4 - 30x^3$       6.  $16x^6y + 16x^2y^4 + 32x^3y^2$   
 $9j(3j^3 - 8j^2 + 1)$        $-5x^3(x^2 - 7x + 6)$        $16x^2y(x^4 + y^3 + 2xy)$

7. The expression used for finding the surface area of a cylinder is  $2\pi r^2 + 2\pi rh$ . Factor this expression.  
 $2\pi r(r + h)$

8. The area of a hallway rug is  $\frac{3}{2}x^2 + \frac{1}{2}x$  ft<sup>2</sup>. Factor this polynomial to find expressions for the dimensions of the rug.  
 $\frac{1}{2}x$  and  $3x + 1$

Factor each expression.

9.  $10(k - 2) + 7k(k - 2)$       10.  $9m^2(m + 7) + 5(m + 7)$   
 $(k - 2)(10 + 7k)$        $(m + 7)(9m^2 + 5)$

Factor each polynomial by grouping.

11.  $2t^3 + 6t^2 + t + 3$       12.  $3n^4 + 2n^3 - 15n - 10$   
 $(2t^3 + 6t^2) + (t + 3)$        $(3n^4 + 2n^3) + (-15n - 10)$   
 $2t^2(t + 3) + (t + 3)$        $(3n + 2)(n^3 - 5)$   
 $(t + 3)(2t^2 + 1)$

13.  $12a^2 + 30a - 14a - 35$       14.  $-28n^2 - 14 + 10n^5 + 5n^3$   
 $(12a^2 + 30a) + (-14a - 35)$        $(-28n^2 - 14) + (10n^5 + 5n^3)$   
 $6a(2a + 5) + (-7)(2a + 5)$        $(-28n^2 - 14) + 5n^3(2n^2 + 1)$   
 $(6a - 7)(2a + 5)$        $(2n^2 + 1)(5n^3 - 14)$

15.  $3b^4 - 24b^3 + 8 - b$       16.  $3x^3 - 12x^2 + 20 - 5x$   
 $(3b^4 - 24b^3) + (8 - b)$        $(3x^3 - 12x^2) + (20 - 5x)$   
 $3b^3(b - 8) + (8 - b)$        $(3x^2 - 12x) + (20 - 5x)$   
 $(3b^3 - 1)(b - 8)$        $(x - 4)(3x^2 - 5)$

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**LESSON Reteach**  
**8-2 Factoring by GCF**

The Distributive Property states:  $a(b + c) = ab + ac$   
Factoring by GCF reverses the Distributive Property:  
 $ab + ac = a(b + c)$

Factor  $12x^3 + 21x^2 + 15x$ . Check your answer.

Step 1: Find the GCF of all the terms in the polynomial.  
The factors of  $12x^3$  are: 1, 2, 3, 4, 6, 12,  $x$ ,  $x$ ,  $x$   
The factors of  $21x^2$  are: 1, 3, 7, 21,  $x$ ,  $x$   
The factors of  $15x$  are: 1, 3, 5, 15,  $x$   
The GCF is  $3x$ .

Step 2: Write terms as products using the GCF.  
 $12x^3 + 21x^2 + 15x$   
 $(3x)4x^2 + (3x)7x + (3x)5$

Step 3: Use the Distributive Property to factor out the GCF.  
 $3x(4x^2 + 7x + 5)$

Check:  
 $3x(4x^2 + 7x + 5) = 12x^3 + 21x^2 + 15x$  ✓

Factor  $5(x - 3) + 4x(x - 3)$ .

Step 1: Find the GCF of all the terms in the polynomial.  
The factors of  $5(x - 3)$  are: 5,  $(x - 3)$   
The factors of  $4x(x - 3)$  are: 4,  $x$ ,  $(x - 3)$   
The GCF is  $(x - 3)$ .

The terms are already written as products with the GCF.  
Step 2: Use the Distributive Property to factor out the GCF.  
 $(x - 3)(5 + 4x)$

Factor each polynomial.

1.  $20x^2 - 15x$       2.  $44a^2 + 11a$       3.  $24y - 36x$   
 $5x(4x - 3)$        $11a(4a + 1)$        $12(2y - 3x)$

Factor each expression.

4.  $5x(x + 7) + 2(x + 7)$       5.  $3a(a + 4) - 2(a + 4)$       6.  $4y(4y + 1) + (4y + 1)$   
 $(x + 7)(5x + 2)$        $(a + 4)(3a - 2)$        $(4y + 1)^2$

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