Name _____ Date _____ Class _____

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^2. 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 8-2

Practice A

Factoring by GCF

Factor each polynomial. Check your answer.

1. $x^2 + 5x$

$x(\underline{x} + \underline{5})$

2. $5m^3 + 45$

$\underline{5}(\underline{m^3} + 9)$

3. $15y^3 + 20y^5 - 10$

$\underline{5}(3y^3 + 4\underline{y^5} - \underline{2})$

4. $10y^2 + 12y^3$

$2y^2(5 + 6y)$

5. $-12t^5 + 6t$

$6t(-2t^4 + 1)$

6. $6x^4 + 15x^3 + 3x^2$

$3x^2(2x^2 + 5x + 1)$

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^2. 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. $4d(d + 2) + 9(d + 2)$

$(d + 2)(4d + 9)$

10. $12(x - 5) + 7x(x - 5)$

$(x - 5)(12 + 7x)$

Factor each polynomial by grouping.

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

$(n^3 + \underline{3n^2}) + (4n + \underline{12})$

$n^2(n + \underline{3}) + 4(n + \underline{3})$

$(n + 3)(n^2 + 4)$

12. $2x^3 + 5x^2 + 2x + 5$

$(2x + 5)(x^2 + 1)$

Factor each polynomial by grouping and using opposites.

13. $2y^3 - 4y^2 + 6 - 3y$

$(\underline{2y^3} - 4y^2) + (\underline{6} - 3y)$

$2y^2(\underline{y} - 2) + 3(\underline{2} - y)$

$2y^2(\underline{y} - 2) + 3(-1)(\underline{y} - 2)$

$2y^2(\underline{y} - 2) - 3(y - \underline{2})$

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

14. $4m^3 - 12m^2 + 15 - 5m$

$(m - 3)(4m^2 - 5)$

LESSON 8-2

Practice B

Factoring by GCF

Factor each polynomial. Check your answer.

1. $8c^2 + 7c$

$c(8c + 7)$

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

$3n^2(n + 4)$

3. $15x^5 - 18x$

$3x(5x^4 - 6)$

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

$4(-2s^4 + 5t^3 - 7)$

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

$6n(n^5 + 3n^3 - 4)$

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

$5m^2(-m^2 - m + 1)$

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^2. Factor this polynomial to find expressions for the dimensions of her computer screen.

$3x$ and $4x + 1$

Factor each expression.

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

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

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

$(b - 3)(16b + 1)$

Factor each polynomial by grouping.

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

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

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

$(4n + 3)(n^2 + 1)$

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

$(5d - 3)(2d + 7)$

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

$(4n - 5)(3n^2 - 2)$

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

$(b - 3)(5b^3 - 1)$

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

$(t^2 - 2)(t - 5)$

LESSON 8-2

Practice C

Factoring by GCF

Factor each polynomial. Check your answer.

1. $8x^4 - 12x^2$

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

2. $-12ab^3 + 20b$

$4b(-3ab^2 + 5)$

3. $16m^2 - 2n^3 + 30m$

$2(8m^2 - n^3 + 15m)$

4. $27j^4 - 72j^3 + 9j$

$9j(3j^3 - 8j^2 + 1)$

5. $-5x^5 + 35x^4 - 30x^3$

$-5x^3(x^2 - 7x + 6)$

6. $16x^6y + 16x^2y^4 + 32x^3y^2$

$16x^2y(x^4 + y^3 + 2xy)$

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^2. Factor this polynomial to find expressions for the dimensions of the rug.

$\frac{1}{2}x$ and $3x + 1$

Factor each expression.

9. $10(k - 2) + 7k(k - 2)$

$(k - 2)(10 + 7k)$

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

$(m + 7)(9m^2 + 5)$

Factor each polynomial by grouping.

11. $2t^3 + 6t^2 + t + 3$

$(t + 3)(2t^2 + 1)$

12. $3n^4 + 2n^3 - 15n - 10$

$(3n + 2)(n^3 - 5)$

13. $12a^2 + 30a - 14a - 35$

$(6a - 7)(2a + 5)$

14. $-28n^2 - 14 + 10n^5 + 5n^3$

$(2n^2 + 1)(5n^3 - 14)$

15. $3b^4 - 24b^3 + 8 - b$

$(3b^3 - 1)(b - 8)$

16. $3x^3 - 12x^2 + 20 - 5x$

$(x - 4)(3x^2 - 5)$

LESSON 8-2

Reteach

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 **3*x***.

Step 2: Write terms as products using the GCF.

$12x^3 + 21x^2 + 15x$

$(\mathbf{3x})4x^2 + (\mathbf{3x})7x + (\mathbf{3x})5$

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, $(\boldsymbol{x - 3})$

The factors of $4x(x - 3)$ are: 4, *x*, $(\boldsymbol{x - 3})$

} The GCF is $(\boldsymbol{x - 3})$.

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. $20x^2 - 15x$

$5x(4x - 3)$

2. $44a^2 + 11a$

$11a(4a + 1)$

3. $24y - 36x$

$12(2y - 3x)$

Factor each expression.

4. $5x(x + 7) + 2(x + 7)$

$(x + 7)(5x + 2)$

5. $3a(a + 4) - 2(a + 4)$

$(a + 4)(3a - 2)$

6. $4y(4y + 1) + (4y + 1)$

$(4y + 1)^2$