Algebra 1
Unit 7 – Test Review

Mount Si High School
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Name: _____
Date: _____ Per: _____

7.1 Adding and Subtracting Polynomials *(pp. 357–364)*

Find $(2x^3 + 6x^2 - x) - (-3x^3 - 2x^2 - 9x)$.

$(2x^3 + 6x^2 - x) - (-3x^3 - 2x^2 - 9x) = (2x^3 + 6x^2 - x) + (3x^3 + 2x^2 + 9x)$
$= (2x^3 + 3x^3) + (6x^2 + 2x^2) + (-x + 9x)$
$= 5x^3 + 8x^2 + 8x$

Write the polynomial in standard form. Identify the degree and leading coefficient of the polynomial. Then classify the polynomial by the number of terms.

1. $6 + 2x^2$ **2.** $-3p^3 + 5p^6 - 4$ **3.** $9x^7 - 6x^2 + 13x^5$ **4.** $-12y + 8y^3$

Find the sum or difference.

5. $(3a + 7) + (a - 1)$ **6.** $(x^2 + 6x - 5) + (2x^2 + 15)$
7. $(-y^2 + y + 2) - (y^2 - 5y - 2)$ **8.** $(p + 7) - (6p^2 + 13p)$

7.2 Multiplying Polynomials *(pp. 365–370)*

Find $(x + 7)(x - 9)$.

$(x + 7)(x - 9) = x(x - 9) + 7(x - 9)$ Distribute $(x - 9)$ to each term of $(x + 7)$.
$= x(x) + x(-9) + 7(x) + 7(-9)$ Distributive Property
$= x^2 + (-9x) + 7x + (-63)$ Multiply.
$= x^2 - 2x - 63$ Combine like terms.

Find the product.

9. $(x + 6)(x - 4)$ **10.** $(y - 5)(3y + 8)$ **11.** $(x + 4)(x^2 + 7x)$ **12.** $(-3y + 1)(4y^2 - y - 7)$

7.3 Special Products of Polynomials *(pp. 371–376)*

Find each product.

a. $(6x + 4y)^2$

$(6x + 4y)^2 = (6x)^2 + 2(6x)(4y) + (4y)^2$ Square of a binomial pattern
$= 36x^2 + 48xy + 16y^2$ Simplify.

b. $(2x + 3y)(2x - 3y)$

$(2x + 3y)(2x - 3y) = (2x)^2 - (3y)^2$ Sum and difference pattern
$= 4x^2 - 9y^2$ Simplify.

Find the product.

13. $(x + 9)(x - 9)$ **14.** $(2y + 4)(2y - 4)$ **15.** $(p + 4)^2$ **16.** $(-1 + 2d)^2$

7.4 Solving Polynomial Equations in Factored Form *(pp. 377–382)*

Solve $(x + 6)(x - 8) = 0$.

$(x + 6)(x - 8) = 0$ Write equation.
$x + 6 = 0$ *or* $x - 8 = 0$ Zero-Product Property
$x = -6$ *or* $x = 8$ Solve for x.

Solve the equation.

17. $x^2 + 5x = 0$ **18.** $(z + 3)(z - 7) = 0$ **19.** $(b + 13)^2 = 0$ **20.** $2y(y - 9)(y + 4) = 0$

7.5 Factoring $x^2 + bx + c$ *(pp. 385–390)*

Factor $x^2 + 6x - 27$.

Notice that $b = 6$ and $c = -27$. Because c is negative, the factors p and q must have different signs so that pq is negative.

Find two integer factors of -27 whose sum is 6.

Factors of −27	−27, 1	−1, 27	−9, 3	−3, 9
Sum of factors	−26	26	−6	6

The values of p and q are -3 and 9.

▶ So, $x^2 + 6x - 27 = (x - 3)(x + 9)$.

Factor the polynomial.

21. $p^2 + 2p - 35$ **22.** $b^2 + 18b + 80$ **23.** $z^2 - 4z - 21$ **24.** $x^2 - 11x + 28$

7.6 Factoring $ax^2 + bx + c$ *(pp. 391–396)*

Factor $5x^2 + 36x + 7$.

There is no GCF, so you need to consider the possible factors of a and c. Because b and c are both positive, the factors of c must be positive. Use a table to organize information about the factors of a and c.

Factors of 5	Factors of 7	Possible factorization	Middle term	
1, 5	1, 7	$(x + 1)(5x + 7)$	$7x + 5x = 12x$	✗
1, 5	7, 1	$(x + 7)(5x + 1)$	$x + 35x = 36x$	✓

▶ So, $5x^2 + 36x + 7 = (x + 7)(5x + 1)$.

Factor the polynomial.

25. $3t^2 + 16t - 12$ **26.** $-5y^2 - 22y - 8$ **27.** $6x^2 + 17x + 7$
28. $-2y^2 + 7y - 6$ **29.** $3z^2 + 26z - 9$ **30.** $10a^2 - 13a - 3$

7.7 Factoring Special Products *(pp. 397–402)*

Factor each polynomial.

a. $x^2 - 16$

$x^2 - 16 = x^2 - 4^2$ Write as $a^2 - b^2$.
$= (x + 4)(x - 4)$ Difference of two squares pattern

b. $25x^2 - 30x + 9$

$25x^2 - 30x + 9 = (5x)^2 - 2(5x)(3) + 3^2$ Write as $a^2 - 2ab + b^2$.
$= (5x - 3)^2$ Perfect square trinomial pattern

Factor the polynomial.

31. $x^2 - 9$ **32.** $y^2 - 100$ **33.** $z^2 - 6z + 9$ **34.** $m^2 + 16m + 64$