

Math Connections Worksheets

MAT0028C Developmental Math II

Chapter 6

Polynomials

Name:
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Section:

Chapter 6 POLYNOMIALS

6.1 Exponents and Scientific Notation

KEY VOCABULARY

Term	Definition	Example
Scientific notation		

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Evaluating Exponential Forms with Negative Bases

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Raising a Quotient to a Power

In the Language of Math	In Your Own Words

Nonpositive Integer Exponent Rules

In the Language of Math	In Your Own Words

Changing Scientific Notation (Positive Exponent) to Standard Form

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Changing Scientific Notation (Negative Exponent) to Standard Form

Changing Standard Form to Scientific Notation

GUIDED EXAMPLES

Write each number in standard form.

a) 2.13×10^4

Solution

Multiplying 2.13 by 10^4 means that the decimal point will move _____ places to the [left / right].

$2.13 \times 10^4 =$

b) 4.57×10^{-8}

Solution

Multiplying 4.57 by 10^{-8} means that the decimal point will move _____ places to the [left / right].

$4.57 \times 10^{-8} =$

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PRACTICE PROBLEMS

Evaluate the exponential form.

1. 9^0 1. _____

2. -7^2 2. _____

3. $\left(\frac{2}{5}\right)^3$ 3. _____

4. $(-4)^3$ 4. _____

Rewrite each expression with positive exponents; then if the expression is numeric, evaluate it.

5. 6^{-2} 5. _____

6. $\left(\frac{4}{5}\right)^{-4}$ 6. _____

7. $(-3)^{-3}$ 7. _____

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Write the number in standard form.

8. 4.12×10^5

8. _____

9. 7.32×10^6

9. _____

10. 6.11×10^{-5}

10. _____

11. 1.43×10^{-7}

11. _____

Write the number in scientific notation.

12. Sales totals for the Automation Company were \$25,000,000.

12. _____

13. It is estimated that in the year 2020 the population of the world will be 7,518,000,000.

13. _____

14. One cubic orc is approximately equal to 0.0000000048 cubic balrogs.

14. _____

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Chapter 6 POLYNOMIALS

6.2 Introduction to Polynomials

KEY VOCABULARY

Term	Definition	Example
Monomial		
Coefficient of a monomial		
Degree of a monomial		
Polynomial		
Polynomial in one variable		
Binomial		
Trinomial		
Degree of a polynomial		

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Writing a Polynomial in Descending Order of Degree

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PRACTICE PROBLEMS

Determine whether the expression is a monomial.

1. $-6x^2y^4$ 1. _____

2. $-8x^{-3}y^2$ 2. _____

Identify the coefficient and degree of each monomial.

3. $6t^7$ 3. _____

4. mn^2 4. _____

Indicate whether the expression is a monomial, binomial, or trinomial or has no special polynomial name. If the expression is a polynomial, give the degree.

5. $x^2 - 2x + 1$ 5. _____

6. 68 6. _____

7. $3p^3m^4 - 5p^2m^3 + 5p^3m - 5pm^3 + 4p^4m^3$ 7. _____

Identify the degree of each polynomial.

8. $x^5 - 6x + x^8 - 5x^6$ 8. _____

9. $1.2x^5 - 7.3x^3 + 4.5x + 9.5$ 9. _____

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Evaluate the polynomial using the given values.

10. $3x^2 - 3x + 1; x = 4$

10. _____

11. $a^3 - 3a^2 + 4a + 7; a = 5$

11. _____

Evaluate.

12. A 12-ounce beverage can has a height of 7.3 inches and a radius of 1.6 inches. The polynomial $2\pi rh + 2\pi r^2$ describes the surface area of a cylindrical can. Evaluate the polynomial for $h = 7.3$ inches and $r = 1.6$ inches to find the surface area of the can. Round the result to the nearest tenth.

12. _____

Write the polynomial in descending order of degree.

13. $x^5 + x + 8x^3 + 7 + 6x^2$

13. _____

Combine like terms and write the resulting polynomial in descending order of degree.

14. $9b^5 + b^2 - b^3 - 6b^5 - 7b^2$

14. _____

15. $11a^2p + 4p^2 - 33a^2p - 6p^2$

15. _____

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6.3 Adding and Subtracting Polynomials

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Adding Polynomials

Subtracting Polynomials

GUIDED EXAMPLE

1. Add and write the resulting polynomial in descending order of degree.

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

Solution

Combine like terms. Combining in order of degree places the resulting polynomial in descending order of degree.

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

$$= \div style{border: 1px solid black; width: 460px; height: 47px;">$$

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PRACTICE PROBLEMS

Add and write the resulting polynomial in descending order of degree.

1. $(7x+8)+(-8x+6)$ 1. _____

2. $(5x+9y)+(-6x+8y)$ 2. _____

3. $(-9x+4)+(x^2+x-6)$ 3. _____

4. $(9x^2-6x+15)+(7x^2+8x-89)$ 4. _____

5. $(2+8x+3x^2+7x^3)+(9-8x+3x^2-7x^3)$ 5. _____

6. $(-2x^4-3x^3-3x^2+x-14)+(-3x^4+9x^3+x^2+14x+7)$ 6. _____

Write an expression for the perimeter in simplest form.

7. A rectangle with width $6x-8$ and length $3x+9$ 7. _____

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Subtract and write the resulting polynomial in descending order of degree.

8. $(4x + 5) - (2x + 9)$ **8.** _____

9. $(-3v^2 + 9v + 7) - (7v^2 + 11v - 2)$ **9.** _____

10. $(-4a^3 - 3a^2 + 6a + 9) - (-4a^3 + 9a^2 + 10a - 4)$ **10.** _____

11. $(-y^5 + 3y^4 + 6y^2 - y - 15) - (-3y^5 + y^2 - y - 5)$ **11.** _____

12. $(4w^2 + 9wt - 2t^2) - (6w^2 - 7wt + 16t^2)$ **12.** _____

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6.4 Exponent Rules and Multiplying Monomials

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Product Rule for Exponents

In the Language of Math	In Your Own Words

Multiplying Monomials

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A Power Raised to a Power

In the Language of Math	In Your Own Words

Raising a Product to a Power

In the Language of Math	In Your Own Words

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Simplifying a Monomial Raised to a Power

GUIDED EXAMPLES

1. Multiply.

$$(5n^3)(8n^6)$$

Solution

$$(5n^3)(8n^6)$$

$$= \boxed{}$$

Multiply the coefficients and add the exponents of the like bases.

$$= \boxed{}$$

Simplify.

2. Simplify.

$$(2x^3z^4)^6$$

Solution

$$(2x^3z^4)^6$$

$$= \boxed{}$$

Write the coefficient, 2, raised to the 6th power and multiply the exponents on the variables by 6.

$$= \boxed{}$$

Simplify.

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PRACTICE PROBLEMS

Multiply.

1. $v^3 \cdot v^6$

1. _____

2. $7^9 \cdot 7^3$

2. _____

3. $7r^2 \cdot 5r$

3. _____

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

4. _____

5. $(3qr)(6q^2r^4)(2q^5)$

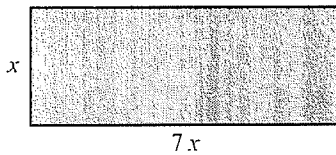
5. _____

6. $(5xy)(4x^3y^4)(3x^2)$

6. _____

Write an expression in simplest form for the area of the figure.

7.



7. _____

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Multiply and write your answer in scientific notation.

8. $(3.1 \times 10^6)(2.4 \times 10^2)$

8. _____

9. $(7.56 \times 10^7)(3.48 \times 10^{-4})$

9. _____

Simplify.

10. $(c^2)^8$

10. _____

11. $(-x^7)^4$

11. _____

12. $\left(\frac{1}{3}x^2y\right)^3$

12. _____

13. $(-r^4s)^3(-r^5s^4)^2$

13. _____

14. $(3a)^2(a^3b)(-5ab)^2$

14. _____

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6.5 Multiplying Polynomials; Special Products

KEY VOCABULARY

Term	Definition	Example
Conjugates		

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Multiplying a Polynomial by a Monomial

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Multiplying Polynomials

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Multiplying Conjugates

In the Language of Math	In Your Own Words

Squaring a Binomial

In the Language of Math	In Your Own Words

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PRACTICE PROBLEMS

Multiply the polynomial by the monomial.

1. $-5x(x-3)$

1. _____

2. $4x(4x^2 - 9x + 9)$

2. _____

3. $-4y^4(9y^2 + 4y - 6)$

3. _____

Multiply the binomials. (Use FOIL.)

4. $(b+11)(b-9)$

4. _____

5. $(3x-1)(4x+3)$

5. _____

6. $(4v-5f)(4v+4f)$

6. _____

Multiply the polynomials.

7. $(x^2 + x + 7)(x - 7)$

7. _____

8. $(9x+5)(2x^2 + 2x + 4)$

8. _____

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Multiply using the rules for special products.

12. $(s+6)(s-6)$

12. _____

13. $(3r+5)(3r-5)$

13. _____

14. $(y-5)^2$

14. _____

15. $(5x+4y)^2$

15. _____

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6.6 Exponent Rules and Dividing Polynomials

KEY PROPERTIES, PROCEDURES, OR STRATEGIES

Dividing Monomials

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Dividing a Polynomial by a Monomial

In the Language of Math	In Your Own Words

Dividing a Polynomial by a Polynomial

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Exponents Summary

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PRACTICE PROBLEMS

Simplify using the rules of exponents. Write all answers with positive exponents.

1. $\frac{3^8}{3^5}$

1. _____

2. $\frac{x^3}{x^{-2}}$

2. _____

Divide and write your answers in scientific notation.

3. $\frac{-18.2 \times 10^{-7}}{2.6 \times 10^{-4}}$

3. _____

4. $\frac{-11.6 \times 10^{-4}}{2.9 \times 10^3}$

4. _____

Divide the monomials.

5. $\frac{15a^4b^5}{-3ab}$

5. _____

6. $\frac{-2st^3}{10s^4t}$

6. _____

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Divide the polynomial by the monomial.

7. $\frac{7x + 28y}{7}$

7. _____

8. $\frac{9a^5 - 9a^3 + 9}{3a}$

8. _____

Simplify. Write all answers with positive exponents.

13. $\left(\frac{4}{5}\right)^{-3}$

13. _____

14. $\left(\frac{1}{6}\right)^{-1}$

14. _____

Chapter 6 POLYNOMIALS

6.1 Exponents and Scientific Notation

1. 1 2. -49 3. $\frac{8}{125}$ 4. -64 5. $\frac{1}{36}$ 6. $\frac{625}{256}$
7. $-\frac{1}{27}$ 8. 412,000 9. 7,320,000 10. 0.0000611
11. 0.000000143 12. 2.5×10^7 13. 7.518×10^9 14. 4.8×10^{-9}

6.2 Introduction to Polynomials

1. monomial 2. not a monomial 3. coefficient: 6; degree: 7
4. coefficient: 1; degree: 3 5. trinomial; 2 6. monomial; 0
7. no special polynomial name; 7 8. 8 9. 5 10. 37 11. 77
12. 89.5 in.^2 13. $x^5 + 8x^3 + 6x^2 + x + 7$ 14. $3b^5 - b^3 - 6b^2$
15. $-22a^2p - 2p^2$

6.3 Adding and Subtracting Polynomials

1. $-x + 14$ 2. $-x + 17y$ 3. $x^2 - 8x - 2$ 4. $16x^2 + 2x - 74$
5. $6x^2 + 11$ 6. $-5x^4 + 6x^3 - 2x^2 + 15x - 7$ 7. $18x + 2$ 8. $2x - 4$
9. $-10v^2 - 2v + 9$ 10. $-12a^2 - 4a + 13$ 11. $2y^5 + 3y^4 + 5y^2 - 10$
12. $-2w^2 + 16wt - 18t^2$

6.4 Exponent Rules and Multiplying Monomials

1. v^9 2. 7^{12} 3. $35r^3$ 4. $-20x^{13}y^9$ 5. $36q^8r^5$
6. $60x^6y^5$ 7. $7x^2$ 8. 7.44×10^8 9. 2.63088×10^4 10. c^{16}
11. x^{28} 12. $\frac{x^6y^3}{27}$ 13. $-r^{22}s^{11}$ 14. $225a^7b^3$

Answers to Worksheets for Classroom or Lab Practice

6.5 Multiplying Polynomials; Special Products

1. $-5x^2 + 15x$ 2. $16x^3 - 36x^2 + 36x$ 3. $-36y^6 - 16y^5 + 24y^4$

4. $b^2 + 2b - 99$ 5. $12x^2 + 5x - 3$ 6. $16v^2 - 4vf - 20f^2$

7. $x^3 - 6x^2 - 49$ 8. $18x^3 + 28x^2 + 46x + 20$

12. $s^2 - 36$ 13. $9r^2 - 25$ 14. $y^2 - 10y + 25$

15. $25x^2 + 40xy + 16y^2$

6.6 Exponent Rules and Dividing Polynomials

1. 3^3 2. x^5 3. -7×10^{-3} 4. -4×10^{-7} 5. $-5a^3b^4$

6. $-\frac{t^2}{5s^3}$ 7. $x + 4y$ 8. $3a^4 - 3a^2 + \frac{3}{a}$ 13. $\frac{125}{64}$ 14. $\frac{6y}{x}$