

Check Skills You'll Need p.494

Simplify each expression.

1. $6t + 13t$ $19t$	2. $5g + 34g$ $39g$
3. $7k - 15k$ $-8k$	4. $2b - 6 + 9b$ $11b - 6 !!$
5. $4n^2 - 7n^2$ $-3n^2$	6. $8x^2 - 1x^2$ $7x^2$

$4n^2 - 7n^2 = 28n^2$
 $x^2 - 2x$

P.156-158

Lesson 9-1 Adding and Subtracting Polynomials

Lesson Objectives: Describe polynomials (degree 0), Add and subtract polynomials (degree 1, 2)

NAEP 2005 strand: Algebra
Topic: Variables, Expressions, and Operations
Local Standards:

A monomial is a term that is a #, a variable, or a product of a # & variable

The degree of a monomial is the exponent of the variable

a constant has a zero degree.

$3, 5, -2, 1$

A polynomial is a monomial or the sum/difference of 2 or more monomials

In the standard form of a polynomial, the highest exponent (degree) is 1st and then goes down

$$3x^4 + 2x^3 + 7x^2 - x + 1$$

The degree of a polynomial is the highest exponent

A binomial is a polynomial w/ 2 terms. $(x+2)$

A trinomial is " " w/ 3 terms

$$x^2 + 2x - 3$$

Example

1 **Degree of a Monomial** Find the degree of each monomial.

- a. 18 Degree: The degree of a nonzero constant is .
- b. $3xy^3$ Degree: The exponents are and . Their sum is .
- c. $6c$ Degree: $6c = 6c^1$. The exponent is .

of terms

$3x$ monomial (1 term)
 $3x^2 + 4$ binomial (2 terms)
 $x^2 - 7x + 9$ trinomial (3 terms)
 $x^3 + x^2 - x + 1$ polynomial (4 or more terms)

degree (highest exponent)

$3x$: degree 1: Linear
 $5x^2$: degree 2: quadratic
 7 : degree 0: constant
 x^3 : degree 3: cubic
 $8x^4 - x + 3$: degree 4: quartic
 $x^5 + 9$: degree 5: quintic

Quick Check

1. **Critical Thinking** What is the degree of $9x^0$? Explain.

degree: 0 9.1
9

Examples

2 **Classifying Polynomials** Write each polynomial in standard form combining like terms. Then name each polynomial by its degree and the number of its terms.

a. $-2 + 7x$ ← degree 1
 ↑
 constant
 $7x^1 - 2$
 degree: linear
 terms(2): binomial

b. $3x^5 - 2 - 2x^5 + 7x$
 $1x^5 + 7x - 2$
 degree(5): quintic
 terms(3): trinomial

Adding Polynomials Simplify $(6x^2 + 3x + 7) + (2x^2 - 6x - 4)$.
 Line up like terms. Then add the coefficients.

$6x^2$	+	$3x$	+	7
$2x^2$	-	$6x$	-	4
$8x^2$	-	$3x$	+	3

Method 2 Subtract horizontally:
 $(2x^3 + 4x^2 - 6) - (5x^3 + 2x - 2)$

Subtract - change the signs

$$\underline{2x^3 + 4x^2 - 6} - \underline{5x^3 - 2x + 2}$$

$$-3x^3 + 4x^2 - 2x - 4$$

2a) $6x^2 + 7 - 9x^4$
 $-9x^4 + 6x^2 + 7$
 degree(4) = quartic
 terms(3) = trinomial

2b) 3b) 3d) 4a) 4b)

2b) $3y - 4 - y^3$
 $-y^3 + 3y - 4$ *degree 3 trinomial*

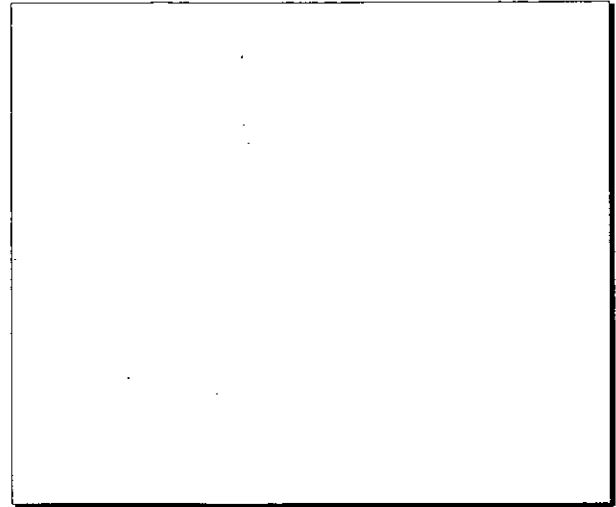
3b) $(4t^2 - 6) + (3t^2 + 11)$
 $4t^2 + 5$ *quadratic Bi*

3d) $(2p^3 + 6p^2 + 10p) + (9p^3 + 11p^2 + 3p)$
 $11p^3 + 17p^2 + 13p$

$$\begin{aligned} \textcircled{4a} & (v^3 + 6v^2 - 1v) - (9v^3 - 7v^2 + 3v) \\ & \underline{v^3 + 6v^2 - 1v - 9v^3 + 7v^2 - 3v} \\ & -8v^3 + 13v^2 - 4v \end{aligned}$$

$$\begin{aligned} \textcircled{4b} & (30d^3 - 29d^2 - 3d) - (2d^3 + d^2) \\ & \underline{30d^3 - 29d^2 - 3d - 2d^3 - 1d^2} \\ & 28d^3 - 30d^2 - 3d \end{aligned}$$

$$\begin{aligned} \textcircled{4c} & (4x^2 + 5x + 1) - (6x^2 + x + 8) \\ & 4x^2 + 5x + 1 - 6x^2 - x - 8 \\ & \underline{4x^2 + 5x + 1 - 6x^2 - x - 8} \\ & -2x^2 + 4x - 7 \end{aligned}$$



p.499 W-U-P-S

Identify the growth factor in each function.


64. $y = 0.6 \cdot 1.4^x$ 66. $y = 0.3 \cdot 5^x$

1.4 - 1 = .4 = 40% 5 - 1 = 4 = 400%

Identify each function as exponential growth or exponential decay.

67. $y = 10 \cdot 3^x$ 68. $y = 1.8 \cdot 0.4^x$

Growth Decay



Simplify each expression.

71. $7^8 \cdot 7^{10}$ 73. $(4x^2)(9x^3)$

75. $(-5r^2)(6r^9)$ 76. $(-3)^6 \cdot (-3)^{-4}$

Write an equation for each translation of $y = |x|$.

79. 5 units up 80. right 6 units

Lesson 9-2 $3(x+2) = 3 \cdot x + 3 \cdot 2$ Multiplying and Factoring

Lesson Objectives	NAEP 2005 Strand: Algebra
<ul style="list-style-type: none"> ✓ Multiply a polynomial by a monomial ✓ Factor a monomial from a polynomial 	Topic: Variables, Expressions, and Operations Local Standards:

Examples

1 Multiplying a Monomial and a Trinomial Simplify $-2g^2(3g^3 + 6g - 5)$.

$-2g^2(3g^3 + 6g - 5)$

$-2g^2 \cdot 3g^3 + -2g^2 \cdot 6g + -2g^2 \cdot -5$

$-6g^5 - 12g^3 + 10g^2$

$3x+6$

2 Finding the Greatest Common Factor Find the GCF of $2x^4 + 10x^2 - 6x$. List the prime factors of each term. Identify the factors common to all terms.

$2x^4 = 2 \cdot x \cdot x \cdot x \cdot x$

$10x^2 = 2 \cdot 5 \cdot x \cdot x$

$6x = 2 \cdot 3 \cdot x$

The GCF is $2x$.

3 Factoring Out a Monomial Factor $4x^3 + 12x^2 - 16x$.

$4x^3 = 2 \cdot 2 \cdot x \cdot x \cdot x$

$12x^2 = 2 \cdot 2 \cdot 3 \cdot x \cdot x$

$-16x = 2 \cdot 2 \cdot 2 \cdot 2 \cdot x$

GCF: $2 \cdot 2 \cdot x = 4x$

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

$\frac{4x^3 + 12x^2 - 16x}{4x}$

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

GCF

Quick Check Distribute
multiply

1. Simplify each product.

a. $4b(5b^2 + b + 6)$ b. $-7h(3h^2 - 8h - 1)$

$4b \cdot 5b^2 + 4b \cdot b + 4b \cdot 6$ $-7h \cdot 3h^2$
 $20b^3 + 4b^2 + 24b$ $-7h \cdot -8h$
 $-7h \cdot -1$
 $-21h^3 + 56h^2 + 7h$

c. $2x(x^2 - 6x + 5)$

$2x \cdot x^2 - 2x \cdot 6x + 2x \cdot 5$
 $2x^3 - 12x^2 + 10x$

2. Find the GCF of the terms of each polynomial.

a. $5v^5 + 10v^3$ b. $3t^2 - 18$

$5v^5: 5 \cdot v \cdot v \cdot v \cdot v \cdot v$ $3t^2 = 3 \cdot t \cdot t$
 $10v^3: 2 \cdot 5 \cdot v \cdot v \cdot v$ $-18 = -1 \cdot 3 \cdot 6$
 $GCF: 5v^3$ $GCF = 3$

c. $4b^3 - 2b^2 - 6b$

$4b^3 = 2 \cdot 2 \cdot b \cdot b \cdot b$ $(2b)^{GCF}$
 $-2b^2 = -1 \cdot 2 \cdot b \cdot b$
 $-6b = -1 \cdot 2 \cdot 3 \cdot b$

3. Use the GCF to factor each polynomial.

a. $8x^2 - 12x$ b. $5d^3 + 10d$

$2 \cdot 2 \cdot 2 \cdot x \cdot x - 2 \cdot 2 \cdot 2 \cdot x$ $5 \cdot d \cdot d \cdot d + 5 \cdot 2 \cdot d$
 $5d(d^2 + 2)$
 $4x(2x - 3)$

c. $6m^3 - 12m^2 - 24m$

p. 413 (1-33) 1st column
 p. 415 (1-37) 1st column

