

Classifying Polynomials

Classify each polynomial based on degree and the number of terms.

1) $\boxed{-xy} - \boxed{7yz} + \boxed{2x^3} - \boxed{5xy^2z}$

degree: 5 terms: 4

3) $2m^6 - 9m^3 + 4m^2$

degree: _____
terms: _____

5) $5uv + uv^2w - 8vw^2 + 2u^3 + v - 7$

degree: _____
terms: _____

7) $-h - 9$

degree: _____
terms: _____

9) $\sqrt{5}$

degree: _____
terms: _____

11) $-a^3 - 2ab + 4a^2 - a + 14b$

degree: _____
terms: _____

2) $6u^3w - u^2v$

degree: _____
terms: _____

4) $-3pq + q - 7r + 2qr - 4$

degree: _____
terms: _____

6) $9a^4b^2$

degree: _____
terms: _____

8) $n^2 + 2n - 5n^3 + 8$

degree: _____
terms: _____

10) $-b + c + d - 3bc - 5cd + 1$

degree: _____
terms: _____

12) $7rs^2t - t^5 - 6s^2$

degree: _____
terms: _____

Name: _____

Unit 4
Lesson 1

Classifying Polynomials

Sheet 1

Classify each polynomial based on degree.

1) $7b^2 + b - 9$

degree: 2

3) $uvw - 3w^3 - 2u^2 + u - 7$

degree:

5) $-m - 4n + 1$

degree:

7) $3p^3 + p^2 - 2p + 6$

degree:

9) $-wx + 3x - 8y + 5 - x^2$

degree:

11) -27

degree:

2) $3p - 8 - q + r$

degree:

4) $12x^2$

degree:

6) $-6abc - b - 5ab$

degree:

8) $14u$

degree:

10) $6r + 3r^3 - rs + 7r^2 - 9s$

degree:

12) $8gh + 9$

degree:

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degree:

Classifying Polynomials

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Classify each polynomial based on degree and the number of terms.

1) $-xy - 7y^2z + 2x^3 - 5xy^2z$

2)

$6u^3w - u^2v$

degree: 5
terms: 4

3) $2m^6 - 9m^3 + 4m^2$

4)

$-3pq + q - 7r + 2qr - 4$

degree: _____
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5) $5uv + uv^2w - 8vw^2 + 2u^3 + v - 7$

6)

$9a^4b^2$

degree: _____
terms: _____

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7) $-h - 9$

8)

$n^2 + 2n - 5n^3 + 8$

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degree: _____
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Assignment 4.1

All

Basic Level

Classify each polynomial as a monomial, binomial or trinomial.

1. $3x + 4$

2. $2x^2 + 5x - 6$

3. $6x^2y$

State the variable, exponent or power, and coefficient.

4. $2x^3$

5. $-6y^4$

6. $-0.7x^4$

State the degree of each polynomial.

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

8. $x^3 - 8x^2y^2 + 3y^2$

Evaluate each polynomial when $x = -2$.

9. $2x + 5$

10. $3x^2 + x$

11. $4x^3$

Most

Mid-Level

Evaluate each polynomial when $x = -2$ and $y = 3$.

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

13. $-3x^3 + 2x^2 - 5$

14. $-4x^2y$

Rearrange in descending order and state the degree of each polynomial.

15. $4x + 5 + x^3$

16. $3x^4 + 2x^7 + 5 + x$

17. $2x - 14$

Few

Extra for Experts

State the degree of each polynomial.

18. $20m^3n + 17m^3n^3$

19. $-7x^4y^2z + 5x^2y^2z^2$

UNIT 4 - Polynomials

Lesson 1 Practice Assignment

Math Language of Polynomials

1. Find the product of each pair of monomials:

all a. $(-4ab)(-2a^2b)$

most b. $(-b^2)(b)(a^2b)$

most c. $(3x^3y^2)(-5x^2y^0)$

2. State the degree of each of the polynomials, then state if they are monomials, binomials, or trinomials, and then put them in descending order.

all a. $-2x^3y + 3xy^2 + 5x^2y^3$

all b. a^2b^4cd

most c. $14x^4y - 2x^2y^2 + 5x^2y^2$

most d. $-5x^2y + 3x^4y^2 - 3x$

most e. $5 - x^2y^4z$

5. Write an algebraic expression for each of the following:

all a. Eight is subtracted from a number

all b. A number is added to 6

all c. Jon is 5 times as old as Jim

most d. Five more than twice as much as a number

few e. To rent a hall for a dinner, the hall costs \$300 and the dinner is \$25 per plate

f. Tim's soccer team earns 3 points for a win in regulation time, 2 points for a win in overtime or a shootout, and one point for a loss in overtime or a shootout. Write an expression to represent the points his team had earned in their season.

Answers

1a) $8a^3b^2$

1b) $-a^2b^4$

1c) $-15x^5y^2$

2a. Degree 5, Trinomial, $5x^2y^3 - 2x^3y + 3xy^2$

2b. Degree 8, Monomial, a^2b^4cd

2c. Degree 4, Binomial, $4x^4y + 3x^2y^2$

2d. Degree 6, Trinomial, $3x^4y^2 - 5x^2y - 3x$

2e. Degree 7, Binomial, $-x^2y^4z + 5$

5a. $x - 8$

5b. $6 + x$

5c. $5x$

5d. $2x + 5$

5e. $25p + 300$

5f. $3w + 2sw + 1s$

Like Terms and Equivalent Polynomials

Unit 4 - Polynomials

1. Are the following pairs of polynomials equivalent? If not, change them to make them equivalent.

a. $-2a^2 + 6 - 4a$, $3a^2 + 6 - 4a$

all

b. $3x^3 + 4x^2 - 2x + 7$, $-2x + 3x^3 + 7 + 4x^2$

2. Identify the coefficients, the variables, the constants in each of the following:

a. $-5x^2y + 3xy - 7$

all

b. $-a^5c + 3$

c. $10x^3y^7 - 9x^5y^2 + 8y^2$

3. Which of the following terms would be classified as like terms? If not like, explain why not.

a. $3x$, $8x$

b. $3x$, $3x^3$

c. $4x^2$, x^2

all

d. $4x^2y$, $2yx^2$

e. $4xy^2$, xyz^2

4. Simplify each of the following by combining like terms.

a) $x^2 - 3x - x^3 - 3x^2 - 8x^3 - 3x^2 - 8x^3$

b) $4x^2 + 5x^3 - 5x + 3x + 4 + x + 2x^3$

all

c) $3n^2 + 3n^3 + 2 - 6n^2 - 8n^3 - 6n^2 - 8n^3$

d) $4x^2 - 3 - 2x^3 - 3x^2 - 8 - 3x^2 - 8x^3$

Answers

a. No, new $\rightarrow -2a^2 + 6 - 4a$, $-2a^2 + 6 - 4a$

b. Yes, $3x^3 + 4x^2 - 2x + 7$, $-2x + 3x^3 + 7 + 4x^2$

	Coefficients	Variables	Constant
2a. $-5x^2y + 3xy - 7$.	-5, 3	x, y	-7
2b. $-a^5c + 3$	-1	a, c	+3
2c. $10x^3y^7 - 9x^5y^2 + 8y^2$	10, -9, 8	x, y	0

3a. $3x$, $8x$ like

3b. $3x$, $3x^3$ not like: x raise 1 not the same as x raise 3

3c. $4x^2$, x^2 like

3d. $4x^2y$, $2yx^2$ like

3e. $4xy^2$, xyz^2 not like: first term does not have z variable, first term has y squared term, second term has z squared term

4a) $17x^3 - 5x^2 - 3x$
 4b) $7x^3 + 4x^2 - x + 4$
 4c) $-13n^3 - 9n^2 + 2$
 4d) $-10x^3 - 2x^2 - 11$

Adding and Subtracting Polynomials

Lesson 3 Practice Assignment

1. Simplify each of the following algebraically.

a. $(6x + 3) + (2x - 5)$

b. $(2x^2 + 3x) + (6 - 3x)$

c. $(-4x^2 + 6x - 4) + (x^2 - 5x + 5)$

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

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

f. $(3x^2 - 5x) - (7 - 5x^3)$

all

most

g. $(-6x^2 - 3x + 1) - (-3x^2 + 2x - 1)$

h. $(5 - 4x^3 - 4x) - (6x^2 - x^3 + 5)$

i. $(3 - 2x^3 - x^2) + (2x^2 - 4x^3 + 11) + (-x^2 - 6x^3 - 14)$

j. $(15 + x^3 - x^2) - (-4x^2 + 3x^3 + 5) + (4x^2 - x^3 - 1)$

few

k. $(9 - 2x^2 - 6x) - (2x^2 - 5x + 1) - (-4x^2 - 6x - 4)$

l. $(6 + 3x^2 - x) + (-x^2 - 3x - 4) - (-2x^2 + 6x - 1)$

2a. $8x - 2$

2b. $2x^2 + x + 6$

2c. $-3x^2 + x + 1$

2d. $-x^3 + x^2 - x + 2$

2e. $-5x - 2$

2f. $5x^3 + 3x^2 - 5x - 7$

2g. $-3x^2 - 5x + 2$

2h. $-3x^3 - 6x^2 - 4x$

2i. $-12x^3$

2j. $-3x^3 + 7x^2 + 9$

2k. $5x + 12$

2l. $4x^2 - 10x + 3$

Multiplying and Dividing Monomials

3. Simplify each of the following polynomials.

a. $6r^3 \times 3r^3$

b. $5x^2 \times 4y^3$

c. $4n^3 \times (-4n^5)$

d. $(-r^4) \times 4r^3$

all

e. $5n \times 4m^2$

f. $(-4k^2) \times (-5k^4)$

g. $7r^4 \times 8r^4 \times 5^3$

h. $(-7x) \times (-2x^2) \times (6y^2)$

i. $8y \times 5x^3y^4$

most

4. Simplify each of the following polynomials.

a. $(-b) \div (-4b)$

b. $(-2x^2) \div x^2$

c. $\frac{12x^4}{(-4x^0)}$

all

6. Area: $3x^4$, Perimeter: $5x^2 + \sqrt{13}x^2$
6. Area: $32x^3$, Perimeter: $8x^2 + 16x$
- 4i. $4x^4y$, 4j. $-\frac{3x^2y^3z}{5}$, 4k. $\frac{m^2n^2}{3}$
- 4a. $\frac{1}{4}$, 4b. -2 , 4c. $-3x^4$, 4d. k^3 , 4e. $\frac{n^3}{2}$, 4f. $\frac{1x^3}{2k^4}$, 4g. $\frac{4}{3n}$, 4h. $\frac{n^3y}{2x^4}$
- 3h. $84x^3y^2$, 3i. $40x^3y^5$
- 3a. $18r^6$, 3b. $20x^2y^3$, 3c. $-16n^8$, 3d. $-4r^7$, 3e. $20m^2n$, 3f. $20k^6$, 3g. $56r^8s^3$

Answers

6. A right triangle has a base length of $2x^2$ and a height of $3x^2$. Find an expression for the area and the perimeter.
5. A rectangle has a length of $4x^2$ and a width of $8x$. Find an expression for the area and the perimeter.

k. $\frac{3m^5n^4}{9m^3n^2}$

j. $\frac{25x^3yz^2}{(-15x^5y^4z^3)}$

i. $\frac{16x^7y^2}{4x^3y}$

few

h. $5y^4n^3 \div 10x^4y^3$

g. $6m^3n^3 \div 8m^3n^2$

f. $(-4x^3) \div (-8k^4)$

most

e. $\frac{10n}{5n^4}$

d. $\frac{6k}{6k^4}$

Multiplying Polynomials by Monomials

Lesson 5 Practice Assignment

3. Simplify each of the following polynomials.

a. $7m(3m+n)$

b. $8(2a-3b)$

c. $4xy^2(8x-8y)$

d. $8x^2(6x-3y)$

e. $3y(3x+7y)$

f. $-7xy(7x^2-6y^2)$

g. $5b(-5a-8b^3)$

h. $4y^3(5x-3y)$

i. $-3mn^4(-6m^2+2n)$

j. $-3xy^3(2xy+4x^2y)$

k. $-xy(xy+3x^2-y)$

l. $-3y^3(2-xy+5x^2y)$

m. $5(-2x+y-4x^2y)$

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

few

most

all

5. A rectangle has a length of $(4x+3)$ units and a width that is 3 units shorter than the length. Find a simplified expression for the length, width, the area and the perimeter. Find the area and the perimeter if x is equal to 10 cm.

Answers

- 3a. $21m^2n + 7mn^2$, 3b. $16a - 24b$, 3c. $32x^2y^2 - 32xy^3$, 3d. $48x^3 - 24x^2y$, 3e. $9xy + 21y^2$
3f. $-49x^3y + 42xy^3$, 3g. $-25ab - 40b^4$, 3h. $20xy^3 - 12y^4$, 3i. $18m^3n^4 - 6mn^5$, 3j. $-6x^2y^4 - 12x^3y^4$
3k. $-x^2y^2 - 3x^3y + xy^2$, 3l. $-6y^3 + 3xy^4 - 15x^2y^4$, 3m. $-10x + 5y - 20x^2y$, 3n. $-12x^5y^4 + 2x^6y^3 - 10x^4y^3$

5. Length: $4x + 3$ units Width: $4x$
Area: $16x^2 + 12x$, Perimeter: $16x + 6$
Area: 1720 cm^2 , Perimeter: 166 cm

Dividing Polynomials by Monomials

3. Simplify each of the following polynomials.

a. $(24n^2 + 8n) \div 4n$

b. $(20x^5 - 12x^4) \div 4x^3$

c. $\frac{3n^5 - 3n^3}{9n}$

d. $\frac{8x^3 - 8x^5}{16x^3}$

e. $(30b^3 + 30b^2 + 10b) \div 10b$

f. $(4a^3 + 2a^2 + 4a) \div 2a$

g. $(12x^3 - 8xy - 6x) \div 2x$

h. $\frac{20p^4 + 15p^3 + 10p}{5}$

i. $\frac{18b^3c + 6b^2c^2 - 9b^2c}{3bc}$

j. $\frac{14x^3y^4 + 14x^4y^5 - 14x^4y^5}{42x^2y^2}$

all

most

5. An aquarium has a length of $(8x - 6)$ feet and a width of $4x$ feet and a height of 4 feet. If a container holds 12 cubic feet of water, find a polynomial that would represent how many containers would it take to fill the aquarium. If x is equal to 3 feet, how many containers would it take to fill the aquarium?

few

6. A garden box in a greenhouse has a volume represented by the polynomial $(80x^3 + 120x)$ cubic units. If the height of the garden box is 4 units and the length is represented by the polynomial $4x$ units find a simplified polynomial that would represent the width of the garden box.

Answers

3a. $6n+2$, 3b. $5x^2-3x$, 3c. $\frac{n^4-n^2}{3}$, 3d. $\frac{1-x^2}{2}$, 3e. $3b^2+3b+1$, 3f. $2a^2+a+2$

3g. $6x^2-4y-3$, 3h. $4p^4+3p^3+2p$, 3i. $6b^2-2bc-3b$, 3j. $\frac{xy^2}{3}$

5a. $\frac{128x^2-96x}{12}$

6. $\frac{10x^2+15}{2}$ units

5b. 72 containers