

## Chapter 3 Review – Polynomials

MPM1D

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### Section 1: Vocabulary

*Match each term to the correct definition.*

**a.** distributive property

**b.** polynomial

**c.** term

**d.** algebraic expression

**e.** degree of a term

**f.** degree of a polynomial

**g.** variable

**h.** like terms

\_\_\_ 1. a quantity whose value can change or vary

\_\_\_ 2. an expression formed by the product of numbers and/or variables

\_\_\_ 3. an algebraic expression formed by adding or subtracting terms

\_\_\_ 4. the degree of the highest-degree term

\_\_\_ 5. terms that have identical variables

\_\_\_ 6.  $a(x + y) = ax + ay$

\_\_\_ 7. the sum of the exponents on the variables in a term

## Section 2: Exponents

8. Evaluate the Following Exponents

a)  $5^3$

b)  $2^8$

c)  $-3^4$

d)  $(-2)^4$

e)  $(-1)^{10}$

f)  $\left(\frac{2}{3}\right)^3$

9. Write as a single Power then Evaluate

a)  $8^5 \times 8^4 \div 8^7$

b)  $6^7 \div 6^5 \div 6$

c)  $(3^3)^4 \div 3^9$

d)  $\frac{(5^3)^4 \times 5^2}{5^{10}}$

e)  $2^7 \times 2^5 \div (2^2)^4$

f)  $[(-6)^3]^3 \div [(-6)^2]^4$

10. Simplify the following using exponent laws.

a)  $(b^6)(b^3)$

b)  $\frac{g^2 \cdot g^8}{g^7}$

c)  $\frac{(a^5)^3}{(a^4)^2}$

d)  $3m^5n \times 4m^2n^4$

e)  $\frac{p^7q^4}{p^3q^4}$

f)  $\frac{8b^3d \times 4bd^2}{2(2bd)^2}$

g)  $x^5 \div x^7$

h)  $\frac{2x^3 \cdot 3x^3}{9x^5}$

i)  $\frac{4x^7}{12x^{11}}$

j)  $\frac{(2x^3)^3 \cdot 2x^2}{(8x^2)^5}$

k)  $\left(\frac{3}{7}\right)^2$

l)  $-6^4$

### Section 3: Communication

11. Complete the following charts:

a)

Term	Coefficient	Variable
$7m$		
$-3x^5$		
$\frac{3}{7}m^2n$		
$gh$		

b)

Term	Degree of Term
$-8b^4$	
$-x^4y^3$	
$\frac{3}{4}mn^2$	
$6r^6s$	

c)

Expression	Classify the Polynomial by Name
$a^2 - 2a + 1$	
$2 - 3x^4 - 5x^2 + 4x$	
$6m^2n^5$	
$h^3 + 6$	
$12x$	

d)

Polynomial	Degree of Polynomial
$5a^4 + b^3$	
$7ab^6 + 8a^3b^3$	
$2x^2 + 3x - 1$	
$8m^4n - m^2n^4 + 2m$	

## Section 4: Like Terms

12. Simplify the following by collecting like terms:

a)  $2b + 7g - 5b - 8g$

b)  $3x + y^2 + 5y^2 - 7x$

c)  $6q + u + 4u + q + u + 4u - u$

d)  $10 - m^2 - 7 - m^2 + 4m^2$

e)  $-3v + 2v + 6 - 3v - 9 - v$

f)  $7 + h + h - 5 + 6h + 2 + 3h$

## Section 5: Add and Subtract Polynomials

13. Simplify the following expressions

a)  $(6k - 4) + (2k + 4)$

b)  $(2a + 1) - (4a + 2)$

c)  $(b - 6) - (2 - 5b) + (b + 4)$

d)  $(g + 12) + (g - 7) - (2 - 3g)$

e)  $(x^2 + 2x + 1) + (2x^2 + 4)$

f)  $(2m^2 + m + 12) - (3m^2 + 4m - 6)$

## **Section 6: Distributive Property**

**14.** Expand and simplify the following:

**a)**  $5(x + 3)$

**b)**  $w(2w + 1)$

**c)**  $q(q + 4)$

**d)**  $3c(6 - 4c)$

**e)**  $\frac{1}{4}(8a - 4) + \frac{2}{5}(5a + 10)$

**f)**  $-5b(a^2 - 4a - 2)$

**g)**  $3(x + 3) + 2(x + 1)$

**h)**  $-4(m + 2) + 3(m - 7)$

**i)**  $5(d - 3) - (d + 2)$

**j)**  $5[b + 2(b + 1)]$

**k)**  $-2[3(a + 3) - 4]$

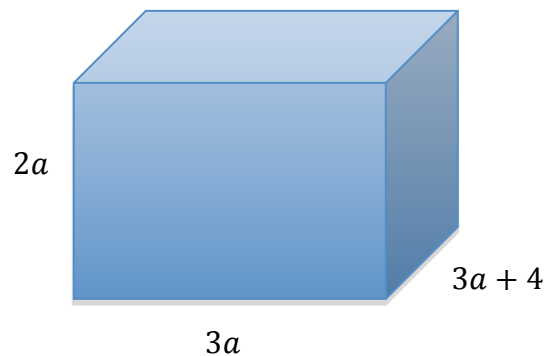
**l)**  $4x(xy + 2y) - 3y(3x^2 + x)$

## Section 7: Applications

15. A rectangular window frame has dimensions expressed by  $3x$  and  $(2x - 5)$ . Find a simplified expression for its perimeter and determine the actual perimeter if  $x = 3$  meters.

16. Write, expand and simplify an expression for the area of the face of the:

a) Front or back



b) Left or right side

c) Top or bottom

17. Write a simplified expression for the volume of the rectangular prism from the previous question.

## Answer Key

### Section 1

1) g 2) c 3) b 4) f 5) h 6) a 7) e

### Section 2

8) a) 125 b) 256 c) -81 d) 16 e) 1 f)  $\frac{8}{27}$

9) a) 64 b) 6 c) 27 d) 625 e) 16 f) -6

10) a)  $b^9$  b)  $g^3$  c)  $a^7$  d)  $12m^7n^5$  e)  $p^4$  f)  $4b^2d$  g)  $\frac{1}{x^2}$  h)  $\frac{2x}{3}$  i)  $\frac{1}{3x^4}$  j)  $\frac{x}{2048}$  k)  $\frac{9}{49}$  l) -1296

### Section 3

a)

Term	Coefficient	Variable
$7m$	7	$m$
$-3x^5$	-3	$x^5$
$\frac{3}{7}m^2n$	$\frac{3}{7}$	$m^2n$
$gh$	1	$gh$

b)

Term	Degree of Term
$-8b^4$	4
$-x^4y^3$	7
$\frac{3}{4}mn^2$	3
$6r^6s$	7

c)

Expression	Classify the Polynomial by Name
$a^2 - 2a + 1$	Trinomial
$2 - 3x^4 - 5x^2 + 4x$	4-term polynomial
$6m^2n^5$	Monomial
$h^3 + 6$	Binomial
$12x$	Monomial

d)

Polynomial	Degree of Polynomial
$5a^4 + b^3$	4
$7ab^6 + 8a^3b^3$	7
$2x^2 + 3x - 1$	2
$8m^4n - m^2n^4 + 2m$	6

### Section 4

12) a)  $-3b - g$  b)  $6y^2 - 4x$  c)  $7q + 9u$  d)  $2m^2 + 3$  e)  $-5v - 3$  f)  $11h + 4$

### Section 5

13) a)  $8k$  b)  $-2a - 1$  c)  $7b - 4$  d)  $5g + 3$  e)  $3x^2 + 2x + 5$  f)  $-m^2 - 3m + 18$

### Section 6

14) a)  $5x + 15$  b)  $2w^2 + w$  c)  $q^2 + 4q$  d)  $-12c^2 + 18c$  e)  $4a + 3$  f)  $-5a^2b + 20ab + 10b$  g)  $5x + 11$  h)  $-m - 29$  i)  $4d - 17$  j)  $15b + 10$  k)  $-6a - 10$  l)  $-5x^2y + 5xy$

### Section 7

15)  $10x - 10$ , 20 units

16) a)  $6a^2$  b)  $6a^2 + 8a$  c)  $9a^2 + 12a$

17)  $18a^3 + 24a^2$