

Chapter 3 Review

MPM1D

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Name: _____

Section 1: Vocabulary

Match each term to the correct definition.

- | | |
|--------------------------|---------------------------|
| a. distributive property | e. degree of a term |
| b. polynomial | f. degree of a polynomial |
| c. term | g. variable |
| d. algebraic expression | h. like terms |

g 1. a quantity whose value can change or vary

~~h~~ d 2. a mathematical phrase made up of numbers and variables, connected by addition or subtraction operators

c 3. an expression formed by the product of numbers and/or variables

b 4. an algebraic expression formed by adding or subtracting terms

f 5. the degree of the highest-degree term

h 6. terms that have identical variables

a 7. $a(x + y) = ax + ay$

e 8. the sum of the exponents on the variables in a term

Section 2: Exponents

1. Evaluate the Following Exponents

a) 5^3
 $= 125$

b) 2^8
 $= 256$

c) -3^4
 $= -81$

d) $(-2)^4$
 $= 16$

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

f) $\left(\frac{2}{3}\right)^3$
 $= \frac{8}{27}$

2. Write as a single Power then Evaluate

a) $8^5 \times 8^4 \div 8^7$
 $= 8^2$
 $= 64$

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

c) $(3^3)^4 \div 3^9$
 $= 3^3$
 $= 27$

d) $\frac{(5^3)^4 \times 5^2}{5^{10}}$
 $= \frac{5^{14}}{5^{10}}$
 $= 5^4$
 $= 625$

e) $2^7 \times 2^5 \div (2^2)^4$
 $= 2^{12} \div 2^8$
 $= 2^4$
 $= 16$

f) $[(-6)^3]^3 \div [(-6)^2]^4$
 $= (-6)^9 \div (-6)^8$
 $= (-6)^1$
 $= -6$

3. Simplify the following using exponent laws.

$$\text{a) } b^6 \times b^3 \\ = b^9$$

$$\text{b) } g^2 \times g^8 \div g^7 \\ = g^3$$

$$\text{c) } (a^5)^3 \div (a^4)^2 \\ = a^{15} \div a^8 \\ = a^7$$

$$\text{d) } 3m^5n \times 4m^2n^4 \\ = 12m^7n^5$$

$$\text{e) } p^7q^4 \div p^3q^4 \\ = p^4$$

$$\text{f) } \frac{8b^3d \times 4bd^2}{2(2bd)^2} \\ = \frac{32b^4d^3}{2(4b^2d^2)} \\ = \frac{32b^4d^3}{8b^2d^2} \\ = 4b^2d$$

$$\text{g) } x^5 \div x^7 \\ = x^{-2} \\ = \frac{1}{x^2}$$

$$\text{h) } \frac{2x^3 \cdot 3x^3}{9x^5} \\ = \frac{6x^6}{9x^5} \\ = \frac{2x}{3}$$

$$\text{i) } \frac{4x^7}{12x^{11}} \\ = \frac{1}{3x^4}$$

$$\text{j) } \frac{(2x^3)^3 \cdot 2x^2}{(8x^2)^5} \\ = \frac{8x^9 \cdot 2x^2}{32768x^{10}} \\ = \frac{16x^{11}}{32768x^{10}} \\ = \frac{1x}{2048}$$

$$\text{k) } \left(\frac{3}{7}\right)^2 \\ = \frac{9}{49}$$

$$\text{l) } -6^4 \\ = -1296$$

Section 3: Communication

4. Complete the following charts:

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 th
$-x^4y^3$	7 th
$\frac{3}{4}mn^2$	3 rd
$6r^6s$	7 th

c)

Expression	Classify as a monomial, binomial, trinomial, or four-term polynomial
$a^2 - 2a + 1$	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 th
$7b^6$	6 th
$2x^2 + 3x - 1$	2 nd
$8m^4 - m^2 + 2m$	4 th

Section 4: Like Terms

5. Simplify the following by collecting like terms:

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

$$= -3b - g$$

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

$$= 6y^2 - 4x$$

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

$$= 7q + 9u$$

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

$$= 2m^2 + 3$$

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

$$= -5v - 3$$

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

$$= 11h + 4$$

Section 5: Add and Subtract Polynomials

7. Simplify the following expressions

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

$$= 6k - 4 + 2k + 4$$

$$= 8k$$

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

$$= 2a + 1 - 4a - 2$$

$$= -2a - 1$$

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

$$= b - 6 - 2 + 5b + b + 4$$

$$= 7b - 4$$

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

$$= g + 12 + g - 7 - 2 + 3g$$

$$= 5g + 3$$

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

$$= x^2 + 2x + 1 + 2x^2 + 4$$

$$= 3x^2 + 2x + 5$$

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

$$= 2m^2 + m + 12 - 3m^2 - 4m + 6$$

$$= -m^2 - 3m + 18$$

Section 6: Distributive Property

8. Expand and Simplify the following:

a) $5(x+3)$

$$= 5x + 15$$

b) $w(2w+1)$

$$= 2w^2 + w$$

c) $q(q+4)$

$$= q^2 + 4q$$

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

$$= 18c - 12c^2$$

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

$$= 2a - 1 + 2a + 4$$

$$= 4a + 3$$

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

$$= -5a^2b + 20ab + 10b$$

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

$$= 3x + 9 + 2x + 2$$

$$= 5x + 11$$

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

$$= -4m - 8 + 3m - 21$$

$$= -m - 29$$

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

$$= 5d - 15 - d - 2$$

$$= 4d - 17$$

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

$$= 5(b + 2b + 2)$$

$$= 5(3b + 2)$$

$$= 15b + 10$$

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

$$= -2(3a + 9 - 4)$$

$$= -2(3a + 5)$$

$$= -6a - 10$$

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

$$= 4x^2y + 8xy - 9x^2y - 3xy$$

$$= -5x^2y + 5xy$$

Section 7: Applications

9. 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.

$$\begin{aligned} P &= 2(3x) + 2(2x - 5) \\ &= 6x + 4x - 10 \\ &= 10x - 10 \end{aligned}$$

$$\begin{aligned} P &= 10(3) - 10 \\ &= 30 - 10 \\ &= 20 \text{ units} \end{aligned}$$

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

- a. Front or back

$$\begin{aligned} A &= 2a(3a) \\ &= 6a^2 \end{aligned}$$

- b. Left or right side

$$\begin{aligned} A &= 2a(3a + 4) \\ &= 6a^2 + 8a \end{aligned}$$

- c. Top or bottom

$$\begin{aligned} A &= 3a(3a + 4) \\ &= 9a^2 + 12a \end{aligned}$$



