Chapter 3 Review – Polynomials
MPM1D

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

C **2.** an expression formed by the product of numbers and/or variables

B **3.** an algebraic expression formed by adding or subtracting terms

F **4.** the degree of the highest-degree term

H **5.** terms that have identical variables

A **6.** $a(x + y) = ax + ay$

E **7.** the sum of the exponents on the variables in a term

Section 2: Exponents

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

$= \frac{2^3}{3^3}$

$= \frac{8}{27}$

9. Write as a single Power then Evaluate

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

$= 8^9 \div 8^7$

$= 8^2$

$= 64$

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

$= 6^2 \div 6^1$

$= 6$

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

$= 3^{12} \div 3^9$

$= 3^3$

$= 27$

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

$= \frac{5^{12} \times 5^2}{5^{10}}$

$= \frac{5^{14}}{5^{10}}$

$= 5^4$

$= 625$

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

$= 2^{12} \div 2^8$

$= 2^4$

$= 16$

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

$= (-6)^9 \div (-6)^8$

$= (-6)^1$

$= -6$

10. Simplify the following using exponent laws.

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

$= b^9$

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

$= \frac{g^{10}}{g^7}$

$= g^3$

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

$= \frac{a^{15}}{a^8}$

$= a^7$

d) $3m^5n^1 \times 4m^2n^4$

$= 12m^7n^5$

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

$= p^4q^0$

$= p^4(1)$

$= p^4$

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

$= \frac{32b^4d^3}{2(4b^2d^2)}$

$= \frac{32b^4d^3}{8b^2d^2}$

$= 4b^2d$

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

$= x^{-2}$

$= \frac{1}{x^2}$

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

$= \frac{6x^6}{9x^5}$

$= \frac{2x}{3}$

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

$= \frac{1x^{-4}}{3}$

$= \frac{1}{3x^4}$

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

$= \frac{8x^9 \cdot 2x^2}{32768x^{10}}$

$= \frac{16x^{11}}{32768x^{10}}$

$= \frac{x}{2048}$

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

$= \frac{3^2}{7^2}$

$= \frac{9}{49}$

l) -6^4

$= -1296$

Section 3: Communication

11. 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
$-x^4y^3$	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: Like Terms

12. Simplify the following by collecting like terms:

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

$= 2b - 5b + 7g - 8g$

$= -3b - 1g$

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

$= 1y^2 + 5y^2 + 3x - 7x$

$= 6y^2 - 4x$

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

$= 6q + 1q + 1u + 4u + 1u + 4u - 1u$

$= 7q + 9u$

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

$= -1m^2 - 1m^2 + 4m^2 + 10 - 7$

$= 2m^2 + 3$

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

$= -3v - 3v + 2v - 1v + 6 - 9$

$= -5v - 3$

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

$= 1h + 1h + 6h + 3h + 7 - 5 + 2$

$= 11h + 4$

Section 5: Add and Subtract Polynomials

13. Simplify the following expressions

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

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

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

$= 8k$

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

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

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

$= -2a - 1$

c) $(b - 6) - 1(2 - 5b) + (b + 4)$

$= 1b - 6 - 2 + 5b + 1b + 4$

$= 1b + 5b + 1b - 6 - 2 + 4$

$= 7b - 4$

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

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

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

$= 5g + 3$

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

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

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

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

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

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

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

$= -1m^2 - 3m + 18$

Section 6: Distributive Property

14. 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) $3c(6-4c)$

$= 18c - 12c^2$

$= -12c^2 + 18c$

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

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

$= \frac{8a}{4} - \frac{4}{4} + \frac{10a}{5} + \frac{20}{5}$

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

$= 4a + 3$

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

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

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

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

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

$= 5x + 11$

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

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

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

$= -m - 29$

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

$= 5d - 15 - d - 2$

$= 5d - 1d - 15 - 2$

$= 4d - 17$

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

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

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

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

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.

$P = 2(3x) + 2(2x-5)$

$P = 6x + 4x - 10$

$P = 10x - 10$

$P = 10(3) - 10$

$P = 30 - 10$

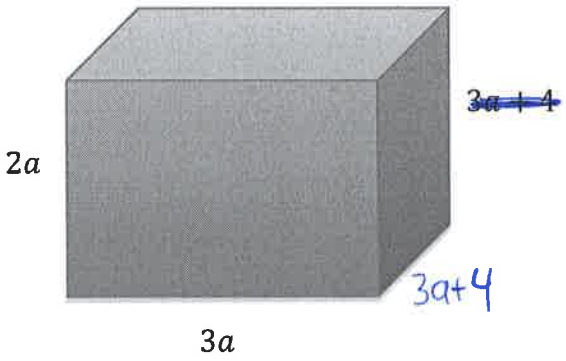
$P = 20$ units

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

a) Front or back

$A = 2a(3a)$

$A = 6a^2$



b) Left or right side

$A = 2a(3a+4)$

$A = 6a^2 + 8a$

c) Top or bottom

$A = 3a(3a+4)$

$A = 9a^2 + 12a$

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

$V = 2a(3a)(3a+4)$

$V = (6a^2)(3a+4)$

$V = 18a^3 + 24a^2$