

Chapter 3 – Polynomials - Exam Review

MPM1D

Jensen

Section 1: Exponents

1. Write each expression as a power

a) $5 \times 5 \times 5$

b) $(-3) \times (-3) \times (-3) \times (-3)$

c) $\left(\frac{1}{2}\right) \times \left(\frac{1}{2}\right)$

2. Write each power in expanded form

a) 7^4

b) $(-10)^5$

c) $\left(\frac{5}{3}\right)^3$

3. Evaluate the following powers

a) 5^3

b) 2^5

c) -3^3

d) $(-3)^3$

e) $(-2)^4$

f) -2^4

g) $(-1)^{17}$

h) $(-1)^{20}$

i) $\left(\frac{3}{5}\right)^2$

4. Evaluate. Remember to use the correct order of operations

a) $3^4 + 4^2$

b) $7^2 - 7$

c) $9^2 \div 3^2$

d) $5 \times \left(\frac{2}{5}\right)^3$

e) $(3^2 + 4^2)$

f) $(3 + 4)^2$

5. Write as a single power (with a positive exponent), then evaluate

a) $8^2 \times 8^3$

b) $4^3 \times 4^5 \div 4^2$

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

d) $9^7 \times 9^5 \div 9^{12}$

e) 7^{-2}

f) $5^4 \times 5^{-7}$

g) $(2^2)^4$

h) $\left[\left(-\frac{2}{3}\right)^2\right]^3$

i) $(5^2)^{-2}$

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

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

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

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

n) $(-3)^5 \times (-3)^4 \div (-3)^6$

o) $\frac{8^7 \times 8^3}{(8^2)^4}$

6. Simplify the following using exponent laws and evaluate where possible

a) $(x^7)(x^7)$

b) $(a^3)(a^4)(a^5)$

c) x^{-3}

d) $\frac{y^6}{y^3}$

e) $\frac{2x^{10}}{8x^2}$

f) $\frac{y^3}{y^6}$

f) $\frac{6a^5}{3a^9}$

g) $(x^4)^5$

h) $(x^4)^{-5}$

$$\mathbf{i)} (5x^6)^2$$

$$\mathbf{j)} (4x^2y^5)^3$$

$$\mathbf{k)} (a^5)^3 \div (a^4)^2$$

$$\mathbf{l)} 5m^5n \times 4m^2n^4$$

$$\mathbf{m)} p^7q^4 \div p^3q^4$$

$$\mathbf{n)} \frac{24x^3y^{10}}{36xy^4}$$

$$\mathbf{o)} \frac{36x^3y^9}{27x^6y^4}$$

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

$$\mathbf{q)} x^5 \div x^7$$

$$\mathbf{r)} \frac{2x^3 \cdot 3x^3}{18x^5}$$

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

$$\mathbf{t)} (x^{25})^0$$

$$\mathbf{u)} \frac{(2x^2)^3 \cdot 2x^2}{8x^2}$$

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

$$\mathbf{w)} (-4x^2y^5)^3$$

$$\mathbf{x)} -8a^5 \times (2a^3)^2$$

$$\mathbf{y)} \frac{3f^4g^3 \times 8fg^4}{(6f^2g^3)^2}$$

$$\mathbf{z)} \frac{(-3m^2n)(6m^3n^2)}{(2m^4n^2)(3mn)}$$

Section 2: Polynomials

7. Classify each of the following polynomials and state the degree of the polynomial

	Type of Polynomial (monomial, binomial, trinomial, etc.)	Degree of Polynomial
a) $3a^2 + 2a^3 + b$		
b) $3x^2y$		
c) $-b^4d + bd^3 + b^6$		
d) $7xy^5z - 15x^6$		
e) $2 - 3x^4 - 5x^2 + 4x$		

8. State the degree of each of the following terms

a) $-8b^4$

b) $-x^4y^3$

c) $\frac{3}{4}mn^2$

d) $6r^6s$

9. Classify each of the following terms as like or unlike

a) $4a^2$ and $4a$

b) $6x^3$ and $-x^3$

c) $12p^4$ and $-p^4$

d) $4a^2b^3$ and $6a^3b^2$

10. Simplify the following expressions by collecting like terms

a) $-2x + 7y - 5x - 9y$

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

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

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

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

f) $7 + 3x^2y + 4y - y + 8x^2y + 80$

11. Add/Subtract the following polynomials

a) $(3x - 1) + (4 - 2x)$

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

c) $(68x^2 + 66x + 1) + (3x^2 + 86)$

d) $(2 + y) - (3 - 2y)$

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

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

g) $(2m^2 - m - 12) - (5m^2 + 4m - 6)$

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

12. Expand and simplify the following expressions using the distributive property

a) $5(x + 3)$

b) $4(b + 2)$

c) $w(2w + 1)$

d) $q(q + 4)$

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

f) $-p(2p - 1)$

g) $-5(a^2 - 4a - 2)$

h) $2d(d^2 - 3d - 1)$

i) $3(x + 3) + 2(x + 1) - 5x$

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

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

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

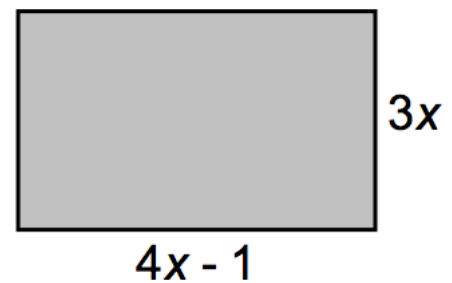
m) $-2[3(a + 3) - 4]$

n) $4[-2(4 - t) + 3t]$

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

Section 3: Applications

13. a) Expand and simplify an expression for the area of the following rectangle.



b) What is the area if $x = 3$ cm?

14. Three artists contributed to a coffee-table book. They each chose to be paid a different way.

Artist	Fixed Rate (\$)	Royalty (\$ per n books sold)
Ayesha	1000	$2n$
Jorge	-	$5n$
Ioana	4000	-

a) Write a simplified expression for the total amount paid to Ayesha, Jorge, and Ioana.

b) If 1000 books are sold. What is the total amount that will be paid to the authors?

Answers:

1) a) 5^3 b) $(-3)^4$ c) $\left(\frac{1}{2}\right)^2$

2) a) $7 \times 7 \times 7 \times 7$ b) $(-10)(-10)(-10)(-10)(-10)$ c) $\left(\frac{5}{3}\right)\left(\frac{5}{3}\right)\left(\frac{5}{3}\right)$

3) a) 125 b) 32 c) -27 d) -27 e) 16 f) -16 g) -1 h) 1 i) $\frac{9}{25}$

4) a) 97 b) 42 c) 9 d) $\frac{8}{25}$ e) 25 f) 49

5) a) 32768 b) 4096 c) 6 d) 1 e) $\frac{1}{49}$ f) $\frac{1}{125}$ g) 256 h) $\frac{64}{729}$ i) $\frac{1}{625}$ j) 27 k) 625 l) 16 m) -6 n) -27 o) 64

6) a) x^{14} b) a^{12} c) $\frac{1}{x^3}$ d) y^3 e) $\frac{x^8}{4}$ f) $\frac{1}{y^3}$ g) $\frac{2}{a^4}$ h) x^{20} i) $\frac{1}{x^{20}}$ j) $25x^{12}$ k) a^7 l) $20m^7n^5$

m) p^4 n) $\frac{2x^2y^6}{3}$ o) $\frac{4y^5}{3x^3}$ p) $4b^2d$ q) $\frac{1}{x^2}$ r) $\frac{x}{3}$ s) $\frac{1}{3x^4}$ t) 1 u) $2x^6$ v) $\frac{9}{49}$ w) $-64x^6y^{15}$ x) $-32a^{11}$
y) $\frac{2fg}{3}$ z) -3

7) a) trinomial; 3 b) monomial; 3 c) trinomial; 6 d) binomial; 7 e) 4-term polynomial; 4

8) a) 4 b) 7 c) 3 d) 7

9) a) unlike b) like c) like d) unlike

10) a) $-7x - 2y$ b) $4x^2 + 6y^2 - 7x$ c) $7q + 9u$ d) $4n^2m^2 - 2nm^2 + 3$ e) $-5v - 3$
f) $11x^2y + 3y + 87$

11) a) $x + 3$ b) $-4k$ c) $71x^2 + 66x + 87$ d) $3y - 1$ e) $-2a - 1$ f) $5g + 3$ g) $-3m^2 - 5m - 6$
h) $7b - 4$

12) a) $5x + 15$ b) $4b + 8$ c) $2w^2 + w$ d) $q^2 + 4q$ e) $18c - 12c^2$ f) $-2p^2 + p$ g) $-5a^2 + 20a + 10$
h) $2d^3 - 6d^2 - 2d$ i) 11 j) $-m - 29$ k) $-6d - 7$ l) $15b + 10$ m) $-6a - 10$ n) $20t - 32$
o) $-5x^2y + 5xy$

13) a) $12x^2 - 3x$ b) 99

14) a) Total = $5000 + 7n$ b) \$12000