

## MPM2D – Unit 1 Review Package

### Polynomials

#### Operations with Polynomials

1. Simplify.

- a.  $(2x + y) + (2x - 4y)$
- b.  $(5x^2 - 3x + 4) + (3x^2 - x - 1)$
- c.  $(3a^2 - a - 2) - (4a^2 + 5a + 6)$
- d.  $(2m^2 + 2mn - n^2) - (m^2 - mn - 2n^2)$

2. Multiply.

- a.  $(3xy^2)(-4x^3y^2)$
- b.  $(-4rs^3t^2)(-6rst^4)$

3. Simplify.

- a.  $\frac{20a^2b^3c}{-5ab^3c}$
- b.  $\frac{-36m^3n^4p^2}{-9m^3np}$

4. Expand and simplify.

- a.  $3(x - 4) + 5(x + 6)$
- b.  $6(a + 3) - 2(a - 5)$
- c.  $2t(3t - 4) + t(2t + 5)$
- d.  $3(y^2 - y - 1) - (2y^2 - 3y + 4)$

5. Find the product.

- a.  $(x - 2)(x + 4)$
- b.  $(a + 5)(a - 6)$
- c.  $(2y - 3)(3y + 4)$
- d.  $(3x + y)(x - 4y)$

6. Expand and simplify.

- a.  $2(x + 1)(x - 3)$
- b.  $-2(y - 1)(y + 4)$
- c.  $4(m - 2)(3m - 1)$
- d.  $3(2x + 1)(2x - 3)$

7. Expand and simplify.

- a.  $(y + 4)(y - 3) + (y - 2)(y - 3)$
- b.  $(2x - 1)(x - 4) - (3x + 2)(3x - 1)$
- c.  $3(2a + 3)(2a - 1) - 4(a^2 - 7)$
- d.  $4(2x - 1)(x + 3) + 3(x - 2)(3x - 4)$

8. Expand.

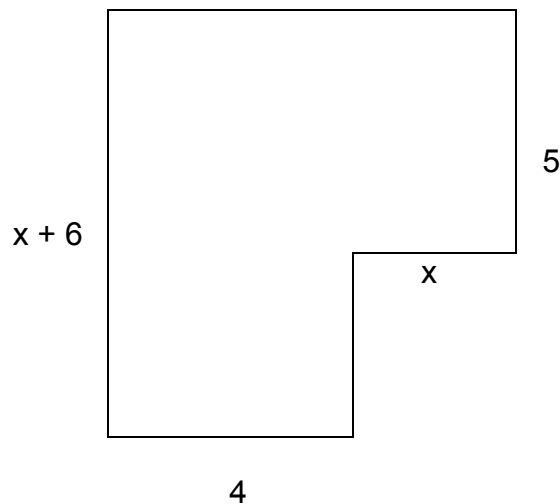
- a.  $(x + 4)^2$
- b.  $(y - 4)(y + 4)$
- c.  $(a - 5)^2$
- d.  $(3t + 1)(3t - 1)$
- e.  $(2x - 3y)^2$
- f.  $(5a + 3b)(5a - 3b)$
- g.  $2(3m + 1)^2$
- h.  $(1 - 2x)^2$
- i.  $3(4x + 3)(4x - 3)$

9. Expand and Simplify

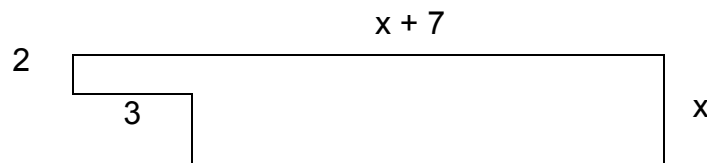
- a.  $(m - 3)(m + 3) + (m - 4)^2$
- b.  $(x - 6)^2 - (x + 5)(x - 5)$
- c.  $3(2t + 2)^2 + 2(3t - 1)(3t + 1)$
- d.  $2(3x + 2y)(3x - 2y) - 3(3x - y)^2$
- e.  $-3(2x - 5)^2 - 13$
- f.  $\frac{1}{2}(2x + 4y)^2 - 11$
- g.  $x^2 - (x + 7)^2 - 2(x - 8)$
- h.  $3(x - 5)(2x + 3) - (3x - 4)^2 + 17$
- i.  $-9(5x - 11)^2 - 111$

10. Write an algebraic expression for the area of each figure. Expand and simplify.

a.



b.



11. Question #1-3 and 5-7 on page 256 of the textbook.

**Answers**

- |                         |                       |                   |                       |
|-------------------------|-----------------------|-------------------|-----------------------|
| 1a) $4x-3y$             | b) $8x^2-4x+3$        | c) $-a^2-6a-8$    | d) $m^2+3mn+n^2$      |
| 2a) $-12x^4y^4$         | b) $24r^2s^4t^6$      |                   |                       |
| 3a) $-4a$               | b) $4n^3p$            |                   |                       |
| 4a) $8x+18$             | b) $4a+28$            | c) $8t^2-3t$      | d) $y^2-7$            |
| 5a) $x^2+2x-8$          | b) $a^2-a-30$         | c) $6y^2-y-1$     | d) $3x^2-11xy-4y^2$   |
| 6a) $2x^2-4x-6$         | b) $-2y^2-6y+8$       | c) $12m^2-28m+8$  | d) $12x^2-12x-9$      |
| 7a) $2y^2-4y-6$         | b) $-7x^2-12x+6$      | c) $8a^2+12a+19$  | d) $17x^2-10x+12$     |
| 8a) $x^2+8x+16$         | b) $y^2-16$           | c) $a^2-10a+25$   | d) $9t^2-1$           |
| 8e) $4x^2-12xy+9y^2$    | f) $25a^2-9b^2$       | g) $18m^2+12m+2$  | h) $1-4x+4x^2$        |
| 8i) $48x^2-27$          |                       |                   |                       |
| 9a) $2m^2-8m+7$         | b) $-12x+61$          | c) $30t^2+24t+10$ | d) $-9x^2+18xy-11y^2$ |
| e) $-12x^2+60x-88$      | f) $2x^2+8xy+8y^2-11$ | g) $-16x-33$      | h) $-3x^2+3x-20$      |
| i) $-225x^2+4950x-1200$ |                       |                   |                       |
| 10a) $9x+24$            | b) $x^2+4x+6$         |                   |                       |

## Power Laws

1. Simplify.

a.  $(x^3)(x^5)$

b.  $(a^2)(a^{10})$

c.  $(b)(b)(b)$

d.  $(m^2)(m^3)(m)$

e.  $(a^2)(a^3)(b)(b^4)$

f.  $(a)(b)(a^2)(b^3)$

2. Simplify.

a.  $a^7 \div a^3$

b.  $b^3 \div b^2$

c.  $n^{12} \div n^3$

d.  $x^8 \div x^5$

e.  $a^5 \div a$

f.  $x^{10} \div x^9$

3. Simplify.

a.  $(x^4)^2$

b.  $(a^3)^3$

c.  $(a^2b)^3$

d.  $(xy^3)^5$

e.  $(abc)^5$

f.  $(b^8)^3$

g.  $(2x^3)^3$

h.  $(a^5b^2)^3$

i.  $(3a^5)^2$

j.  $(3xy^2)^3$

k.  $(5a^8)^3$

l.  $(4x^2yz)^3$

4. Simplify.

a.  $\left(\frac{x}{y}\right)^5$

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

c.  $\left(\frac{x^2}{y}\right)^3$

d.  $\left(\frac{-a}{b^5}\right)^4$

e.  $\left(\frac{-3x}{y}\right)^2$

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

g.  $\left(\frac{5a^2}{2b^3}\right)^2$

h.  $\left(\frac{3a}{b^3}\right)^2$

5. Write each power with a positive exponent.

a.  $2^{-3}$

b.  $4^{-1}$

c.  $10^{-7}$

d.  $9^{-8}$

e.  $1^{-4}$

f.  $\left(\frac{1}{2}\right)^{-6}$

g.  $(-7)^{-6}$

h.  $(-2)^{-3}$

i.  $\frac{1}{2^{-3}}$

j.  $\frac{1}{4^{-2}}$

k.  $\frac{1}{5^{-4}}$

l.  $\frac{1}{(-3)^{-5}}$

6. Evaluate.

a.  $5^0$

b.  $2^6$

c.  $3^{-1}$

d.  $4^{-2}$

e.  $(-1)^7$

f.  $10^{-3}$

g.  $(-6)^0$

h.  $8^{-1}$

i.  $(-3)^{-4}$

j.  $(-10)^{-3}$

k.  $(0.1)^{-3}$

l.  $(-1)^{-6}$

m.  $\frac{1}{3^{-1}}$

n.  $\frac{1}{4^{-2}}$

o.  $\frac{1}{(-3)^{-1}}$

7. Write each expression as a single power.

a.  $(7^4)(7^5)$

b.  $(9^6)(9^{-4})$

c.  $(8^{-3})(8^{-5})$

d.  $(6^7) \div (6^3)$

e.  $5^{-7} \div 5^{-2}$

f.  $4^{-2} \div 4^6$

g.  $(3^3)^4$

h.  $(9^{-2})^4$

i.  $(8^{-1})^{-5}$

j.  $-(2^{-3})^{-2}$

8. Write each expression as a single power.

a.  $2^4(2^{-3})(2^2)$

b.  $(3^{-5})(3^{-3})(3^2)$

c.  $5^6 \times 5^{-9} \times 5$

d.  $8^4 \times 8^{-5} \div 8^{-2}$

e.  $(-2)^{-4} \times (-2)^{-3} \div (-2)^{-1}$

f.  $(-3)^{-6} \div (-3)^{-2} \times (-3)^4$

9. Evaluate.

a.  $3^2 \times 3^2$

b.  $4^7 \div 4^5$

c.  $2^4 \times 2^{-3}$

d.  $3^2 \div 3^{-1}$

e.  $5^2 \times 5^{-4}$

f.  $6^{-2} \div 6^0$

g.  $7^{-4} \div 7^{-5}$

h.  $6^{-3} \div 6^{-3}$

i.  $\frac{(2^2)^2}{(5^3)^{-1}}$

j.  $\frac{(3^{-1})^3}{(2^{-3})^{-2}}$

k.  $\frac{(6^0)^{-4}}{(10^2)^{-2}}$

l.  $\frac{(7^{-3})^0}{(0.1^{-1})^{-2}}$

10. Evaluate.

a.  $2^3 \times 2^{-2} \times 2^{-2}$

b.  $3^4 \div 3^5 \times 3$

c.  $3^0 + 3^3$

d.  $4^2 - 2^{-1}$

e.  $5^3 + 3^2$

f.  $2^{-2} + 5^0$

g.  $2^3 \times 2^{-1} + 5$

h.  $(6-3)^{-2}$

i.  $(9^0 + 2^0)^{-1}$

j.  $\frac{1}{2^{-2}} + \frac{1}{3^{-1}}$

k.  $\frac{2^{-1}}{3^{-1}}$

l.  $\frac{3^{-2}}{4^{-1}}$

11. Evaluate.

a.  $\left(\frac{1}{3}\right)^{-1}$

b.  $\left(\frac{-1}{5}\right)^2$

c.  $\left(\frac{-7}{8}\right)^0$

d.  $\left(\frac{1}{10}\right)^{-2}$

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

f.  $\left(\frac{-3}{4}\right)^{-2}$

12. Evaluate

a.  $(-2x^7y^{11})^{-4}$

b.  $(13x^2y^2z^4)^{-3}$

c.  $\left(\frac{4}{9x^3y^4}\right)^{-1}$

13. Evaluate.

a.  $3^0 + 3^{-1}$

b.  $5^{-1} + 2^{-1}$

c.  $(12^0 \times 3^{-1}) \times 4^{-2}$

d.  $2^{-3} + 3^{-2}$

e.  $\frac{2^{-1} + 3^{-1}}{3^0}$

f.  $\frac{1}{3^{-1}} + \frac{1}{2^{-1}}$

g.  $\left(\frac{1}{2}\right)^{-3} + \left(\frac{1}{2}\right)^0$

h.  $\left(\frac{2}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-1}$

## Answers

1a) $x^8$	b) $a^{12}$	c) $b^3$	d) $m^6$	e) $a^5b^5$	
f) $a^3b^4$					
2a) $a^4$	b) $b$	c) $n^9$	d) $x^3$	e) $a^4$	
f) $x$					
3a) $x^9$	b) $a^9$	c) $a^6b^3$	d) $x^5y^{15}$	e) $a^5b^5c^5$	
f) $b^{24}$	g) $8x^9$	h) $a^{15}b^6$	i) $9a^{10}$	j) $27x^3y^6$	
k) $125a^{24}$	l) $64x^6y^3z^3$				
4a) $x^5/y^5$	b) $a^4/9$	c) $x^6/y^3$	d) $a^4/b^{20}$	e) $9x^2/y^2$	
f) $x^6$	g) $25a^4/4b^6$	h) $9a^2/b^2$			
5a) $1/2^3$	b) $1/4^1$	c) $1/10^7$	d) $1/9^8$	e) $1/1^4$	
f) $1/2^6$	g) $1/(-7)^6$	h) $1/(-2)^3$	i) $2^3$	j) $4^2$	
k) $5^4$	l) $(-3)^5$				
6a) $1$	b) $64$	c) $1/3$	d) $1/16$	e) $-1$	
f) $1/1000$	g) $1$	h) $1/8$	i) $1/81$	j) $-(1/1000)$	
k) $1000$	l) $1$	m) $3$	n) $16$	o) $-3$	
7a) $7^9$	b) $9^2$	c) $8^{-8}$	d) $6^4$	e) $5^{-5}$	
f) $4^{-8}$	g) $3^{12}$	h) $9^{-8}$	i) $8^5$	j) $-2^{-6}$	
8a) $2^3$	b) $3^{-6}$	c) $5^{-2}$	d) $8$	e) $(-2)^8$	
f) $(-3)^0$					
9a) $81$	b) $16$	c) $2$	d) $27$	e) $1/25$	
f) $1/36$	g) $7$	h) $1$	i) $2000$	j) $1/1728$	
k) $10000$	l) $100$				
10a) $1/2$	b) $1$	c) $28$	d) $31/2$	e) $134$	
f) $5/4$	g) $9$	h) $1/9$	i) $1/2$	j) $7$	
k) $3/2$	l) $4/9$				
11a) $3$	b) $1/25$	c) $1$	d) $100$	e) $-(27/8)$	
f) $16/9$					
12a) $1/16x^{28}y^{44}$	b) $1/2197x^6y^6z^{12}$	c) $9x^3y^4/4$			
13a) $4/3$	b) $7/10$	c) $1/48$	d) $17/72$	e) $5/6$	f) $5$
g) $9$	h) $25/4$				