

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Review for Grade 9 Math Exam on Unit 5 - Polynomials

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. A large white square represents an  $x^2$ -tile, a black rectangle represents a  $-x$ -tile, and a small white square represents a 1-tile.

Write the polynomial represented by this set of algebra tiles.



- a.  $-2x^2 + 3x + 4$       b.  $2x^2 - 3x + 4$       c.  $2x^2 - x^3 + 4$       d.  $2x - 3x^2 + 4$

- \_\_\_\_\_ 2. A large white square represents an  $x^2$ -tile, a large black square represents a  $-x^2$ -tile, a small white square represents a 1-tile, and a small black square represents a  $-1$ -tile.

How would you model the polynomial  $-3x^2 - 4$  with algebra tiles?

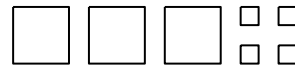
a.



b.



c.



d.



- \_\_\_\_\_ 3. Which of the following expressions are polynomials?

i)  $\frac{1}{2}x$

ii)  $1 - 5.5x^2$

iii)  $2\sqrt{t}$

iv) 3.5

a. i, iii, and iv

b. ii and iv

c. i, ii, and iii

d. i, ii, and iv

- \_\_\_\_\_ 4. Identify the polynomials that can be represented by the same set of algebra tiles.

i)  $2x^2 - 5 + 6x$

ii)  $2x^2 - 6x + 5$

iii)  $-5 + 6x - 2x^2$

iv)  $6x - 5 + 2x^2$

a. i and iv

b. iii and iv

c. ii and iv

d. i and ii

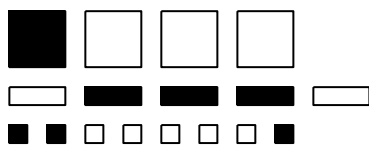
- \_\_\_\_\_ 5. Identify the polynomial that is equivalent to  $4 - 6v - 7v^2$ .
- i)  $7v^2 + 6v - 4$   
 ii)  $4 + 7v^2 - 6v$   
 iii)  $-7v^2 - 6v + 4$   
 iv)  $-7v^2 - 4 + 6v$
- a. iv                      b. ii                      c. i                      d. iii
- \_\_\_\_\_ 6. Combine like terms. Sketch algebra tiles if it helps.  
 $3x + 10 + 7x - 4$
- a.  $13x + 3$               b.  $10x + 6$               c.  $16x$               d.  $10x - 6$
- \_\_\_\_\_ 7. Combine like terms. Sketch algebra tiles if it helps.  
 $9x^2 - 7x + 2x - 6x^2$
- a.  $-2x^2$               b.  $3x^2 - 5x$               c.  $2x^2 - 4x$               d.  $3x^2 + 5x$
- \_\_\_\_\_ 8. Simplify:  $10x^2 - 8 + 3x + 5 - 6x^2 - 6x$
- a.  $4x^2 - 3x + 3$               c.  $4x^2 + 3x + 3$   
 b.  $4x^2 - 3x - 3$               d.  $4x^4 - 3x^2 - 3$
- \_\_\_\_\_ 9. Add:  $(2x^2 - 6) + (5x^2 - 8x - 4)$
- a.  $10x^2 - 8x - 24$               c.  $7x^2 - 8x - 10$   
 b.  $7x^2 - 14x - 4$               d.  $7x^2 - 8x + 10$
- \_\_\_\_\_ 10. Add:  $(-3x^2 + 3 - 5x) + (5 + x^2 + 8x)$
- a.  $-2x^2 + 3x + 8$               c.  $-4x^2 - 3x + 8$   
 b.  $-2x^2 - 3x + 8$               d.  $-4x^2 + 3x + 8$
- \_\_\_\_\_ 11. Subtract:  $(3x - 7x^2 + 2) - (4x^2 - 5 + 6x)$
- a.  $-11x^2 + 3x - 7$               c.  $-11x^2 - 3x + 7$   
 b.  $-11x^2 - 9x - 3$               d.  $11x^2 + 3x - 7$
- \_\_\_\_\_ 12. Subtract:  $(3y^2 - 5x^2 + 4) - (2x - 8 + 4y^2)$
- a.  $-1y^2 - 5x^2 - 2x - 4$               c.  $-4x + 12$   
 b.  $3y^2 - 7x^2 + 12$               d.  $-1y^2 - 5x^2 - 2x + 12$

- \_\_\_ 13. Multiply:  $7(2x^2 - 5x)$
- a.  $14x^2 - 5x$       b.  $14x^2 + 2x$       c.  $14x^2 - 35x$       d.  $9x^2 - 2x$
- \_\_\_ 14. Multiply:  $(-2)(4c^2 - 6c - 7)$
- a.  $-8c^2 - 12c - 14$       c.  $-8c^2 + 12c + 14$   
 b.  $2c^2 - 8c - 9$       d.  $-8c^2 - 6c - 7$
- \_\_\_ 15. Divide:  $\frac{20p - 28}{4}$
- a.  $5p - 28$       b.  $5p - 7$       c.  $20p - 24$       d.  $16p - 24$
- \_\_\_ 16. Divide:  $\frac{-20p^2 - 16p}{-4p}$
- a.  $5p^2 - 16p$       b.  $5p + 4$       c.  $80p^2 - 64$       d.  $5p + 4p$

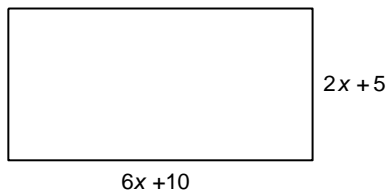
**Short Answer**

17. A large white square represents an  $x^2$ -tile, a large black square represents a  $-x^2$ -tile, a white rectangle represents an  $x$ -tile, a black rectangle represents a  $-x$ -tile, a small white square represents a 1-tile, and a small black square represents a  $-1$ -tile.

Write the simplified polynomial.



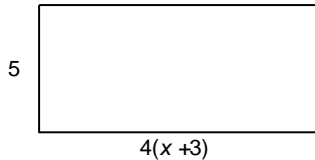
18. Combine like terms. Sketch algebra tiles if it helps.  
 $3x^2 - 6x + 4x^2 + 3x - 6$
19. Add:  $(10x^2 - 7x + 6) + (-2x^2 + 2x - 9)$
20. Write the perimeter of this rectangle as a polynomial in simplest form.



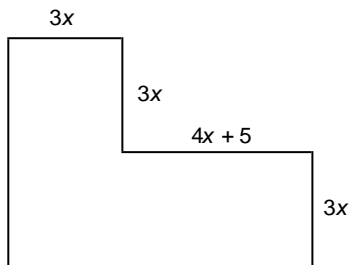
21. Subtract:  $(9x^2 - 6x + 4) - (5x^2 - 4x - 5)$
22. Subtract:  $(4x^2 + 9x - 3) - (x^2 - 11x + 5)$
23. Multiply:  $5(-2x^2 - 5)$
24. Multiply:  $-2(-8 + 2x - 5x^2)$
25. Divide:  $\frac{12m - 20m^2}{-4m}$
26. Determine the product:  $(-2x)(4x + 3y - 5z)$
27. Determine the quotient:  $(-10x^2 + 4xy - 6xz) \div (-2x)$

### Problem

28. a) Write the multiplication sentence modelled by this rectangle.  
 b) Determine the area of the rectangle when  $x = 12$ .  
 Show your work.



29. The area of a rectangular deck, in square metres, is given by the polynomial  $40p^2 + 24p$ .  
 The deck is  $8p$  metres wide.  
 a) Write a polynomial to represent the length of the deck.  
 b) Determine the length, width, and area of the deck when  $p = 4$  m.
30. a) Determine a polynomial for the perimeter of the shape below.  
 b) Determine a polynomial for the area of the shape below.  
 c) Determine the perimeter and area when  $x = 6$  cm.



## Review for Grade 9 Math Exam on Unit 5 - Polynomials

### Answer Section

#### MULTIPLE CHOICE

1. ANS: B                   PTS: 1                   DIF: Easy                   REF: 5.1 Modelling Polynomials  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Conceptual Understanding
2. ANS: B                   PTS: 1                   DIF: Easy                   REF: 5.1 Modelling Polynomials  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Conceptual Understanding
3. ANS: D                   PTS: 1                   DIF: Easy                   REF: 5.1 Modelling Polynomials  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Conceptual Understanding
4. ANS: A                   PTS: 1                   DIF: Moderate              REF: 5.1 Modelling Polynomials  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
5. ANS: D                   PTS: 1                   DIF: Moderate              REF: 5.1 Modelling Polynomials  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
6. ANS: B                   PTS: 1                   DIF: Easy                   REF: 5.2 Like Terms and Unlike Terms  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
7. ANS: B                   PTS: 1                   DIF: Easy                   REF: 5.2 Like Terms and Unlike Terms  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
8. ANS: B                   PTS: 1                   DIF: Moderate              REF: 5.2 Like Terms and Unlike Terms  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
9. ANS: C                   PTS: 1                   DIF: Moderate              REF: 5.3 Adding Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
10. ANS: A                   PTS: 1                   DIF: Moderate              REF: 5.3 Adding Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
11. ANS: C                   PTS: 1                   DIF: Moderate              REF: 5.4 Subtracting Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
12. ANS: D                   PTS: 1                   DIF: Difficult              REF: 5.4 Subtracting Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
13. ANS: C                   PTS: 1                   DIF: Moderate  
REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
LOC: 9.PR7               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
14. ANS: C                   PTS: 1                   DIF: Moderate  
REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
LOC: 9.PR7               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge

15. ANS: B                   PTS: 1                   DIF: Moderate  
REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
16. ANS: B                   PTS: 1                   DIF: Moderate  
REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial  
LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge

## SHORT ANSWER

17. ANS:  
 $2x^2 - x + 2$
- PTS: 1                   DIF: Moderate       REF: 5.2 Like Terms and Unlike Terms  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
18. ANS:  
 $7x^2 - 3x - 6$
- PTS: 1                   DIF: Moderate       REF: 5.2 Like Terms and Unlike Terms  
LOC: 9.PR5               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
19. ANS:  
 $8x^2 - 5x - 3$
- PTS: 1                   DIF: Moderate       REF: 5.3 Adding Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
20. ANS:  
 $16x + 30$
- PTS: 1                   DIF: Moderate       REF: 5.3 Adding Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
21. ANS:  
 $4x^2 - 2x + 9$
- PTS: 1                   DIF: Moderate       REF: 5.4 Subtracting Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge
22. ANS:  
 $3x^2 + 20x - 8$
- PTS: 1                   DIF: Difficult       REF: 5.4 Subtracting Polynomials  
LOC: 9.PR6               TOP: Patterns and Relations (Variables and Equations)  
KEY: Procedural Knowledge

23. ANS:  
 $-10x^2 - 25$
- PTS: 1                      DIF: Moderate      REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Procedural Knowledge
24. ANS:  
 $16 - 4x + 10x^2$
- PTS: 1                      DIF: Moderate      REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Procedural Knowledge
25. ANS:  
 $-3 + 5m$
- PTS: 1                      DIF: Moderate  
 REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Procedural Knowledge
26. ANS:  
 $-8x^2 - 6xy + 10xz$
- PTS: 1                      DIF: Difficult  
 REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Procedural Knowledge
27. ANS:  
 $5x - 2y + 3z$
- PTS: 1                      DIF: Difficult  
 REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Procedural Knowledge

## PROBLEM

28. ANS:
- a)  $5(4(x + 3))$   
 $= 5(4x + 12)$   
 $= 20x + 60$
- b) Substitute  $x = 12$  into  $20x + 60$ .  
 $20(12) + 60 = 300$   
 The area of the rectangle when  $x = 12$  is 300 square units.
- PTS: 1                      DIF: Moderate      REF: 5.5 Multiplying and Dividing a Polynomial by a Constant  
 LOC: 9.PR7                TOP: Patterns and Relations (Variables and Equations)  
 KEY: Problem-Solving Skills | Communication

29. ANS:

a) Length of deck =  $(40p^2 + 24p) \div 8p$   
$$= \frac{40p^2}{8p} + \frac{24p}{8p}$$
$$= 5p + 3$$

b) Length:

Substitute  $p = 4$  into  $5p + 3$ .

$$5p + 3$$
$$= 5(4) + 3$$
$$= 23$$

The length of the deck is 23 m.

Width:

Substitute  $p = 4$  into  $8p$ .

$$8p$$
$$= 8(4)$$
$$= 32$$

The width of the deck is 32 m.

Area:

$$A = l \times w$$
$$= 23 \times 32$$
$$= 736$$

The area of the deck is 736 m<sup>2</sup>.

PTS: 1

DIF: Difficult

REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial

LOC: 9.PR7

TOP: Patterns and Relations (Variables and Equations)

KEY: Problem-Solving Skills | Communication

30. ANS:

a) Perimeter =  $3x + 3x + (4x + 5) + 3x + (4x + 5) + 3x + 3x + 3x$   
$$= 26x + 10$$

b) Area =  $3x(3x) + 3x(3x + 4x + 5)$   
$$= 9x^2 + 9x^2 + 12x^2 + 15x$$
$$= 30x^2 + 15x$$

c) Perimeter:

Substitute  $x = 6$  into  $26x + 10$ .

$$26x + 10$$
$$= 26(6) + 10$$
$$= 166$$

The perimeter of the shape is 166 cm.



Area:

Substitute  $x = 6$  into  $30x^2 + 15x$ .

$$30x^2 + 15x$$

$$= 30(6)^2 + 15(6)$$

$$= 1170$$

The area of the shape is  $1170 \text{ cm}^2$ .

PTS: 1

DIF: Difficult

REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial

LOC: 9.PR7

TOP: Patterns and Relations (Variables and Equations)

KEY: Problem-Solving Skills | Communication