

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?

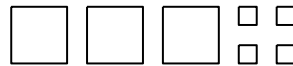
a.



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

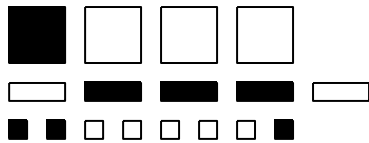
- _____ 5. Identify the polynomial that is equivalent to $4 - 6v - 7v^2$.
- i) $7v^2 + 6v - 4$
 ii) $4 + 7v^2 - 6v$
 iii) $-7v^2 - 6v + 4$
 iv) $-7v^2 - 4 + 6v$
- a. iv b. ii c. i d. iii
- _____ 6. Combine like terms. Sketch algebra tiles if it helps.
 $3x + 10 + 7x - 4$
- a. $13x + 3$ b. $10x + 6$ c. $16x$ 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.

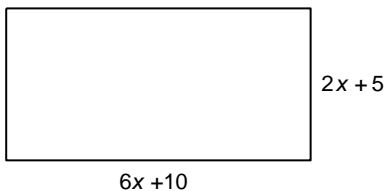
Write the simplified polynomial.



18. Combine like terms. Sketch algebra tiles if it helps.
 $3x^2 - 6x + 4x^2 + 3x - 6$

19. Add: $(10x^2 - 7x + 6) + (-2x^2 + 2x - 9)$

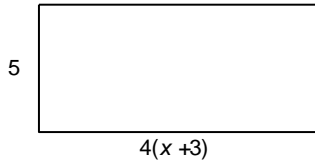
20. Write the perimeter of this rectangle as a polynomial in simplest form.



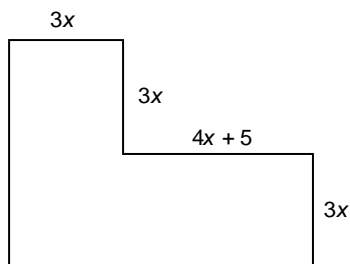
21. Subtract: $(9x^2 - 6x + 4) - (5x^2 - 4x - 5)$
22. Subtract: $(4x^2 + 9x - 3) - (x^2 - 11x + 5)$
23. Multiply: $5(-2x^2 - 5)$
24. Multiply: $-2(-8 + 2x - 5x^2)$
25. Divide: $\frac{12m - 20m^2}{-4m}$
26. Determine the product: $(-2x)(4x + 3y - 5z)$
27. Determine the quotient: $(-10x^2 + 4xy - 6xz)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

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 m².

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 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