Name: _Answer Key_

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.

B 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.

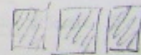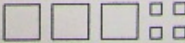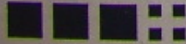Write the polynomial represented by this set of algebra tiles. $2x^2 - 3x + 4$
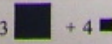
a. $-2x^2 + 3x + 4$ b. $2x^2 - 3x + 4$ c. $2x^2 - x^3 + 4$ d. $2x - 3x^2 + 4$
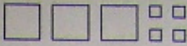
B 2. A large white square represents an x^2-tile, a large black square represents a $-x^2$-tile, a small white square
        represents a 1-tile, and a small black square represents a -1-tile.
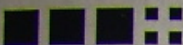
How would you model the polynomial $-3x^2 - 4$ with algebra tiles?

a.   c.

b.   d.   3 ▨ + 4 ■

b. ∎∎∎∎ ::

d. 3∎ + 4∎

3. Which of the following expressions are polynomials?

i) $\frac{1}{2}x$ ✓

ii) $1 - 5.5n^2$ ✓

✗ 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) $2x^2 - 5 + 6x$ $2x^2 + 6x - 5$

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

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

✓ iv) $6x - 5 + 2x^2$ $2x^2 + 6x - 5$

   a. i and iv   b. iii and iv   c. ii and iv   d. i and ii

D 5. Identify the polynomial that is equivalent to $4 - 6v - 7v^2$.

    i) $7v^2 + 6v - 4$

    ii) $4 + 7v^2 - 6v$ $7v^2 - 6v + 4$

    iii) $-7v^2 - 6v + 4$

    iv) $-7v^2 - 4 + 6v$ $-7v^2 + 6v - 4$

$\boxed{-7v^2 - 6v + 4}$

   a. iv   b. ii   c. i   **(d.)** iii

B 6. Combine like terms. Sketch algebra tiles if it helps.

    $3x + 10 + 7x - 4$ $10X + 6$

   a. $13x + 3$ **(b.)** $10x + 6$ c. $16x$ d. $10x - 6$

B 7. Combine like terms. Sketch algebra tiles if it helps.

    $9x^2 - 7x + 2x - 6x^2$ $3X^2 - 5X$

   a. $-2x^2$ **(b.)** $3x^2 - 5x$ c. $2x^2 - 4x$ d. $3x^2 + 5x$

B 8. Simplify: $10x^2 - 8 + 3x + 5 - 6x^2 - 6x$ $4X^2 - 3X - 3$

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

   (b.) $4x^2 - 3x - 3$ d. $4x^4 - 3x^2 - 3$

C 9. Add: $(2x^2 - 6) + (5x^2 - 8x - 4)$

    $2x^2 - 6 + 5x^2 - 8x - 4$

    $7x^2 - 8x - 10$

   a. $10x^2 - 8x - 24$ **(c.)** $7x^2 - 8x - 10$

   b. $7x^2 - 14x - 4$ d. $7x^2 - 8x + 10$

A 10. Add: $(-3x^2 + 3 - 5x) + (5 + x^2 + 8x)$

    $-3x^2 + 3 - 5x + 5 + x^2 + 8x$

   (a.) $-2x^2 + 3x + 8$ $-2x^2 + 3X + 8$

   b. $-2x^2 - 3x + 8$

   c. $-4x^2 - 3x + 8$

   d. $-4x^2 + 3x + 8$

7. Combine like terms. Sketch algebra tiles if it helps.

$\boxed{9x^2} \boxed{-7x} \boxed{2x} \boxed{-6x^2}$ $3x^2 - 5x$

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

B 8. Simplify: $\boxed{10x} - 8 + \boxed{3x} + 5 \boxed{-6x^2} \boxed{-6x}$ $4x^2 - 3x - 3$

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

C 9. Add: $(2x^2 - 6) + (5x^2 - 8x - 4)$

$\boxed{2x^2 - 6} + \boxed{5x^2} - 8x \boxed{-4}$

$7x^2 - 8x - 10$

a. $10x^2 - 8x - 24$
b. $7x^2 - 14x - 4$
(c.) $7x^2 - 8x - 10$
d. $7x^2 - 8x + 10$

A 10. Add: $(-3x^2 + 3 - 5x) + (5 + x^2 + 8x)$

$\boxed{-3x^2} + 3 \boxed{-5x} + 5 \boxed{+x^2} + 8x$

(a.) $-2x^2 + 3x + 8$
b. $-2x^2 - 3x + 8$
c. $-4x^2 - 3x + 8$
d. $-4x^2 + 3x + 8$

$-2x^2 + 3x + 8$

C 11. Subtract: $(3x - 7x^2 + 2) - (4x^2 - 5 + 6x)$

$\boxed{3x} \boxed{-7x^2} + 2 \boxed{-4x^2} + 5 \boxed{-6x}$

$-11x^2 - 3x + 7$

a. $-11x^2 + 3x - 7$
b. $-11x^2 - 9x - 3$
(c.) $-11x^2 - 3x + 7$
d. $11x^2 + 3x - 7$

D 12. Subtract: $(3y^2 - 5x^2 + 4) - (2x - 8 + 4y^2)$

$\boxed{3y^2} \boxed{-5x^2} + 4 - 2x + 8 \boxed{-4y^2}$

$-y^2 - 5x^2 - 2x + 12$

a. $-1y^2 - 5x^2 - 2x - 4$
b. $3y^2 - 7x^2 + 12$
c. $-4x + 12$
(d.) $-1y^2 - 5x^2 - 2x + 12$

C 13. Multiply: $7(2x^2 - 5x)$

$$14x^2 - 35x$$

a. $14x^2 - 5x$　　　b. $14x^2 + 2x$　　　c. $14x^2 - 35x$　　　d. $9x^2 - 2x$

C 14. Multiply: $(-2)(4c^2 - 6c - 7)$

$$-8c^2 + 12c + 14$$

a. $-8c^2 - 12c - 14$
b. $2c^2 - 8c - 9$

c. $-8c^2 + 12c + 14$
d. $-8c^2 - 6c - 7$

B 15. Divide: $\dfrac{20p - 28}{4}$

$$\frac{20p}{4} - \frac{28}{4}$$

$$5p - 7$$

a. $5p - 28$　　　b. $5p - 7$　　　c. $20p - 24$　　　d. $16p - 24$

B 16. Divide: $\dfrac{-20p^2 - 16p}{-4p}$

$$\frac{-20p^2}{-4p} \quad \frac{-16p}{-4p} = 5p + 4$$
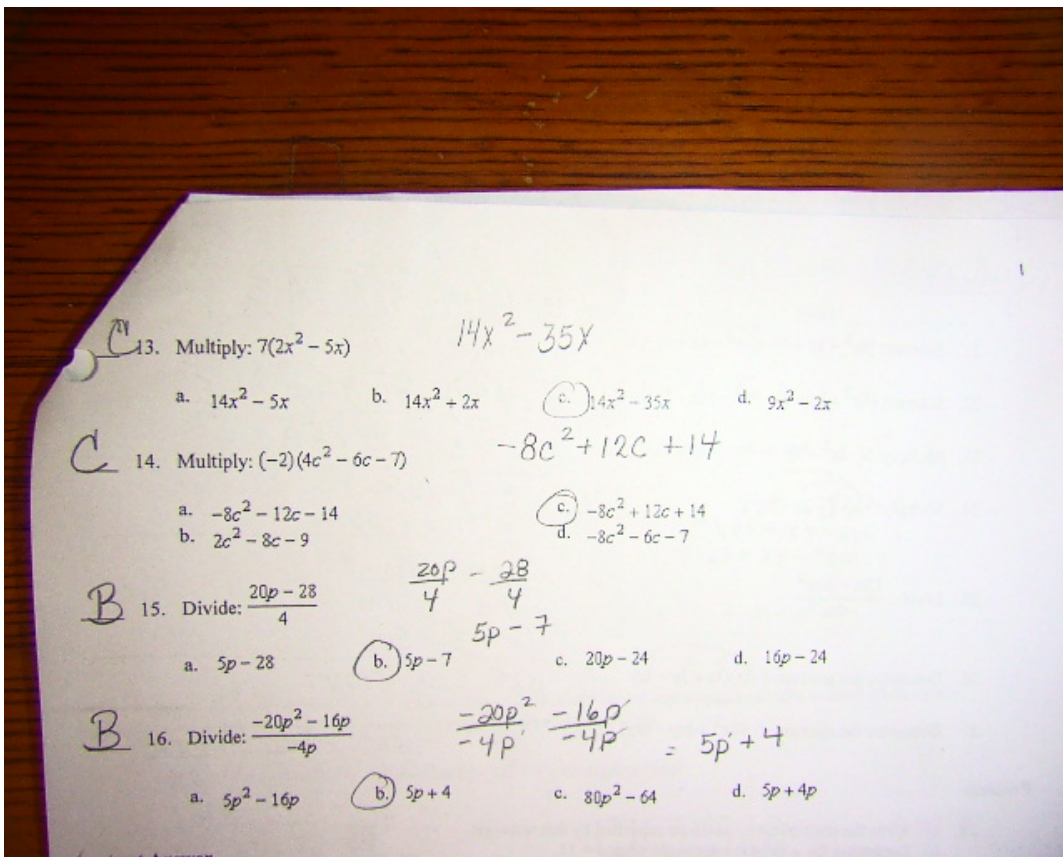
a. $5p^2 - 16p$　　　b. $5p + 4$　　　c. $80p^2 - 64$　　　d. $5p + 4p$

Short Answer

a. $5p^2 - 16p$ (b.) $5p + 4$ c. $80p^2 - 64$ d. $5p + 4p$

hort 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.

$= 2x^2 - 1x + 2$

18. Combine like terms. Sketch algebra tiles if it helps.

$3x^2 - 6x + 4x^2 + 3x - 6$ $= 7x^2 - 3x - 6$

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

$10x^2 - 7x + 6 - 2x^2 + 2x - 9$

$= 8x^2 - 5x - 3$

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

$6x + 10$

$2x + 5$ $2x + 5$

$6x + 10$

$(6x + 10) + (6x + 10) + (2x + 5) + (2x + 5)$

$6x + 10 + 6x + 10 + 2x + 5 + 2x + 5$

$16x + 30$

OR $2(6x + 10) + 2(2x + 5)$

$12x + 20 + 4x + 10$

$16x + 30$

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: $-2(-8 + 2x - 5x^2)$
$= +16 - 4X + 10X^2$
$= 10X^2 - 4X + 16$

25. Divide: $\dfrac{12m - 20m^2}{-4m}$

26. Determine the product: $(-2x)(4x + 3y - 5z)$

27. Determine the quotient: $(-10x^2 + 4xy - 6xz) \div (-2x)$

Problem

21. $(9x^2 - 6x) + 4(-5x^2 + 4x) + 5$
$= 4x^2 - 2X + 9$

22. $(4x^2 + 9x) - 3(-1x^2 + 11x) - 5$
$= 3X^2 + 20X - 8$

23. $5(-2x^2 - 5)$
$= -10x^2 - 25$

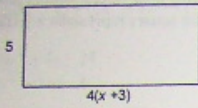25. $\dfrac{12m}{-4m} - \dfrac{20m^2}{-4m}$
$= -3 + 5m$

26. $= -8x^2 - 6xy + 10xz$

27. $\dfrac{-10x^2}{-2x} + \dfrac{4xy}{-2x} - \dfrac{6xz}{-2x}$
$= 5x - 2y + 3z$

Problem

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

$-2x$ $-2y$ $-2x$

$= 5x - 2y + 3z$

a) $5 \left[4(x+3) \right]$

b) $5 \left[4(x+3) \right]$
   $5 \left[4x + 12 \right]$

$20x + 60$ Let $x = 12$
$20(12) + 60$
$240 + 60$ $= \boxed{300}$

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.
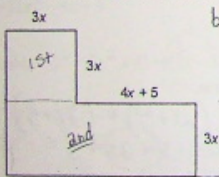   b) Determine the length, width, and area of the deck when $p = 4$ m.

29. a) $\dfrac{40p^2 + 24p}{8p}$

$\dfrac{40p^2}{8p} + \dfrac{24p}{8p}$

$\boxed{L = 5p + 3}$

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.

b) $(3x)(3x) + (3x)(7x+5)$
   $9x^2 + 21x^2 + 15x$
   $= \boxed{30x^2 + 15x}$

c) $26x + 10$
   $26(6) + 10$
   $= \boxed{166 \text{ cm}}$

30. a) $(3x) + (3x) + (4x+5) + (3x) + (3x+4x+5) + (3x+3x)$
    $(3x) + (3x + 4x) + 5 + (3x) + (3x + 4x) + 5 + (3x) + (3x)$
    $\boxed{26x + 10}$

b) Length $5p + 3$
   $5(4) + 3$
   $20 + 3$
   $= 23$ m

b) Width $8p$
   $8(4)$
   $= 32$ m

c) $A = L \times W$
   $= 23 \times 32$
   $= \boxed{736 \text{ m}^2}$