

SAMPLE
Grade 9 Math Test
Unit 5 - Polynomials

Name: Key

Section A: Place the letter that corresponds with the correct answer in the space provided to the right. Note that Shaded tiles are positive and unshaded tiles are negative. (10 marks)

1. Which of the following is a binomial?

a) $-4y$

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

c) $3x^2y$

d) $4x - 3$

$4x - 3$
 \nearrow first term \uparrow second term

1. d.

2. Determine the algebraic expression represented by the following set of tiles.



a) $2x^2 + 3x + 4$

b) $2x^2 - 3x - 4$

c) $2x^2 - 3x + 4$

d) $-2x^2 - 3x - 4$

2. C.

3. What is the opposite of $-3x^2 - 4x$?

a) $-3x^2 + 4x$

b) $3x^2 + 4x$

c) $3x^2 - 4x$

d) $4x^2 + 3x$

$-(-3x^2 - 4x)$
 $= 3x^2 + 4x$

3. b.

4. Simplify $3a^2 - 4a - 6 - 4a^2 + 7a - 2$.

a) $7a^2 + 3a - 4$

b) $-7a^2 - 11a - 4$

c) $-a^2 + 3a - 8$

d) $a^2 - 3a - 8$

$(3a^2 - 4a^2) + (-4a + 7a)$
 $+ (-6 - 2)$
 $= -a^2 + 3a - 8$

4. C.

5. Subtract $(3x^2 + 3x - 6)$ from $(2x - 5)$.

a) $-3x^2 - x + 1$

b) $-3x^2 + 5x - 11$

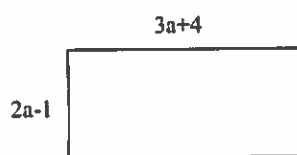
c) $3x^2 + x - 1$

d) $3x^2 + x - 11$

$(2x - 5) - (3x^2 + 3x - 6)$
 $= -3x^2 - x + 1$

5. a.

6. Which polynomial represents the perimeter of the rectangle?



$2(3a+4) + (2a-1)2$
 $6a + 8 + 4a - 2$
 $= 10a + 6$

a) $10a + 6$

b) $5a + 3$

c) $12a + 8$

d) $6a^2 - 4$

6. a.

7. What is the quotient for $\frac{12b^2 - 8b}{4}$?

$$\frac{12b^2 - 8b}{4}$$

7. b.

a) $3b^2 + 2b$

b) $3b^2 - 2b$ $\frac{4(3b^2 - 2b)}{4}$

c) $20b + 12$

d) $16b - 4$ $= 3b^2 - 2b$

8. If $x = 3$, what is the value of $x^2 + 3x - 5$?

a) 7

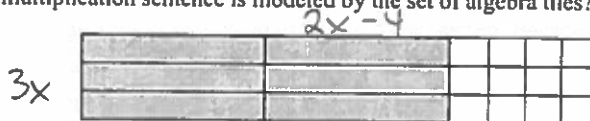
b) 6 $(3)^2 + 3(3) - 5$
 $= 9 + 9 - 5$
 $= 13$

8. d.

c) 10

d) 13

9. Which multiplication sentence is modeled by the set of algebra tiles?



9. b.

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

b) $3x(2x - 4)$

c) $3(2x - 4)$

d) $3(2x + 4)$

10. What is the product for $-2(-2m + 3m^2)$?

$$4m - 6m^2$$

10. d.

a) $-4m + 6m^2$

b) $4m + 3m^2$

c) $-2m - 6m^2$

d) $4m - 6m^2$

Section B: Answer each of the following in the space provided. Show ALL necessary workings to receive full credit. (25 marks)

1. Simplify each of the following. (8 marks)

a) $(2a^2 + 5ab - 2b^2) + (3ab - 5a^2 - 7b^2)$
 $= 2a^2 - 5a^2 + 5ab + 3ab - 2b^2 - 7b^2$
 $= -3a^2 + 8ab - 9b^2$

b) $(-6x^2 + 7x - 3) - (-4x^2 + 3x - 9)$
 $= (-6x^2 + 7x - 3) + (4x^2 - 3x + 9)$
 $= -6x^2 + 4x^2 + 7x - 3x - 3 + 9$
 $= -2x^2 + 4x + 6$

c) $-2(-3x^2 + 2xy - 4y^2)$
 $= 6x^2 - 4xy + 8y^2$

d) $\frac{20a^2 - 15a}{-5a}$
 $= \frac{5a(4a - 3)}{-5a}$
 $= -(4a - 3)$
 $= -4a + 3$

2. Simplify the following $3x(x+1) - 2x(3x-4)$ (3 marks)

$$\begin{aligned} & 3x(x+1) - 2x(3x-4) \\ = & 3x^2 + 3x - 6x^2 + 8x \\ = & +3x^2 - 6x^2 + 3x + 8x \\ = & -3x^2 + 11x \\ = & -x(3x-11) \end{aligned}$$

3. The sum of two polynomials is $-2x^2 + x + 3$. If one of the polynomials is $-4x^2 - 3x + 8$, what is the other polynomial? (2 marks)

$$\begin{aligned} & (-2x^2 + x + 3) - (-4x^2 - 3x + 8) \\ = & (-2x^2 + x + 3) + (4x^2 + 3x - 8) \\ = & -2x^2 + 4x^2 + x + 3x + 3 - 8 \\ = & 2x^2 + 4x - 5 \end{aligned}$$

The other polynomial is $2x^2 + 4x - 5$

4. Here is a student's solution for the following question. (2 marks)

$$\begin{aligned} & -2(3p^2 + 5p - 6) \\ = & (-2)(3p^2) - (-2)(5p) - (-2)(6) \\ = & -6p^2 + 10p + 12 \end{aligned}$$

Identify the errors in the solution and then write the correct solution.

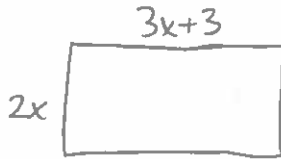
The student wrote $-(-2)(5p)$ instead of $+(-2)(5p)$!

Solution:

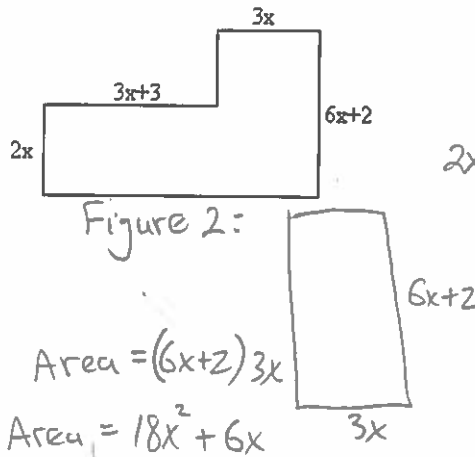
$$\begin{aligned} & -2(3p^2 + 5p - 6) \\ = & -2(3p^2) + (-2)(5p) - (-2)(6) \\ = & -6p^2 - 10p + 12 \end{aligned}$$

5. Write a simplified polynomial to represent the area of the figure below. (5 marks)

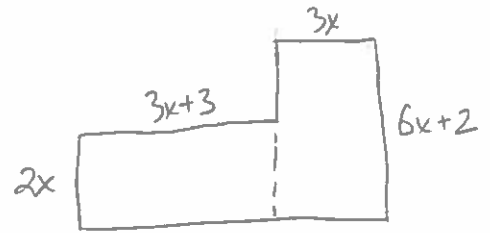
Figure 1:



$$\begin{aligned} \text{Area} &= (3x+3)2x \\ &= 6x^2 + 6x \end{aligned}$$



$$\begin{aligned} \text{Area} &= (6x+2)3x \\ \text{Area}_1 &= 18x^2 + 6x \end{aligned}$$

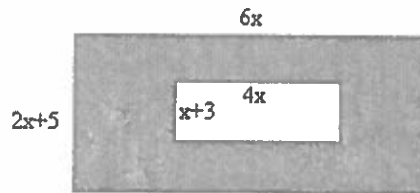


split figure into 2 separate pieces!

$$\begin{aligned} \text{Total Area} &= 6x^2 + 6x + 18x^2 + 6x \\ &= 6x^2 + 18x^2 + 6x + 6x \end{aligned}$$

$$\boxed{\text{Area} = 24x^2 + 12x}$$

6. Find the area of the shaded region. (5 marks)



$$\text{Area of whole} = 6x(2x+5) = 12x^2 + 30x$$

$$\text{Area of inside} = 4x(x+3) = 4x^2 + 12x$$

$$\text{shaded Area} = 12x^2 + 30x - (4x^2 + 12x) = 12x^2 - 4x^2 + 30x - 12x$$

$$\boxed{\text{shaded Area} = 8x^2 + 18x}$$