Name _____ Date _____ Period _____

9.1-9.3 Polynomials & Operations Station Activity

Student Recording Sheet

Whole Group Instruction: Follow along with the power-point to record important vocabulary and examples.

Vocabulary:

1. A _____ is a monomial or a sum or difference of monomials. **Ex:**

2. A _____ is a number, a variable, or a product of numbers and variables with whole-number exponents. **Ex:**

3. A _____ is a sum or difference of *two* monomials. **Ex:**

4. A _____ is a sum or difference of *three* monomials. **Ex:**

5. The _____ is the degree of the term with the greatest degree. **Ex:**

6. The _____ is the sum of the exponents of the variables. **Ex:**
   Note: A constant has degree 0.

7. The _____of a polynomial that contains one variable is written with the terms in order from greatest degree to least degree.

8. When written in standard form, the coefficient of the first term is called the _____.

leading coefficient polynomial degree constant term

$$2x^3 + x^2 - 5x + 12$$

Degree	Name
0	Constant
1	Linear
2	Quadratic
3	Cubic
4	Quartic
5	Quintic
6 or more	6th, 7th, degree and so on

Terms	Name
1	Monomial
2	Binomial
3	Trinomial
4 or more	Polynomial

Examples:

1. Classify each according to degree and number of terms.
   A. $4p^4q^3$
   B. $11x^6 + 3x^3$
2. Rewrite in standard form. $6x - 7x^5 + 4x^2 + 9$

3. Add.

4. Subtract.

5. Multiply. (Distribute!)

6. Multiply. (FOIL Method!)

Station 1: Classifying Polynomials & Standard Form

I. **Write each polynomial in standard form. Then, classify according to degree and number of terms.**

1.
2.
3.
4.
5.

II. **Match the polynomials on the STATION 1 HANDOUT to a description below. Record your answers on the line provided.**

6. I am a quintic (degree 5) monomial. Who am I?_____

7. I am a sum of monomials with degree 8. Who am I? _____

8. I am a quintic (degree 5) trinomial. Who am I? _____

9. I am a binomial. Both of my terms have degree 2. Who am I? _____

10. I am a quartic (degree 4) monomial. Who am I? _____

11. I am a quartic (degree 4) binomial. Who am I? _____

12. I am a trinomial. When you put me in standard form, my leading coefficient is –3. Who am I? _____

III. **Making Sense of Vocabulary.**

Prefix	Word	Quantity
mono		
bi		
tri		
poly		

IV. **Critical Thinking.**

Check in with your teacher. ☐

Station 1: Classifying Polynomials & Standard Form **ANSWER KEY**

I. **Write each polynomial in standard form. Then, classify according to degree and number of terms.**

1. $-8x^3 + 2x^2 - x - 12$; **cubic polynomial**
2. $-5x^6 + 6x^5 + 65$; **sixth degree trinomial**
3. $-x + 6$; **linear (first degree) binomial**
4. $-x^2 - x + 6$; **quadratic (second degree) trinomial**
5. **63; constant monomial**

II. **Match the polynomials on the STATION 1 HANDOUT to a description below. Record your answers on the line provided.**

6. I am a quintic (degree 5) monomial. Who am I? $-3xy^4$
7. I am a sum of monomials with degree 8. Who am I? $2x^4y^4 + 3x^2y^5$
8. I am a quintic (degree 5) trinomial. Who am I? $x^5 + x^3 + x$
9. I am a binomial. Both of my terms have degree 2. Who am I? $2xy + 5xz$
10. I am a quartic (degree 4) monomial. Who am I? $2x^4$
11. I am a quartic (degree 4) binomial. Who am I? $4xyz^2 + xyz$
12. I am a trinomial. When you put me in standard form, my leading coefficient is –3. Who am I? $4x^2 - 3x^5 + x$

III. **Making Sense of Vocabulary.**

Prefix	Word	Quantity
mono	**Ex: monochromatic, monopoly**	**1**
bi	**Ex: bicycle, binary, binoculars**	**2**
tri	**Ex: tricycle, triceratops, triangle**	**3**
poly	**Ex: polytheism, polygon,**	**Many**

IV. **Critical Thinking.** No, it is not possible to write a binomial with degree 0. In order to be named "degree 0", the highest exponent in the polynomial must be 0. Since polynomials only contain integer exponents that are greater than or equal to 0, there are no terms of lower degree within the polynomial. Therefore, a polynomial with degree 0 will only ever contain exactly 1 term and ,hence, can only be a monomial.

Station 2: Adding & Subtracting Polynomials

1.) When _____ or _____ polynomials, the _____ doesn't change.

2.) Adding or subtracting polynomials is also known as _____ _____ _____.

3.) In order to combine like terms, when _____ or _____ polynomials, only add or subtract the _____(numbers that are in front of the variable) or the _____ (the numbers that do not have a variable). You do not change the _____.

4.) When writing your final answer, you need to make sure that your polynomial is written in _____ form.

Let's remind ourselves of what like terms are.....

Example 1: Circle which of the following are like terms:

$4x^2$ $6x$ $-8x^2$ $9y^2$ -8 $-2x^2$ $3x^3$

Example 2: Circle which of the following are like terms:

$12m^2$ -9 -4 $12n^2$ $-9m$ 7 -1

Try this on your own: Circle the pairs of terms that are like terms.

3x and 2x	8x and 7y
5x and $2x^2$	$-5y^2$ and $9y^2$
xy and - xy	3 and 4

Summary: In your own words, explain what makes terms "like terms" and what makes terms "unlike terms".

There are two methods that you can use to add or subtract polynomials:

In vertical form, align the like terms and add:

$$\begin{array}{r} 5x^2+4x+1 \\ +\,2x^2+5x+2 \\ \hline 7x^2+9x+3 \end{array}$$

In horizontal form, use the Associative and Commutative Properties to regroup and combine like terms:

$$\begin{aligned} &(5x^2+4x+1)+(2x^2+5x+2) \\ &=(5x^2+2x^2)+(4x+5x)+(1+2) \\ &=7x^2+9x+3 \end{aligned}$$

Now try these using either method:

1.) $(3x^2-x)-(x^2+3x-5)$

2.) $(-7x^2-2x+3)+(4x^2-9x-10)$

Adding and Subtracting Polynomials Cube Activity:

1. With a partner, roll each number cube and flip the operation chip.
   a. Perform the operation indicated by the chip (add or subtract).
   b. Always use the tan number cube as your addend/minuend (first number in each problem). Be sure to write down which expression number from which color cube it came from. (You will need this to be able to check your answer).
   c. Check your answers according to the answer key.

Check in with your teacher. ☐

Station 3: Multiplying Polynomials

I. Multiply using the distributive property / FOIL:

1. $(x + 4)(x + 6)$

2. $(x + 7)(x - 8)$

3. $(x - 4)(x - 5)$

II. Multiply using horizontal multiplication:

4. $(9x - 3)(x^2 + 2x + 1)$

5. $(12w^2 - w - 1)(4w - 2)$

III. Multiply using vertical multiplication:

6. $(x + 9)(x^2 - 4x + 1)$

7. $(x - 3)(2x^2 + 3x + 3)$

IV. Multiply using box multiplication:

8. $(x - 4)(x^2 - 2x + 1)$

9. $(7x^2 + 5x + 3)(8x + 9)$

V. Activity: Find the envelope titled Multiplying Polynomials Puzzle. Match equivalent expressions. You should get a 4 X 4 square.

Check in with your teacher. ☐

Station 4: Applications

Part 1: Expressing Areas and Perimeters Using Polynomial Expressions

1. Perimeter of the kitchen:

2. Perimeter of the dining room:
3.
   - x = _____

   - Kitchen's Perimeter

4. Area of the Master Bedroom:

5. Area of the Living Room:

6. Calculate the total cost for carpeting these rooms.

7. Area of the Kitchen:

8. Area of the Dining Room:

9. Calculate the total cost for the ceramic tile flooring:

   - Cost of ceramic tile if you add an island

Part 2: Polynomials & Geometry Applications

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

Check in with your teacher. ☐

Station 1 Question Set

I. **Write each polynomial in standard form. Then, classify according to degree and number of terms.**

Example: $x - 1 - 8x^3 \rightarrow -8x^3 + x - 1$; cubic trinomial

1. $-x + 2x^2 - 12 - 8x^3$
2. $-5x^6 + 6x^5 + 65$
3. $16 - x$
4. $-x^2 + 6 - x$
5. 63

II. **Match each polynomial with the correct clue. Each polynomial can be used only once. Not every polynomial will be used.**

$x^5 + x^3 + x$	$2x^4y^4 + 3x^2y^5$
$2x^4$	$x^5y - 3x^2y - xy$
$3x + 3y + 3z$	$-3xy^4$
$2xy + 5xz$	$2x^2y + 5xy^2$
$4x^2 - 3x^5 + x$	$4xyz^2 + xyz$

III. **Making Sense of Vocabulary.**

The words **monomial, binomial, trinomial** and **polynomial** contain prefixes that are used to indicate and differentiate quantity. As a group come up with another (non-math) word that uses the same prefix and state the quantity it describes.

IV. **Critical Thinking.**

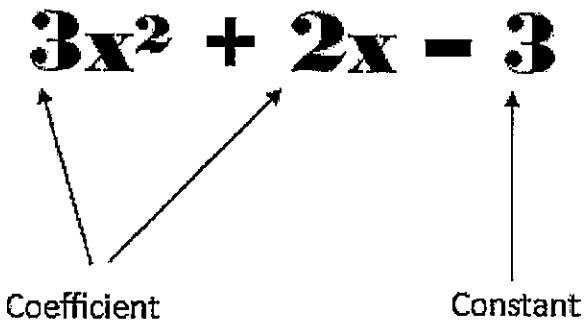
Is it possible to write a binomial with degree 0? Explain.

Station 2

Adding and Subtracting Polynomials

When you are adding and subtracting polynomials, the exponents do not change. For example, in $(3x^2 + 2x - 3) + (4x^2 - x + 8)$, your first step in solving would be to add $3x^2$ and $4x^2$ to get $7x^2$. Adding or subtracting polynomials is also known as combining like terms.

Remember, that when you are combining like terms, or adding and subtracting polynomials, you only add or subtract the coefficients and the constants. You do not change the exponents.



When writing your final answer, you need to make sure that your polynomial is written in standard form.

Standard Form:

- Variables are in alphabetical order
- Exponents are in descending order
- Constants come last

Let's remind ourselves of what like terms are.....

Example 1: Circle which of the following are like terms:

$4x^2$ $6x$ $-8x^2$ $9y^2$ -8 $-2x^2$ $3x^3$

Example 2: Circle which of the following are like terms:

$12m^2$ -9 -4 $12n^2$ $-9m$ 7 -1

Try this on your own: Circle the pairs of terms that are like terms.

3x and 2x

8x and 7y

5x and $2x^2$

$-5y^2$ and $9y^2$

xy and $-xy$

3 and 4

Summary: In your own words, explain what makes terms "like terms" and what makes terms "unlike terms".

Like terms are terms that have identical variables and exponents (or are constants with no variables). For example, $3x^2y$ and $-8x^2y$ are like terms. Unlike terms are terms that do not have the exact same variable or exponents. For example, $2xy$ and $-5x^2y$ are unlike terms.

There are two methods that you can use to add or subtract polynomials:

In vertical form, align the like terms and add:

$$\begin{array}{r} 5x^2 + 4x + 1 \\ +\ 2x^2 + 5x + 2 \\ \hline 7x^2 + 9x + 3 \end{array}$$

In horizontal form, use the Associative and Commutative Properties to regroup and combine like terms:

$$\begin{aligned} &(5x^2 + 4x + 1) + (2x^2 + 5x + 2) \\ &= (5x^2 + 2x^2) + (4x + 5x) + (1 + 2) \\ &= 7x^2 + 9x + 3 \end{aligned}$$

Now try these using either method:

1.) $(3x^2 - x) - (x^2 + 3x - 5)$

$2x^2 - 4x + 5$

2.) $(-7x^2 - 2x + 3) + (4x^2 - 9x - 10)$

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

Adding and Subtracting Polynomials Cube Activity:

1. With a partner, roll each number cube and flip the operation chip.
    a. Perform the operation indicated by the chip (add or subtract).
    b. Always use the tan number cube as your addend/minuend (first number in each problem). Be sure to write down which expression number from which color cube it came from. (You will need this to be able to check your answer).
    c. Check your answers according to the answer key.

Adding and Subtracting Polynomials Cube Activity Key:

Tan Cube	White Cube	Addition Answer	Subtraction Answer
1	1	$10x^3 - 4x^2 + 6x - 5$	$-10x^3 + 10x^2 + 6x - 9$
1	2	$3x^3 + 15x^2 - 16$	$-3x^3 - 9x^2 + 12x + 2$
1	3	$-7x^2 + 15x - 4$	$13x^2 - 3x - 10$
1	4	$4x^3 + 9x^2 + 3x - 2$	$-4x^3 - 3x^2 + 9x - 12$
1	5	$8x^2 + 2x - 15$	$-2x^2 + 10x + 1$
1	6	$-6x^3 + 8x^2 + 9x - 15$	$6x^3 - 2x^2 + 3x + 1$
2	1	$8x^3 - 5x^2 + 8x + 1$	$-12x^3 + 9x^2 + 8x - 3$
2	2	$x^3 + 14x^2 + 2x - 10$	$-5x^3 - 10x^2 + 14x + 8$
2	3	$-2x^3 - 8x^2 + 17x + 2$	$-2x^3 + 12x^2 - x - 4$
2	4	$2x^3 + 8x^2 + 5x + 4$	$-6x^3 - 4x^2 + 11x - 6$
2	5	$-2x^3 + 7x^2 + 4x - 9$	$-2x^3 - 3x^2 + 12x + 7$
2	6	$-8x^3 + 7x^2 + 11x - 9$	$4x^3 - 3x^2 + 5x + 7$
3	1	$14x^3 - 10x^2 + x + 12$	$-6x^3 + 4x^2 + x + 8$
3	2	$7x^3 + 9x^2 - 5x + 1$	$x^3 - 15x^2 + 7x + 19$
3	3	$4x^3 - 13x^2 + 10x + 13$	$4x^3 + 7x^2 - 8x + 7$
3	4	$8x^3 + 3x^2 - 2x + 15$	$-9x^2 + 4x + 5$
3	5	$4x^3 + 2x^2 - 3x + 2$	$4x^3 - 8x^2 + 5x + 18$
3	6	$-2x^3 + 2x^2 + 4x + 2$	$10x^3 - 8x^2 - 2x + 18$

Tan Cube	White Cube	Addition Answer	Subtraction Answer
4	1	$10x^3 - 2x^2 + 2x + 8$	$-10x^3 + 12x^2 + 2x + 4$
4	2	$3x^3 + 17x^2 - 4x - 3$	$-3x^3 - 7x^2 + 8x + 15$
4	3	$-5x^2 + 11x + 9$	$15x^2 - 7x + 3$
4	4	$4x^3 + 11x^2 - x + 11$	$-4x^3 - x^2 + 5x + 1$
4	5	$10x^2 - 2x - 2$	$6x + 14$
4	6	$-6x^3 + 10x^2 + 5x - 2$	$6x^3 - x + 14$
5	1	$10x^3 - 12x^2 + 6x - 6$	$-10x^3 + 2x^2 + 6x - 10$
5	2	$3x^3 + 7x^2 - 17$	$-3x^3 - 17x^2 + 12x + 1$
5	3	$-15x^2 + 15x - 5$	$5x^2 - 3x - 11$
5	4	$4x^3 + x^2 + 3x - 3$	$-4x^3 - 11x^2 + 9x - 13$
5	5	$2x - 16$	$-10x^2 + 10x$
5	6	$-6x^3 + 9x - 16$	$6x^3 - 10x^2 + 3x$
6	1	$16x^3 - 10x^2 + 7x + 12$	$-4x^3 + 4x^2 + 7x + 8$
6	2	$9x^3 + 9x^2 + x + 1$	$3x^3 - 15x^2 + 13x + 19$
6	3	$6x^3 - 13x^2 + 16x + 13$	$6x^3 + 7x^2 - 2x + 7$
6	4	$10x^3 + 3x^2 + 4x + 15$	$2x^3 - 9x^2 + 10x + 5$
6	5	$6x^3 + 2x^2 + 3x + 2$	$6x^3 - 8x^2 + 11x + 18$
6	6	$2x^2 + 10x + 2$	$12x^3 - 8x^2 + 4x + 18$

Station 3 Notes

Methods for Multiplying Two Binomials

I. Using the Distributive Property:

Multiplication of two binomials is an extension of the distributive property. When you multiply two binomials you distribute each term of one binomial to each term of the other binomial.

EXAMPLE:

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

II. Using the FOIL Method to Distribute:

"FOIL" is a memory device that many people use as a way to help them organize multiplying two binomials, using the distributive property. FOIL stands for "First, Outer, Inner, Last."

EXAMPLE:

$(x+3)(x+2)$

1) Multiply the **First** terms: $x \cdot x = x^2$
2) Multiply the Outer terms: $x \cdot 2 = 2x$
3) Multiply the **Inner** terms: $3 \cdot x = 3x$
4) Multiply the Last terms: $3 \cdot 2 = 6$

F O I L

$x^2 + 2x + 3x + 6 = x^2 + 5x + 6$

Methods for Multiplying a Binomial and Trinomial

III. Using the Distributive Property:

Multiplication of a binomial and a trinomial (or any two larger polynomials) can still be done using the distributive property. You distribute each term of one polynomial to each term of the other polynomial. This can be done horizontally or vertically.

A. Horizontal Multiplication:

EXAMPLE:
$(2x - 3)(4x^2 + x - 6)$

$= 2x(4x^2) + 2x(x) + 2x(-6) - 3(4x^2) - 3(x) - 3(-6)$
$=8x^3 + 2x^2 - 12x - 12x^2 - 3x + 18$
$=8x^3 - 10x^2 - 15x + 18$

B. Vertical Multiplication: This is done like long multiplication of numbers.

$$\begin{array}{rrrr} & 4x^2 & + x & - 6 \\ & & 2x & - 3 \\ \hline & -12x^2 & - 3x & + 18 \\ 8x^3 & +2x^2 & -12x & \\ \hline 8x^3 & -10x^2 & -15x & + 18 \end{array}$$

IV. Using Box Multiplication:

You can also use a rectangle model to multiply polynomials with more than two terms.

EXAMPLE:

$(2x - 3)(4x^2 + x - 6)$

	$4x^2$	x	-6
$2x$	$8x^3$	$+2x^2$	$-12x$
-3	$-12x^2$	$-3x$	$+18$

To find the product, add all of the terms inside the rectangle by combining like terms and simplifying if necessary, being sure to write your answer in standard form:

$8x^3 - 10x^2 - 15x + 18$

Station 3 Multiplying Polynomials Question Set

I. Multiply using the distributive property / FOIL:

1. $(x + 4)(x + 6)$

2. $(x + 7)(x - 8)$

3. $(x - 4)(x - 5)$

II. Multiply using horizontal multiplication:

4. $(9x - 3)(x^2 + 2x + 1)$

5. $(12w^2 - w - 1)(4w - 2)$

III. Multiply using vertical multiplication:

6. $(x + 9)(x^2 - 4x + 1)$

7. $(x - 3)(2x^2 + 3x + 3)$

IV. Multiply using box multiplication:

8. $(x - 4)(x^2 - 2x + 1)$

9. $(7x^2 + 5x + 3)(8x + 9)$

V. Activity: Find the envelope titled Multiplying Polynomials Puzzle. Match equivalent expressions. You should get a 4 X 4 square.

Station 3 Activity

Multiplying Polynomials Puzzle

Match equivalent expressions. You should get a new 4 X 4 square.

	$(x+2)(x-2)$			$(4x-1)^2$			$(6x+1)(x-2)$			$(x+1)(x-1)$	
$(5x-4)^2$		$x^2-4x-12$	$(x+2)(x-6)$		x^2-16	$(x-4)(x+4)$		$6x^2+13x+6$	$(3x+2)(2x+3)$		$x^2-14x=24$
	x^2+6x+9			$x^2-10x+24$			$25x^2-16$			$6x^2+41x+30$	
	$(x+3)^2$			$(x-4)(x-6)$			$(5x-4)(5x+4)$			$(x+6)(6x+5)$	
$(x-2)(x-9)$		$x^2+3x-18$	$(x-3)(x+6)$		$x^2+6x-16$	$(x-2)(x+8)$		$9x^2-12x+4$	$(3x-2)^2$		$x^2+7x-18$
	$4x^2-25$			x^2-9			$16x^2-1$			$x^2-7x+12$	
	$(2x-5)(2x+5)$			$(x+3)(x-3)$			$(4x-1)(4x+1)$			$(x-4)(x-3)$	
$(x+2)(x+5)$		$x^2-6x-16$	$(x+2)(x-8)$		$x^2-2x-15$	$(x+3)(x-5)$		$4x^2+x-5$	$(4x+5)(x-1)$		$6x^2-x-2$
	x^2+4x+3			$7x^2-19x+10$			$9x^2-4$			$x^2-8x+16$	
	$(x+3)(x+1)$			$(7x-5)(x-2)$			$(3x-2)(3x+2))$			$(x-4)^2$	
$(2x-5)(2x+1)$		$4x^2+20x+25$	$(2x+5)^2$		$3x^2+2x-1$	$(3x-1)(x+1)$		x^2-x-12	$(x+3)(x-4)$		x^2+16
	$25x^2+20x+4$			x^2+9			$x^2+3x-10$			x^2-15	

Station 3: Multiplying Polynomials Solutions

I. Multiply using the distributive property / FOIL:

1. $(x + 4)(x + 6) = x(x + 6) + 4(x + 6) = x^2 + 6x + 4x + 24 = x^2 + 10x + 24$

2. $(x + 7)(x - 8) = x(x - 8) + 7(x - 8) = x^2 - 8x + 7x - 56 = x^2 - x - 56$

3. $(x - 4)(x - 5) = x(x - 5) - 4(x - 5) = x^2 - 5x - 4x + 20 = x^2 - 9x + 20$

II. Multiply using horizontal multiplication:

4. $(9x - 3)(x^2 + 2x + 1) = 9x^3 + 15x^2 + 3x - 3$

5. $(12w^2 - w - 1)(4w - 2) = 48w^3 - 28w^2 - 2w + 2$

III. Multiply using vertical multiplication:

6. $(x + 9)(x^2 - 4x + 1) = x^3 + 5x^2 - 35x + 9$

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

IV. Multiply using box multiplication:

8. $(x - 4)(x^2 - 2x + 1) = x^3 - 6x^2 + 9x - 4$

9. $(7x^2 + 5x + 3)(8x + 9) = 56x^3 + 103x^2 + 69x + 27$

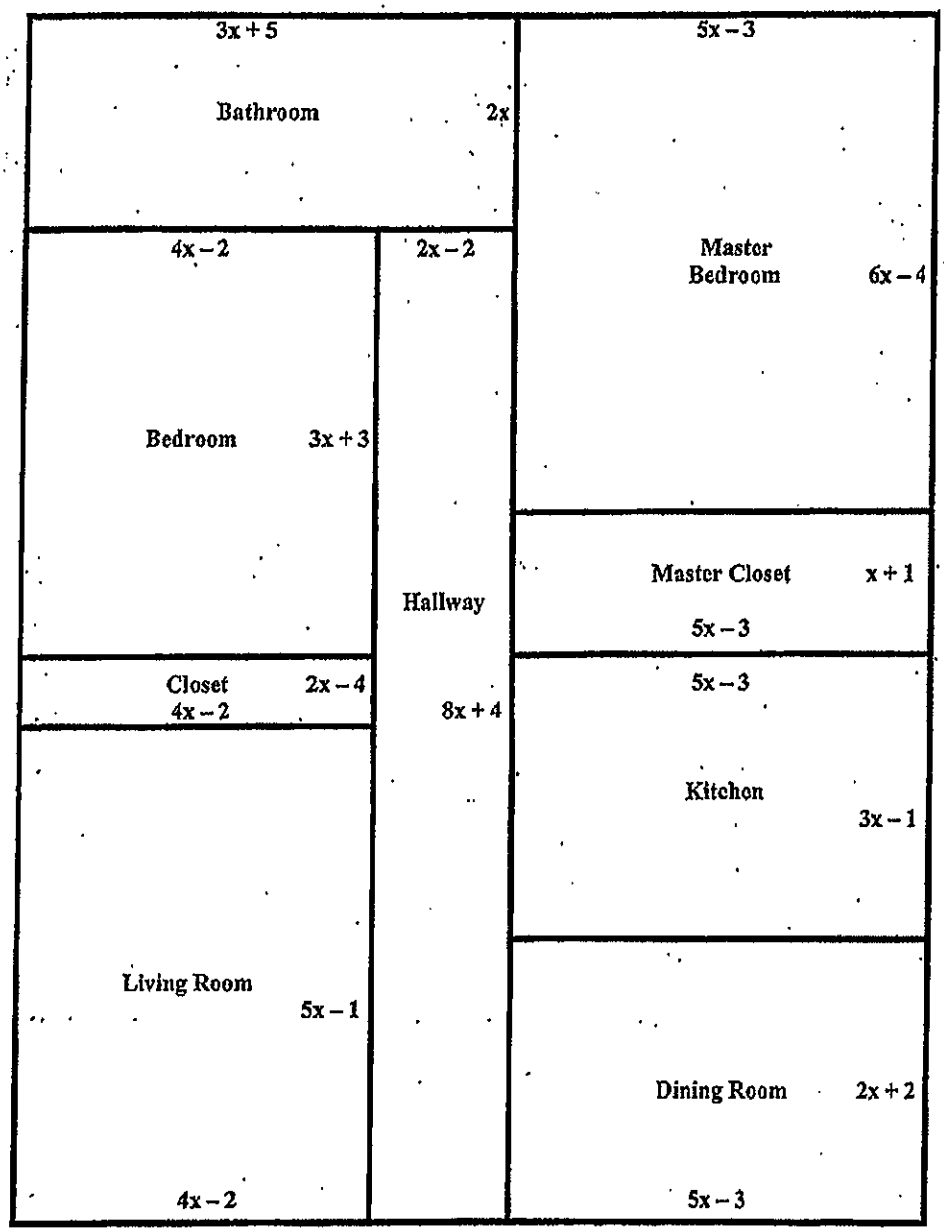
Station 4 : Applications

Part 1: Expressing Areas and Perimeters Using Polynomial Expressions

Use the diagram provided to answer each question.

1. Write an expression that shows the perimeter of the kitchen.
2. Write an expression that shows the perimeter of the dining room.
3. The perimeter of the kitchen and the perimeter of the dining room are exactly the same.
    - Find the value of x.
    - What is the perimeter of the kitchen?
4. Write an expression that shows the area of the Master Bedroom.
5. Write an expression that shows the area of the Living Room.
6. You want to put carpet in the Master Bedroom and the Living Room. You checked with various stores and found that the best deal was given by a company who will charge you $3.49 per square foot (this includes carpet pad). Calculate the total cost for carpeting these rooms.
7. Write an expression that shows the area of the Kitchen.
8. Write an expression that shows the area of the Dining Room.
9. You want to put ceramic tile flooring in your Kitchen and Dining Room. You checked with various stores and found that the best deal was given by a company who will charge you $3.00 per square foot plus $320 for labor. Calculate the total cost for the ceramic tile flooring.
    - You are considering adding a kitchen island for extra counter space in the center of the kitchen. How much would ceramic tiling cost if you added a square island into the kitchen with each side measuring $2x - 1$? (Hint: you will not need ceramic tiling under the island)

Polynomial Project

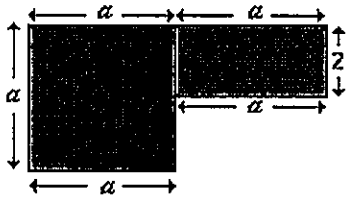


Station 4 : Applications

Part 2: Polynomials & Geometry Applications

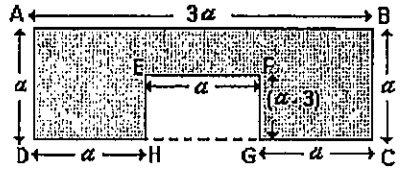
Multiple Choice

1. Express the **area** of the figure as a simplified polynomial.



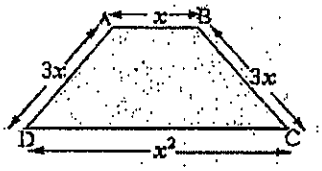
a) $(a^2 + 2a)$ sq units
b) $(a^2 + a)$ sq units
c) $(a^2 + 2)$ sq units
d) $(2a^2 + 2a)$ sq units

2. Express the **area** of the polygon 'ABCGFEHD' as a polynomial.



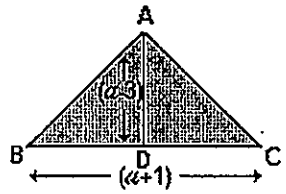
a) $(3a^2 + 3a)$ sq units
b) $(3a^2 + 2a)$ sq units
c) $(2a^2 - 3a)$ sq units
d) $(2a^2 + 3a)$ sq units

3. Express the **perimeter** of the polygon ABCD as a polynomial.



a) $(3x^2 + 3x)$ units
b) $(x^2 + 6x)$ units
c) $(x^2 + 3x)$ units
d) $(x^2 + 7x)$ units

4. Express the **area** of the ΔABC as a polynomial.

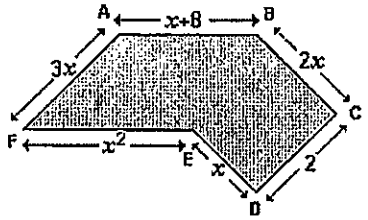


a) $1 / 2(a^2 - 2a - 3)$
b) $1 / 2(a^2)$
c) $1 / 2(a^2 + 4a + 3)$
d) None of the above

5. Express the **area** of the shaded region in the figure as a polynomial, **where EF = BC.**

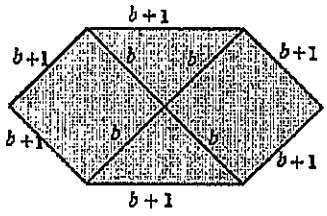
a) $(4a^2 + 8a)$ sq units
b) $(4a^2 + 4a)$ sq units
c) $(4a^2 - 8a)$ sq units
d) $(4a^2 - 4a)$ sq units

6. Express the **perimeter** of the polygon as a polynomial.



a) $(x^2 + 7x + 10)$ units
b) $(x^2 + 8x + 10)$ units
c) $(x^2 + 9x + 10)$ units
d) $(8x + 10)$ units

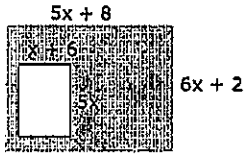
7. Write the **perimeter** of the figure as a polynomial.



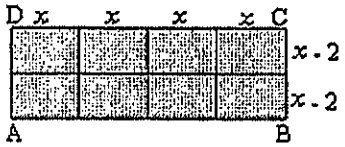
a) $10b + 6$ units
b) $10b + 8$ units
c) $6b + 6$ units
d) $8b + 8$ units

Short answer: Write each as a polynomial in standard form.

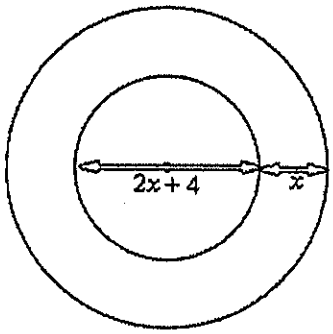
8. Find the **area** of the shaded region below.



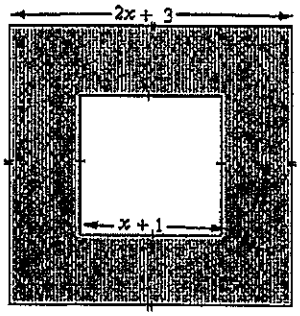
9. Find the **perimeter** of the polygon ABCD.



10. Find the **diameter** of the bigger circle.



11. Find the **area** of the shaded region..



Key

Station 4: Applications

Part 1: Expressing Areas and Perimeters Using Polynomial Expressions

1. Perimeter of the kitchen: $16x - 8$
2. Perimeter of the dining room: $14x - 2$
3.
   - $x = 3$
   - Kitchen's Perimeter 40
4. Area of the Master Bedroom: $30x^2 - 38x + 12 = 168 \text{ un}^2$
5. Area of the Living Room: $20x^2 - 14x + 2 = 140 \text{ un}^2$
6. Calculate the total cost for carpeting these rooms.

   $168(3.49) + 140(3.49) = \$1,074.92$
7. Area of the Kitchen:

   $15x^2 - 14x + 3 = 96 \text{ units}^2$
8. Area of the Dining Room: 96 units^2
9. Calculate the total cost for the ceramic tile flooring: $96 \cdot 3 + 96 \cdot 3 + 320$

   $\$896$

   - ceramic tile needed if you add an island

     $4x^2 - 4x + 1 = 25 \text{ units}^2$

     $896 - (25 \cdot \$3.00) = 896 - 75 = \$821$

Part 2: Polynomials & Geometry Applications

key

1. A
2. D
3. D
4. A
5. A
6. A
7. C
8. $25x^2+28x+16$ units^2

9. $12x-8$ units

10. $4x+4$ units

11. $3x^2+10x+8$ units^2