Introduction to Polynomials Assignment

Connect and Reflect

Key Ideas

- Algebra is a branch of mathematics that uses symbols to represent numbers and quantities.
- Polynomials are algebraic expressions made up of one or more terms. Two or more terms are connected by addition or subtraction. For example, $-2x$, $5y + 8$, and $6x^2 + 5x - 3$.
- You can classify a polynomial by the number of terms and degree.
- Some polynomials have specific names: a monomial has one term, a binomial has two terms, and a trinomial has three terms.
- A polynomial has the degree of its highest-degree term.
- You can use algebra tiles to model algebraic expressions.

Practise

1. Use algebra tiles to model each of the following expressions.

a) $4x + 2$

b) $2x - 5$

c) $-4x + 3$

d) $x^2 + 1$

e) $-2x^2 + 5x$

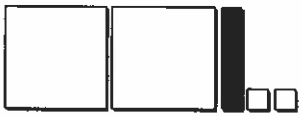
f) $x^2 - 3x + 4$

2. Write an algebraic expression modelled by each set of algebra tiles.

a)

b)

c)



For help with #3, refer to Example 1 on page 109.

3. Identify the coefficient and the variable(s) for each term.

	Term	Coefficient	Variable
a)	$4x$		
b)	$9y^2$		
c)	$-6kz$		
d)	$\frac{1}{3}xy$		
e)	$-c^2$		
f)	ac		

For help with #4 and #5, refer to Example 2 on page 110.

4. Refer to the polynomials below to answer each question.

$3b^2$ $\quad 2 + p$ $\quad 4st + t - 1$ $\quad 2x^2 - y^2$

a) Which one(s) are binomials?

b) Which one(s) have degree 2?

c) What is the variable in the monomial?

d) Which polynomials have a constant term?

5. List the terms, and then classify each polynomial by the number of terms and state its degree.

a) $-3x$

b) $5x^2 - 9x + 6$

c) $ab - 4b$

d) $3u^2 + 5uv - 2v^2$

e) 10

f) $-7m^2 + 7mn - 3n^2 + 4$

For help with #6 and #7, refer to Example 3 on page 111.

6. Substitute the given values and evaluate each expression.

a) $3m + 8$; $m = 9$

b) $-5c + 3d$; $c = 7$, $d = -6$

c) $a^2 + 2a + 9$; $a = 4$

d) $4x^2 - 5x - 8$; $x = -2$

7. Provide one value of the variable that would make the expression $-2x^2 + 4x - 5$ less than -50.

Apply

8. Use six algebra tiles to show expressions that have a degree of

a) 1 b) 2

9. Which does not belong in each list? Explain your reasoning.

a) monomial, binomial, trinomial, constant

b) coefficient, degree, variable, exponent

c) $3x - 4$ $2x^2$ $\frac{5}{x}$ $-x^2 + 8x - 7$

10. Create two examples of polynomials with a different degree for each. Share your examples with a partner and have them state the degree of each polynomial.

a) monomial b) binomial

c) trinomial d) 4-term polynomial

11. Use your knowledge of algebra tiles to answer the following questions.

a) How are the dimensions of a 1-tile and an x-tile related?

b) The rectangle shown was formed using an x^2-tile and 3 x-tiles. What is an expression for the length of the rectangle?

12. ✓ **Competency Check** How are the coefficients in an algebraic expression related to an algebra tile model? Use an example to support your answer.

13. Marion gives French lessons in the evening. She charges \$20 for adults and \$15 for children. The expression $20a + 15c$ represents her earnings.

a) What do the variables a and c represent?

b) How much does Marion make if she gives lessons to 4 adults and 9 children? Show your work.

c) Write a new expression for Marion's earnings if she charges \$3 more for adults and \$2 more for children.

14. A student council received a $1000 donation and then raised more money by selling school sweaters for $25 each. An expression for the total amount of money raised is $25n + 1000$.

a) What does n represent?

b) What does $25n$ represent?

c) What type of polynomial is $25n + 1000$?

d) How much money was raised if 120 sweaters were sold?

15. ✓ **Competency Check** Riley's cellphone plan costs $22 per month plus $0.05 per text.

a) Write an expression for the monthly cost of the cellphone plan.

b) What does your variable represent?

c) What type of polynomial is your expression, and what is its degree?

d) Show how your polynomial provides the total cost of text messages sent in one month.

e) How can you modify your polynomial to represent the total cost over two or more months?

16. A hockey team charges $15 for gold seats, $8 for blue seats, and $5 for red seats.

a) Write an expression that describes the total earnings from ticket sales.

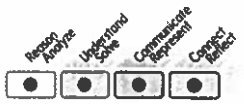
b) Identify the coefficients and variables and describe what they mean.

c) How much will the team earn if they sell 1500 gold, 1800 blue, and 910 red seats?

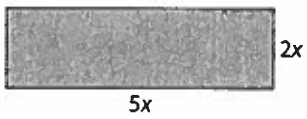
17. Describe a situation that could be modelled by each given polynomial. Share your situation with a partner.

a) $3x + 5$ **b)** $10 - x$

18. ✓ **Competency Check**



a) What expressions represent the area and perimeter of the rectangle shown?



b) Build or draw a model using algebra tiles to illustrate the expressions in part a).

c) Calculate the area and perimeter if $x = 6$ cm.

d) Create another rectangle that has the same perimeter as the one in part a). How is the algebra tile model the same? How is it different?