as an exponent

- no variables

in the

denomination

Section 6: Polynomial Functions Section 6 - Topic 1 Classifying Polynomials and Closure Property

A polynomial is a finite sum of monomials.

Determine whether each of the following expressions is a $-\mu U$ $f(\alpha (-1) \alpha f)$ polynomial. If the expression is not a polynomial of the following expressions is not a polynomial. expression so that it is a polynomial.

$$3x^2 + 2y + 4 \qquad \text{IS}$$

$$8a^{\frac{1}{2}} + 2c \quad \text{no} \qquad \begin{cases} 3a^{\frac{1}{2}} + 2c \\ 3a^{\frac{1}{2}} +$$

$$5r + \frac{s}{t}$$
 no $5r + 5t$

$$\frac{5a+4b}{2}$$
 yes $\frac{5\alpha}{2}$ + 2b

$$9x^{-3} + 2y + 7x^{3} \cap 0 \quad 9 \times^{3} + 9 \times + 9 \times^{3}$$

We can classify polynomials by the number of terms.

Number of Terms	Example	Name of Polynomial
1	$3x^{7}$	Monomial
2	5m + 6n	bingmial
3	$8r^2 + 4s + 7t$	tringmia
4 1	$a + 2b + c^2 + 4$	polynamial

We can also classify polynomials by degree.

Degree	Example	Type of Polynomial
0	3	constant
1	2x + 3z	mear
2	$3x^2 + 2y^2$	quadratic
3	6y ³	CUPIC
4	$5a^4 + 3b^3$	quartic

degree #ut
terms

Let's Practice!

 Describe two polynomial functions that we have seen so far.

quadratic

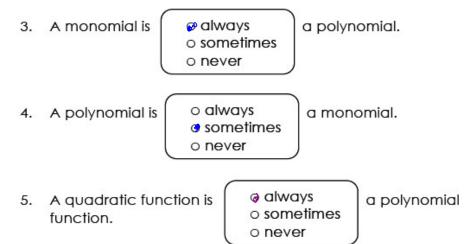
lnear

 Explain if exponential functions are polynomial functions or not.

2× -no because thex is in the exponential position

Try It!

Select the word that correctly completes each of the following statements.



We can also apply the Closure Property to polynomials.

A set is said to be $\frac{\text{Closed}}{\text{cost}}$ under a specific mathematical operation if the $\frac{\text{resolt}}{\text{that}}$ occurs when you perform the operation on any two members of the set is also a member of the set.

Determine whether each of the following statements are true or false. If a statement is false, write a counterexample.

Integers are closed under addition.

True

Odd numbers are closed under addition.

False 3+5=8

Even numbers are closed under addition.

True

Negative numbers are closed under multiplication.

False (-3)(-4)= 12

Odd numbers are closed under multiplication.

When referring to the Closure Property, what do you think "polynomials form a system analogous to the integers"

means?

Integers are classed under t, -, · but not :.

tice! Same goes for polynomials

Let's Practice!

- Determine whether each of the following statements is true or false. If the statement is false, write a counterexample.
 - a. Polynomials are closed under addition.

Truc

b. Polynomials are closed under subtraction.

Truc

Try It!

- Determine whether each of the following statements is true or false. If the statement is false, write a counterexample.
 - a. Polynomials are closed under multiplication.

True

b. Polynomials are closed under division.

False $\frac{1}{2}$ = $\frac{1}{x}$

BEAT THE TEST!

1. Two functions are given below.

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

$$g(x) = x^2$$

Candice solved $\frac{f(x)}{g(x)}$ as follows:

$$\frac{x^3 + 2x^2 - 3x + 4}{x^2}$$

$$\frac{x^3}{x^2} + \frac{2x^2}{x^2} - \frac{3x}{x^2} + \frac{4}{x^2}$$

$$x+2-\frac{3}{x}+\frac{4}{x^2}$$

Part A: Candice's work illustrates that polynomials are

o closed o not closed

- o addition.

 division.
 o multiplication.
 o subtraction.

Part B: Explain your answer from Part A.