

Introduction to Polynomials

by – Anna Panova

Activity overview

In this activity, students will begin getting familiar with terminology of polynomials.

Concepts

Identifying polynomials, naming polynomials, finding the degree of polynomials.

Teacher preparation

This activity should be used as an introduction to polynomials. Students will learn to identify polynomials, name polynomials and find the degree of polynomials. No prior knowledge of polynomials is needed.

Classroom management tips

This activity coordinates with Lesson 8-4 of Glencoe Algebra 1 text

TI-Nspire Applications

Introduction_to_Polynomials.tns

Step-by-step directions

Students begin with definition of monomials.

[Page 1.2]

A screenshot of a TI-Nspire application window titled "Introduction...als". The page number "1.2" is selected in the navigation bar. The text on the page reads: "A **monomial** is an algebraic expression consisting of a single term. [no adding or subtracting] Examples: -5 , a , $\frac{1}{3}x$, xy^3 You can't divide by a variable (or have negative exponents)!"

Students will use Question templates to identify monomials.

[Page 1.3 to 1.6]

A screenshot of a TI-Nspire application window titled "Introduction...als". The page number "1.3" is selected in the navigation bar. The question template displays: "Is this a monomial ?" with the input "12". Below the question are two radio button options: "Yes" and "No".

Students will read the definition polynomials and see specific examples.

[Page 1.7]

1.5 1.6 1.7 Introduction...als

A **polynomial** is a monomial or a sum of monomials.

Examples: x^3 , $x^2 + y^2$, $z^2 - z$

Reminder: No negative exponents allowed !

Students will use Question templates to identify polynomials.

[Page 1.8 to 1.10]

1.6 1.7 1.8 Introduction...als

Is this a polynomial?

$x^{-2} + y^3$

Yes

No

Students will get familiar with definition of number of terms and names associated with each polynomial: monomial, binomial and trinomial.

[Page 1.11 to 1.12]

1.9 1.10 1.11 *Introduction...als

Number of terms: how many monomials you are adding or subtracting

2 terms: $2x^2 + 3y$

3 terms: $2x^2 + 3y + 5$

4 terms: $2x^2 + 3y + 5x - 3$

Students will use Question templates to name polynomials.

[Page 1.13 to 1.18]

1.11 1.12 1.13 *Introduction...als

Identify the following expression. Use special names if appropriate.

$3x^2 + x + 3$

not a polynomial

monomial

binomials

trinomial

polynomial

Directions to find the degree of a polynomial using CAS menu are provided for students to follow.

[Page 2.1]

Followed by practice exercises where students have to find the degree of various polynomials.

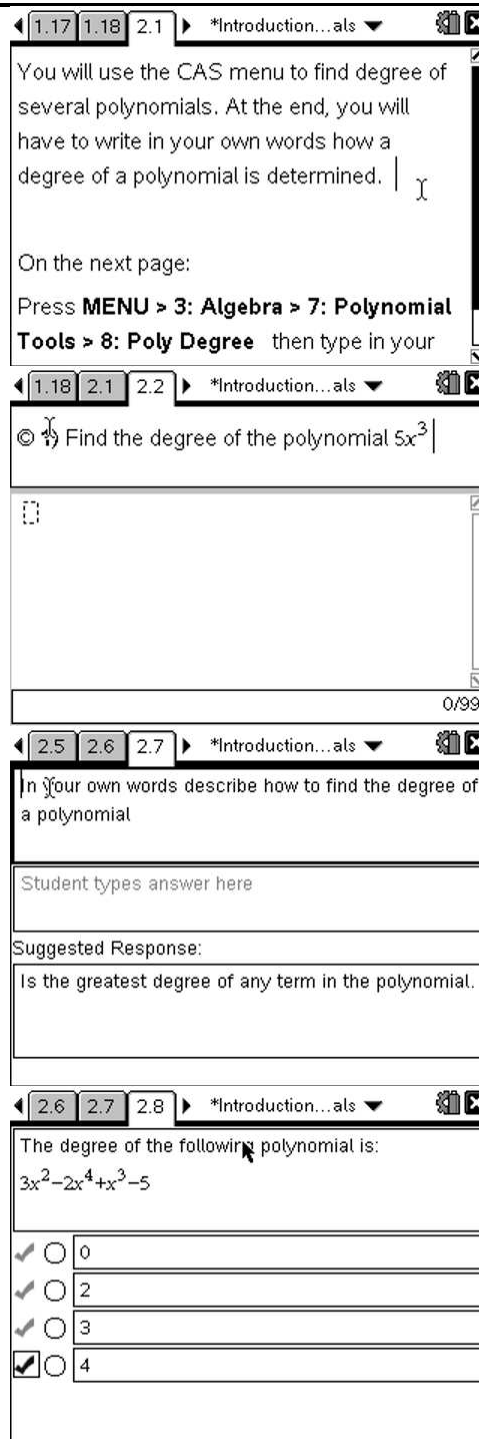
[Page 2.2 to 2.6]

Students will describe how to find the degree of a polynomial in their own words.

[Page 2.7]

Students will use Question template to find the degree of several polynomials.

[Page 2.8]



The screenshots show the TI-Nspire Navigator interface for the 'Introduction to Polynomials' activity. The first screenshot (Page 2.1) displays instructions: 'You will use the CAS menu to find degree of several polynomials. At the end, you will have to write in your own words how a degree of a polynomial is determined.' It also provides navigation instructions: 'On the next page: Press MENU > 3: Algebra > 7: Polynomial Tools > 8: Poly Degree then type in your'. The second screenshot (Page 2.2) shows a question: 'Find the degree of the polynomial $5x^3$ '. The third screenshot (Page 2.7) shows a question: 'In your own words describe how to find the degree of a polynomial'. Below the question is a text entry field with the placeholder 'Student types answer here'. A 'Suggested Response' box contains the text: 'Is the greatest degree of any term in the polynomial.'. The fourth screenshot (Page 2.8) shows a question: 'The degree of the following polynomial is: $3x^2 - 2x^4 + x^3 - 5$ '. Below the question are four radio button options: 0, 2, 3, and 4. The option 4 is selected.

Assessment and evaluation

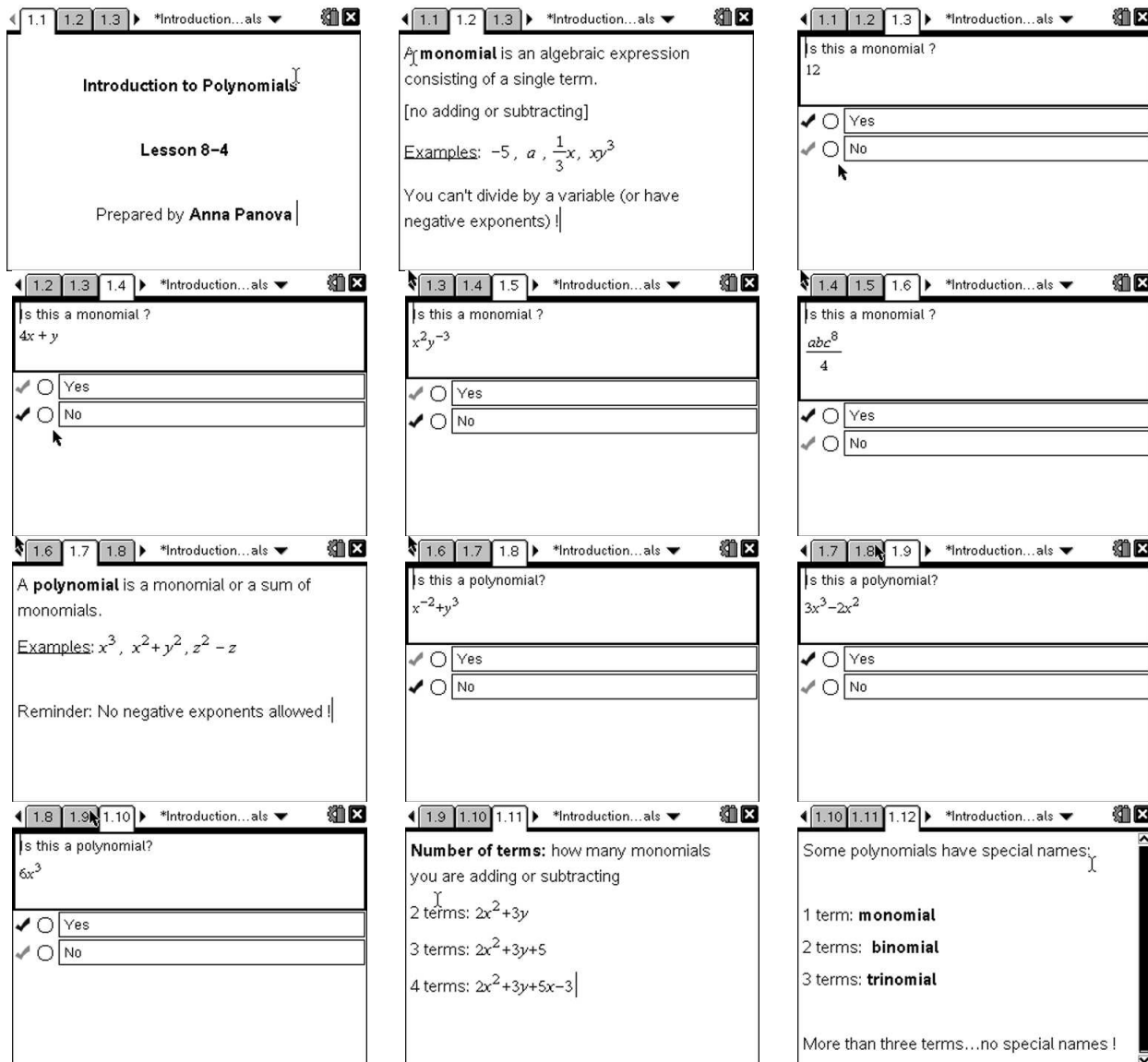
- This .tns file will be collected using TI-Nspire Navigator and results will be analyzed as a class using the Slide Show.

Activity extensions

- Ask students to come up with their own examples of specific polynomials such as “trinomial with degree 5” or “monomial with degree 0”.

Student TI-Nspire Document

Introduction_to_Polynomials.tns



The screenshots show the following content:

- Slide 1.1:** Title "Introduction to Polynomials" and "Lesson 8-4". Prepared by Anna Panova.
- Slide 1.2:** Question: "Is this a monomial?" with example $4x + y$. Radio buttons for Yes and No.
- Slide 1.3:** Definition: "A **monomial** is an algebraic expression consisting of a single term. [no adding or subtracting]". Examples: -5 , a , $\frac{1}{3}x$, xy^3 . Note: "You can't divide by a variable (or have negative exponents)!"
- Slide 1.4:** Question: "Is this a monomial?" with example $\frac{abc^8}{4}$. Radio buttons for Yes and No.
- Slide 1.5:** Question: "Is this a monomial?" with example x^2y^{-3} . Radio buttons for Yes and No.
- Slide 1.6:** Definition: "A **polynomial** is a monomial or a sum of monomials." Examples: x^3 , $x^2 + y^2$, $z^2 - z$. Reminder: "No negative exponents allowed!"
- Slide 1.7:** Question: "Is this a polynomial?" with example $x^{-2} + y^3$. Radio buttons for Yes and No.
- Slide 1.8:** Question: "Is this a polynomial?" with example $6x^3$. Radio buttons for Yes and No.
- Slide 1.9:** Definition: "Number of terms: how many monomials you are adding or subtracting". Examples: 2 terms: $2x^2 + 3y$; 3 terms: $2x^2 + 3y + 5$; 4 terms: $2x^2 + 3y + 5x - 3$.
- Slide 1.10:** Question: "Is this a polynomial?" with example $3x^3 - 2x^2$. Radio buttons for Yes and No.
- Slide 1.11:** Text: "Some polynomials have special names:". List: 1 term: **monomial**; 2 terms: **binomial**; 3 terms: **trinomial**. Note: "More than three terms...no special names!"

<p>1.11 1.12 1.13 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> $3x^2+tx+3$ <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>	<p>1.12 1.13 1.14 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> $3x^{-2}+x$ <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>	<p>1.13 1.14 1.15 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> $5abc^3$ <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>
<p>1.14 1.15 1.16 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> y^5+y <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>	<p>1.15 1.16 1.17 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> $5x^4+3x^3+x+3$ <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>	<p>1.16 1.17 1.18 *Introduction...als</p> <p>Identify the following expression. Use special names if appropriate.</p> 5 <p><input type="checkbox"/> not a polynomial</p> <p><input type="checkbox"/> monomial</p> <p><input type="checkbox"/> binomials</p> <p><input type="checkbox"/> trinomial</p> <p><input type="checkbox"/> polynomial</p>
<p>1.17 1.18 2.1 *Introduction...als</p> <p>You will use the CAS menu to find degree of several polynomials. At the end, you will have to write in your own words how a degree of a polynomial is determined.</p> <p>On the next page: Press MENU > 3: Algebra > 7: Polynomial Tools > 8: Poly Degree then type in your</p>	<p>1.18 2.1 2.2 *Introduction...als</p> <p>1) Find the degree of the polynomial $5x^3$</p> <p>0/99</p>	<p>2.1 2.2 2.3 *Introduction...als</p> <p>2) Find the degree of the polynomial $9x^2+x^3$</p> <p>0/99</p>
<p>2.2 2.3 2.4 *Introduction...als</p> <p>3) Find the degree of the polynomial $4x$</p> <p>0/99</p>	<p>2.3 2.4 2.5 *Introduction...als</p> <p>4) Find the degree of the polynomial -13</p> <p>0/99</p>	<p>2.4 2.5 2.6 *Introduction...als</p> <p>5) Find the degree of the polynomial $6x^3-x+12x^5-20x^2$</p> <p>0/99</p>
<p>2.7 2.8 2.9 *Introduction...als</p> <p>In your own words describe how to find the degree of a polynomial</p> <p>Student types answer here</p> <p>Suggested Response: Is the greatest degree of any term in the polynomial.</p>	<p>2.6 2.7 2.8 *Introduction...als</p> <p>The degree of the following polynomial is: $3x^2-2x^4+x^3-5$</p> <p><input type="checkbox"/> 0</p> <p><input type="checkbox"/> 2</p> <p><input type="checkbox"/> 3</p> <p><input type="checkbox"/> 4</p>	<p>2.7 2.8 2.9 *Introduction...als</p> <p>The degree of the following polynomial is: -5</p> <p><input type="checkbox"/> 0</p> <p><input type="checkbox"/> 1</p> <p><input type="checkbox"/> 2</p> <p><input type="checkbox"/> 3</p>

← 2.9 2.10 ▶ *Introduction...als

The degree of the following polynomial is:
 $2x$

0

1

2

3