**Curve Fitting with Polynomial Models**

**TEKS:** *P3.A, P3.B, P3.C, P3.D*

***Content Objective:*** I will be able to use finite differences to determine the degree of a polynomial that will fit a given set of data. Use technology to find polynomial models for a given set of data.

***Language Objective:***

**I. Lesson**

In section 5-8 we checked for a constant second difference to determine if the data represents a quadratic function, such as:

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Differences

1st

2nd

We can use this same method to determine if the degree of the polynomial represented by the data.

|  |  |  |
| --- | --- | --- |
| Differences of Polynomials | | |
| Function Type | Degree | Constant Differences |
| Linear | 1 | First |
| Quadratic | 2 | Second |
| Cubic | 3 | Third |
| Quartic | 4 | Fourth |
| Quintic | 5 | Fifth |

**EXAMPLE 1:Using Differences to Determine Degree**

Find the constant difference to determine the degree of the polynomial.

A)

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B)

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**Try It**

A)

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B)

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Once you determine the degree of the polynomial, you can use your calculator to create the function.

**EXAMPLE 2: Using Differences to Write a Function**

Determine the degree of the polynomial then use your calculator to create the function.

A) The table below shows the number of square feet of retail space available for rent in various years.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year |  |  |  |  |  |  |
| Retail Space (billion ft2) |  |  |  |  |  |  |

**Try It**

A) The table bellow shows the number of Chess Club members in various years.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year |  |  |  |  |  |  |
| Members |  |  |  |  |  |  |

**NAME: DATE: PERIOD:**

**Independent Practice: Curve Fitting with Polynomial Models**

Determine the degree by finding the constant difference.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
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|  |  |  |  | 30 |  |  |

4.

5.

|  |  |  |  |  |  |  |
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6.

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|  |  |  |  |  |  |  |

Solve.

7. The data set represents the population of rare turtle species on an island for the years since 1980.

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| --- | --- | --- | --- | --- | --- | --- |
| Year |  |  |  |  |  |  |
| Population |  |  |  |  |  |  |

a. Write a polynomial function for the data.

b. Predict when the species will become extinct.

8. The data shows the average price for a luxury commodity for the years since 1998.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year |  |  |  |  |  |  |
| Price ($) |  |  |  |  |  |  |

a. Write a polynomial function for the data.

b. Predict the price of the item in 2008.