Chapter 2    Polynomial and Rational Functions

Section 2.1 Quadratic Functions

Objective: In this lesson you learned how to sketch and analyze graphs of quadratic functions.

Important Vocabulary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant function</td>
<td>A polynomial function with degree 0. That is, ( f(x) = a ).</td>
</tr>
<tr>
<td>Linear function</td>
<td>A polynomial function with degree 1. That is, ( f(x) = mx + b, m \neq 0 ).</td>
</tr>
<tr>
<td>Quadratic function</td>
<td>Let ( a, b, ) and ( c ) be real numbers with ( a \neq 0 ). The function ( f(x) = ax^2 + bx + c ) is called a quadratic function.</td>
</tr>
<tr>
<td>Axis of symmetry</td>
<td>A line about which a parabola is symmetric. Also called simply the axis of the parabola.</td>
</tr>
<tr>
<td>Vertex</td>
<td>The point where the axis intersects the parabola.</td>
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</tbody>
</table>

I. The Graph of a Quadratic Function  (Pages 90–92)

Let \( n \) be a nonnegative integer and let \( a_n, a_{n-1}, \ldots, a_2, a_1, a_0 \) be real numbers with \( a_n \neq 0 \). A polynomial function of \( x \) with degree \( n \) is

\[
 f(x) = a_nx^n + a_{n-1}x^{n-1} + \ldots + a_2x^2 + a_1x + a_0. 
\]

A quadratic function is a polynomial function of \( \text{second} \) degree. The graph of a quadratic function is a special “U”-shaped curve called a(n) \( \text{parabola} \).

If the leading coefficient of a quadratic function is positive, the graph of the function opens \( \text{upward} \) and the vertex of the parabola is the \( \text{minimum} \) point on the graph. If the leading coefficient of a quadratic function is negative, the graph of the function opens \( \text{downward} \) and the vertex of the parabola is the \( \text{maximum} \) point on the graph.
II. The Standard Form of a Quadratic Function
(Pages 93–94)

The **standard form of a quadratic function** is
\[ f(x) = a(x - h)^2 + k, \quad a \neq 0 \]

For a quadratic function in standard form, the axis of the associated parabola is \( x = h \) and the vertex is \((h, k)\).

To write a quadratic function in standard form, use the process of completing the square on the variable \( x \).

To find the \( x \)-intercepts of the graph of \( f(x) = ax^2 + bx + c \), solve the equation \( ax^2 + bx + c = 0 \).

**Example 1:** Sketch the graph of \( f(x) = x^2 + 2x - 8 \) and identify the vertex, axis, and \( x \)-intercepts of the parabola.
\((-1, -9); \quad x = -1; \quad (-4, 0) \) and \((2, 0)\)

III. Finding Minimum and Maximum Values (Page 95)

For a quadratic function in the form \( f(x) = ax^2 + bx + c \), when \( a > 0 \), \( f \) has a minimum that occurs at \(-\frac{b}{2a}\).
When \( a < 0 \), \( f \) has a maximum that occurs at \(-\frac{b}{2a}\).
To find the minimum or maximum value, evaluate the function at \(-\frac{b}{2a}\).

**Example 2:** Find the minimum value of the function \( f(x) = 3x^2 - 11x + 16 \). At what value of \( x \) does this minimum occur?
Minimum function value is \( 71/12 \) when \( x = 11/6 \)

**Homework Assignment**

Page(s)

Exercises
Section 2.2 Polynomial Functions of Higher Degree

Objective: In this lesson you learned how to sketch and analyze graphs of polynomial functions.

I. Graphs of Polynomial Functions (Pages 101–105)

Name two basic features of the graphs of polynomial functions.

1) continuous
2) smooth rounded turns

Will the graph of \( g(x) = x^7 \) look more like the graph of \( f(x) = x^2 \) or the graph of \( f(x) = x^3 \)? Explain.

The graph will look more like that of \( f(x) = x^3 \) because the degree of both is odd.

II. The Leading Coefficient Test (Pages 102–103)

State the Leading Coefficient Test.

As \( x \) moves without bound to the left or to the right, the graph of the polynomial function \( f(x) = a_n x^n + \ldots + a_1 x + a_0 \) eventually rises or falls in the following manner:

1. When \( n \) is odd:
   a. If the leading coefficient is positive, the graph falls to the left and rises to the right.
   b. If the leading coefficient is negative, the graph rises to the left and falls to the right.

2. When \( n \) is even:
   a. If the leading coefficient is positive, the graph rises to the left and right.
   b. If the leading coefficient is negative, the graph falls to the left and right.
Example 1:  Describe the left and right behavior of the graph of
\[ f(x) = 1 - 3x^2 - 4x^6. \]
Because the degree is even and the leading coefficient is negative, the graph falls to the left and right.

III. Zeros of Polynomial Functions  (Pages 104–107)

Let \( f \) be a polynomial function of degree \( n \). The function \( f \) has at most \( n \) real zeros. The graph of \( f \) has at most \( n - 1 \) relative extrema.

Let \( f \) be a polynomial function and let \( a \) be a real number. List four equivalent statements about the real zeros of \( f \).
1) \( x = a \) is a zero of the function \( f \)
2) \( x = a \) is a solution of the polynomial equation \( f(x) = 0 \)
3) \( (x - a) \) is a factor of the polynomial \( f(x) \)
4) \( (a, 0) \) is an \( x \)-intercept of the graph of \( f \)

If a polynomial function \( f \) has a repeated zero \( x = 3 \) with multiplicity 4, the graph of \( f \) touches the \( x \)-axis at \( x = 3 \). If \( f \) has a repeated zero \( x = 4 \) with multiplicity 3, the graph of \( f \) crosses the \( x \)-axis at \( x = 4 \).

Example 2:  Sketch the graph of \( f(x) = \frac{1}{4} x^4 - 2x^2 + 3 \).

IV. The Intermediate Value Theorem  (Page 108)

Interpret the meaning of the Intermediate Value Theorem. If \( (a, f(a)) \) and \( (b, f(b)) \) are two points on the graph of a polynomial function \( f \) such that \( f(a) \neq f(b) \), then for any number \( d \) between \( f(a) \) and \( f(b) \), there must be a number \( c \) between \( a \) and \( b \) such that \( f(c) = d \).

Describe how the Intermediate Value Theorem can help in locating the real zeros of a polynomial function \( f \). If you can find a value \( x = a \) at which \( f \) is positive and another value \( x = b \) at which \( f \) is negative, you can conclude that \( f \) has at least one real zero between \( a \) and \( b \).

What you should learn
How to find and use zeros of polynomial functions as sketching aids

What you should learn
How to use the Intermediate Value Theorem to help locate zeros of polynomial functions

Homework Assignment
Page(s)
Exercises
Section 2.3  Real Zeros of Polynomial Functions

Objective: In this lesson you learned how to use long division and synthetic division to divide polynomials by other polynomials and how to find the rational and real zeros of polynomial functions.

Important Vocabulary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long division of polynomials</td>
<td>A procedure for dividing two polynomials, which is similar to long division in arithmetic.</td>
</tr>
<tr>
<td>Division Algorithm</td>
<td>If ( f(x) ) and ( d(x) ) are polynomials such that ( d(x) \neq 0 ), and the degree of ( d(x) ) is less than or equal to the degree of ( f(x) ), there exist unique polynomials ( q(x) ) and ( r(x) ) such that ( f(x) = d(x)q(x) + r(x) ) where ( r(x) = 0 ) or the degree of ( r(x) ) is less than the degree of ( d(x) ).</td>
</tr>
<tr>
<td>Synthetic division</td>
<td>A shortcut for long division of polynomials when dividing by divisors of the form ( x - k ).</td>
</tr>
<tr>
<td>Remainder Theorem</td>
<td>If a polynomial ( f(x) ) is divided by ( x - k ), then the remainder is ( r = f(k) ).</td>
</tr>
<tr>
<td>Factor Theorem</td>
<td>A polynomial ( f(x) ) has a factor ( (x - k) ) if and only if ( f(k) = 0 ).</td>
</tr>
<tr>
<td>Upper bound</td>
<td>A real number ( b ) is an upper bound for the real zeros of ( f ) if no real zeros of ( f ) are greater than ( b ).</td>
</tr>
<tr>
<td>Lower bound</td>
<td>A real number ( b ) is a lower bound for the real zeros of ( f ) if no real zeros of ( f ) are less than ( b ).</td>
</tr>
</tbody>
</table>

1. Long Division of Polynomials  (Pages 113–115)

When dividing a polynomial \( f(x) \) by another polynomial \( d(x) \), if the remainder \( r(x) = 0 \), \( d(x) \) divides evenly into \( f(x) \).

The rational expression \( f(x)/d(x) \) is improper if the degree of \( f(x) \) is greater than or equal to the degree of \( d(x) \).

The rational expression \( r(x)/d(x) \) is proper if the degree of \( r(x) \) is less than the degree of \( d(x) \).

Before applying the Division Algorithm, you should write the dividend and divisor in descending powers of the variable and insert placeholders with zero coefficients for missing powers of the variable.

Example 1:  Divide \( 3x^3 + 4x - 2 \) by \( x^2 + 2x + 1 \).

\[
3x - 6 + (13x + 4)/(x^2 + 2x + 1)
\]
II. Synthetic Division  (Page 116)

Can synthetic division be used to divide a polynomial by \( x^2 - 5 \)? Explain.

No, the divisor must be in the form \( x - k \).

Can synthetic division be used to divide a polynomial by \( x + 4 \)? Explain.

Yes, rewrite \( x + 4 \) as \( x - (-4) \).

Example 2:  Fill in the following synthetic division array to divide \( 2x^4 + 5x^2 - 3 \) by \( x - 5 \). Then carry out the synthetic division and indicate which entry represents the remainder.

\[
\begin{array}{c|cccc}
  5 & 2 & 0 & 5 & 0 & -3 \\
  \hline
   & 10 & 50 & 275 & 1375 \\
  \hline
 & 2 & 10 & 55 & 275 & 1372 & \rightarrow \text{remainder}
\end{array}
\]

III. The Remainder and Factor Theorems  (Pages 117–118)

To use the Remainder Theorem to evaluate a polynomial function \( f(x) \) at \( x = k \), use synthetic division to divide \( f(x) \) by \( x - k \). The remainder will be \( f(k) \).

Example 3:  Use the Remainder Theorem to evaluate the function \( f(x) = 2x^4 + 5x^2 - 3 \) at \( x = 5 \).

\[ f(5) = 1372 \]

To use the Factor Theorem to show that \( (x - k) \) is a factor of a polynomial function \( f(x) \), use synthetic division on \( f(x) \) with the factor \( (x - k) \). If the remainder is 0, then \( (x - k) \) is a factor. Or, alternatively, evaluate \( f(x) \) at \( x = k \). If the result is 0, then \( (x - k) \) is a factor.
List three facts about the remainder $r$, obtained in the synthetic division of $f(x)$ by $x - k$:

1) The remainder $r$ gives the value of $f$ at $x = k$. That is, $r = f(k)$.
2) If $r = 0$, $(x - k)$ is a factor of $f(x)$.
3) If $r = 0$, $(k, 0)$ is an $x$-intercept of the graph of $f$.

IV. The Rational Zero Test  (Pages 119–120)

Describe the purpose of the Rational Zero Test.

The Rational Zero Test relates the possible rational zeros of a polynomial with integer coefficients to the leading coefficient and to the constant term of the polynomial.

State the Rational Zero Test.  
If the polynomial $f(x) = a_nx^n + a_{n-1}x^{n-1} + \ldots + a_2x^2 + a_1x + a_0$ has integer coefficients, every rational zero of $f$ has the form: rational zero $= p/q$, where $p$ and $q$ have no common factors other than 1, $p$ is a factor of the constant term $a_0$, and $q$ is a factor of the leading coefficient $a_n$.

Describe how to use the Rational Zero Test. First list all rational numbers whose numerators are factors of the constant term and whose denominators are factors of the leading coefficient. Then use trial and error to determine which of these possible rational zeros, if any, are actual zeros of the polynomial.

Example 4: List the possible rational zeros of the polynomial function $f(x) = 3x^5 + x^4 + 4x^3 - 2x^2 + 8x - 5$.

$\pm 1, \pm 5, \pm 1/3, \pm 5/3$

List some strategies that can be used to shorten the search for actual zeros among a list of possible rational zeros.

Using a programmable calculator to speed up the calculations, using a graphing utility to estimate the locations of zeros, using the Intermediate Value Theorem (along with a table generated by a graphing utility) to give approximations of zeros, or using the Factor Theorem and synthetic division to test possible rational zeros, etc.
V. Other Tests for Zeros of Polynomials  (Pages 121–123)

State the Upper and Lower Bound Rules.
Let \( f(x) \) be a polynomial with real coefficients and a positive leading coefficient. Suppose \( f(x) \) is divided by \( x - c \), using synthetic division.

1. If \( c > 0 \) and each number in the last row is either positive or zero, \( c \) is an upper bound for the real zeros of \( f \).
2. If \( c < 0 \) and the numbers in the last row are alternately positive and negative (zero entries count as positive or negative), \( c \) is a lower bound for the real zeros of \( f \).

Explain how the Upper and Lower Bound Rules can be useful in the search for the real zeros of a polynomial function.

Explanations will vary. For instance, suppose you are checking a list of possible rational zeros. When checking the possible rational zero 2 with synthetic division, each number in the last row is positive or zero. Then you need not check any of the other possible rational zeros that are greater than 2 and can concentrate on checking only values less than 2.

Additional notes
Section 2.4 Complex Numbers

Objective: In this lesson you learned how to perform operations with complex numbers.

I. The Imaginary Unit $i$ (Page 128)

Mathematicians created an expanded system of numbers using the imaginary unit $i$, defined as $i = \sqrt{-1}$, because there is no real number $x$ that can be squared to produce $-1$.

By definition, $i^2 = -1$.

For the complex number $a + bi$, if $b = 0$, the number $a + bi = a$ is a(n) __________ real number __________. If $b \neq 0$, the number $a + bi$ is a(n) __________ imaginary number __________. If $a = 0$, the number $a + bi = b$, where $b \neq 0$, is called a(n) __________ pure imaginary number __________.

The set of complex numbers consists of the set of __________ real numbers __________ and the set of __________ imaginary numbers __________.

Two complex numbers $a + bi$ and $c + di$, written in standard form, are equal to each other if __________ and only if $a = c$ and $b = d$ __________.

II. Operations with Complex Numbers (Pages 129–130)

To add two complex numbers, __________ add the real parts and the imaginary parts of the numbers separately __________.

To subtract two complex numbers, __________ subtract the real parts and the imaginary parts of the numbers separately __________.

The additive identity in the complex number system is __________ $0$ __________.

The additive inverse of the complex number $a + bi$ is __________ $-(a + bi) = -a - bi$ __________.
Example 1: Perform the operations:
\[ \frac{(5 - 6i) - (3 - 2i) + 4i}{2} \]
To multiply two complex numbers \( a + bi \) and \( c + di \), use the multiplication rule \((ac - bd) + (ad + bc)i\) or use the Distributive Property to multiply the two complex numbers, similar to using the FOIL method for multiplying two binomials.

Example 2: Multiply: \((5 - 6i)(3 - 2i)\)
\[ 3 - 28i \]

III. Complex Conjugates (Page 131)
The product of a pair of complex conjugates is a(n) _______ real _______ number.
To find the quotient of the complex numbers \( a + bi \) and \( c + di \), where \( c \) and \( d \) are not both zero, multiply the numerator and denominator by the complex conjugate of the denominator.

Example 3: Divide \((1 + i)\) by \((2 - i)\). Write the result in standard form.
\[ 1/5 + 3/5i \]

IV. Complex Solutions of Quadratic Equations (Page 132)
When using the Quadratic Formula to solve a quadratic equation, you may obtain a result such as \( \sqrt{-7} \), which is not a _______ real _______. By factoring out \( i = \sqrt{-1} \), you can write this number in _______ standard form _______.
If \( a \) is a positive number, then the principal square root of the negative number \(-a\) is defined as \( \sqrt{-a} = \sqrt{ai} \).

What you should learn
How to use complex conjugates to write the quotient of two complex numbers in standard form

What you should learn
How to find complex solutions of quadratic equations

Homework Assignment
Page(s) Exercises
Section 2.5  The Fundamental Theorem of Algebra

Objective: In this lesson you learned how to determine the numbers of zeros of polynomial functions and find them.

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I. The Fundamental Theorem of Algebra (Page 135)

In the complex number system, every nth-degree polynomial function has precisely \( n \) zeros.

Example 1: How many zeros does the polynomial function \( f(x) = 5 - 2x^2 + x^3 - 12x^5 \) have? 5

An nth-degree polynomial can be factored into precisely \( n \) linear factors.

II. Finding Zeros of a Polynomial Function (Page 136)

Remember that the \( n \) zeros of a polynomial function can be real or complex, and they may be repeated.

Example 2: List all of the zeros of the polynomial function \( f(x) = x^3 - 2x^2 + 36x - 72 \).
\[ 2, 6i, -6i \]

III. Conjugate Pairs (Page 137)

Let \( f(x) \) be a polynomial function that has real coefficients. If \( a + bi \), where \( b \neq 0 \), is a zero of the function, then we know that \( a - bi \) is also a zero of the function.

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Important Vocabulary

- **Fundamental Theorem of Algebra**: If \( f(x) \) is a polynomial of degree \( n \), where \( n > 0 \), then \( f \) has at least one zero in the complex number system.
- **Linear Factorization Theorem**: If \( f(x) \) is a polynomial of degree \( n \), where \( n > 0 \), \( f \) has precisely \( n \) linear factors \( f(x) = a_n(x - c_1)(x - c_2) \ldots (x - c_n) \) where \( c_1, c_2, \ldots , c_n \) are complex numbers.
- **Conjugates**: A pair of complex numbers of the form \( a + bi \) and \( a - bi \).

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What you should learn

- How to use the Fundamental Theorem of Algebra to determine the number of zeros of a polynomial function
- How to find all zeros of polynomial functions, including complex zeros
- How to find conjugate pairs of complex zeros
IV. Factoring a Polynomial (Pages 138–139)

To write a polynomial of degree \( n > 0 \) with real coefficients as a product without complex factors, write the polynomial as the product of linear and/or quadratic factors with real coefficients, where the quadratic factors have no real zeros.

A quadratic factor with no real zeros is said to be prime or irreducible over the reals.

Example 3: Write the polynomial \( f(x) = x^4 + 5x^2 - 36 \)
(a) as the product of linear factors and quadratic factors that are irreducible over the reals, and
(b) in completely factored form.
(a) \( f(x) = (x + 2)(x - 2)(x^2 + 9) \)
(b) \( f(x) = (x + 2)(x - 2)(x + 3i)(x - 3i) \)

Explain why a graph cannot be used to locate complex zeros.

Real zeros are the only zeros that appear as \( x \)-intercepts on a graph. A polynomial function’s complex zeros must be found algebraically.

Additional notes
Section 2.6 Rational Functions and Asymptotes

Objective: In this lesson you learned how to determine the domains and find asymptotes of rational functions.

I. Introduction to Rational Functions (Page 142)

The domain of a rational function of x includes all real numbers except _____x-values that make the denominator zero_______.

To find the domain of a rational function of x, _______ set the denominator of the rational function equal to zero and solve for x. These values of x must be excluded from the domain of the function _________________.

Example 1: Find the domain of the function \( f(x) = \frac{1}{x^2 - 9} \).

The domain of \( f \) is all real numbers except \( x = -3 \) and \( x = 3 \).

II. Vertical and Horizontal Asymptotes (Pages 143–145)

The notation “\( f(x) \rightarrow 5 \) as \( x \rightarrow \infty \)” means _______ that \( f(x) \) approaches 5 as \( x \) increases without bound _________.

Let \( f \) be the rational function given by

\[
f(x) = \frac{N(x)}{D(x)} = \frac{a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0}{b_m x^m + b_{m-1} x^{m-1} + \cdots + b_1 x + b_0}
\]

where \( N(x) \) and \( D(x) \) have no common factors.

1) The graph of \( f \) has vertical asymptotes at _____ the zeros of \( D(x) \) _____________.

What you should learn

How to find the domains of rational functions

What you should learn

How to find vertical and horizontal asymptotes of graphs of rational functions
2) The graph of \( f \) has at most one horizontal asymptote determined by comparing the degrees of \( N(x) \) and \( D(x) \).

a) If \( n < m \), the line \( y = 0 \) (the x-axis) is a horizontal asymptote.

b) If \( n = m \), the line \( y = \frac{a_n}{b_m} \) is a horizontal asymptote.

c) If \( n > m \), the graph of \( f \) has no horizontal asymptote.

Example 2: Find the asymptotes of the function

\[
f(x) = \frac{2x - 1}{x^2 - x - 6}.
\]

Vertical: \( x = -2, x = 3 \); Horizontal: \( y = 0 \)

III. Application of Rational Functions (Page 146)

Give an example of asymptotic behavior that occurs in real life.

Answers will vary.
Section 2.7 Graphs of Rational Functions

Objective: In this lesson you learned how to sketch graphs of rational functions.

Important Vocabulary

Define each term or concept.

**Slant (or oblique) asymptote** If the degree of the numerator of a rational function is exactly one more than the degree of the denominator, then the line determined by the quotient of the denominator into the numerator is a slant asymptote of the graph of the rational function.

I. The Graph of a Rational Function (Pages 151–154)

List the guidelines for sketching the graph of the rational function \( f(x) = \frac{N(x)}{D(x)} \), where \( N(x) \) and \( D(x) \) are polynomials.

1) Simplify \( f \), if possible. Any restrictions on the domain of \( f \) not in the simplified function should be listed.
2) Find and plot the \( y \)-intercept (if any) by evaluating \( f(0) \).
3) Find the zeros of the numerator (if any) by setting the numerator equal to zero. Then plot the corresponding \( x \)-intercepts.
4) Find the zeros of the denominator (if any) by setting the denominator equal to zero. Then sketch the corresponding vertical asymptotes using dashed vertical lines and plot the corresponding holes using open circles.
5) Find and sketch any other asymptotes of the graph using dashed lines.
6) Plot at least one point between and one point beyond each \( x \)-intercept and vertical asymptote.
7) Use smooth curves to complete the graph between and beyond the vertical asymptotes, excluding any points where \( f \) is not defined.

**Example 1**: Sketch the graph of \( f(x) = \frac{3x}{x + 4} \).

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II. Slant Asymptotes  (Page 155)

Describe how to find the equation of a slant asymptote.

Use long division to divide the denominator of the rational function into the numerator. The equation of the slant asymptote is the quotient, excluding the remainder.

Example 2:  Decide whether each of the following rational functions has a slant asymptote. If so, find the equation of the slant asymptote.

(a) \( f(x) = \frac{x^3 - 1}{x^2 + 3x + 5} \)  (b) \( f(x) = \frac{3x^3 + 2}{2x - 5} \)

(a) Yes, \( y = x - 3 \)  (b) No

III. Applications of Graphs of Rational Functions  
(Page 156)

Describe a real-life situation in which a graph of a rational function would be helpful when solving a problem.

Answers will vary.
Section 2.8 Quadratic Models

Objective: In this lesson you learned how to classify scatter plots and use a graphing utility to find quadratic models for data.

I. Classifying Scatter Plots (Page 161)

Describe how to decide whether a set of data can be modeled by a linear model.

Make a scatter plot of the ordered pairs, either by hand or by entering the data into a graphing utility and displaying a scatter plot. Examine the shape of the scatter plot. If it appears that the data follows a linear pattern, it can be modeled by a linear function.

Describe how to decide whether a set of data can be modeled by a quadratic model.

Make a scatter plot of the ordered pairs, either by hand or by entering the data into a graphing utility and displaying a scatter plot. Examine the shape of the scatter plot. If it appears that the data follows a parabolic pattern, it can be modeled by a quadratic function.

II. Fitting a Quadratic Model to Data (Pages 162–163)

Once it has been determined that a quadratic model is appropriate for a set of data, a quadratic model can be fit to data by ________ entering the data into a graphing utility and using the regression feature ________________________.

Example 1: Find a model that best fits the data given in the table.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>-1</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>y</td>
<td>8.7</td>
<td>3.45</td>
<td>-5.55</td>
<td>-15.3</td>
<td>-21.3</td>
<td>-20.55</td>
</tr>
</tbody>
</table>

\[ y = 0.25x^2 - 5x + 3.45 \]
III. Choosing a Model (Page 164)

If it isn’t easy to tell from a scatter plot which type of model a set of data would best be modeled by, you should first find several models for the data and then choose the model that best fits the data by comparing the y-values of each model with the actual y-values.

Homework Assignment

Page(s)

Exercises

What you should learn
How to choose a model that best fits a set of data