MATH 1314 College Algebra

Day 6 Sections 2.5, 3.1

Absolute Value Equations and Inequalities

Definition: The Absolute Value Function

Graph

Absolute Value Equations

$|x| = a$ **means**

Examples: Solve for *x*.

(a) $\left|\frac{1}{2}x + 1\right| = 5$

(b) $|5 + 3x| = -3$

(c) $|1 - 2x| \quad 3 = \quad 1$

Solving an equation graphically

Example: Solve $|4 - 2x| = 8$ graphically.

Solving Equations With Two Absolute Values

Example: Solve $|1 + x| = |2x - 5|$

Absolute Value Inequalities

$|x| < a$ **means**

$|x| > a$ **means**

Graphical Interpretation

Examples: Solve for *x* and write your solution using interval notation.

(a) $|4 - x| < 2$

(b) $|3x + 2| \geq 1$

(c) $|2x + 5| \leq -4$

(d) $|x - 3| > -7$

Application: The inequality $|T - 81| \leq 11$ describes the range of monthly average high temperatures in degrees Fahrenheit for Orlando.

(a) Solve the inequality graphically and symbolically

(b) The high and low monthly average temperatures satisfy the absolute value equation $|T - 81| = 11$. Use this fact to interpret the results of part (a).

Dew Point and Altitude p156 # 76

Section 3.1 Quadratic Functions and Models

Form:

Graph (characteristics)

Vertex Form:

Converting to vertex form (completing the square)

Example: Write each quadratic function in vertex form by completing the square

(a) $f(x) = x^2 + 4x - 1$ (b) $f(x) = \frac{1}{2}x^2 - x + 2$

Vertex Formula:

Writing Equations from graphs

Fact: A point lies on the graph of a quadratic if and only if its coordinates satisfy the corresponding quadratic equation

Example: p 183 # 25

Graphing Quadratic Functions by Hand

Example: Graph each quadratic function finding the vertex, axis of symmetry and the *y*-intercept.

(a) $f(x) = -2(x + 1)^2 + 2$

(b) $f(x) = \frac{1}{2}x^2 - 2x$

Applications:

Maximizing Area p 185 # 91

Flight of a Baseball p185 # 87

Suspension Bridge p 186 # 99

Heart Rate (from a table of data) p 186 #102