College Algebra Day 1
Sections 1.1-1.3

1.1 Numbers, Data and Problem Solving

Our Number System

Order of Operations

Example: Evaluate \( \frac{-5^2 - 20 + 4 - 2}{|9-11|^3 + 16 \cdot 2} \) by hand.

Scientific Notation

Example: Evaluate \( \frac{9.8 \times 10^{-6}}{2 \times 10^{-8}} \) by hand and write answer in scientific notation

Problem Solving:

Determining the speed of Earth in mph.

The Volume of a soda can.

Thickness of an object: \( T = \frac{V}{A} \)

\( T \) = thickness of object, \( V \) = volume of object, \( A \) = area of object

Percent Change: \( P = \frac{N-O}{O} \times 100 \)

\( N \) = new amount, \( O \) = old amount, \( P \) = percent change

Example: The University of Tennessee announced an in-state undergraduate tuition increase from $407 to $534 a year. What is the percent increase in tuition?
Example: The flow rate from the BP oil spill in the Gulf of Mexico could be as high as 16,000 cubic meters per day. Suppose the oil has a thickness of 30 centimeters. In one day, how much area does the oil spill cover?

Section 1.2 Visualizing and Graphing Data

One-Variable Data

Example: The height of a person selected at random is shown in the table below:

<table>
<thead>
<tr>
<th>Height (in inches)</th>
<th>60</th>
<th>69</th>
<th>66</th>
<th>72</th>
<th>74</th>
<th>64</th>
</tr>
</thead>
</table>

(a) Find the mean height  
(b) Find the maximum and minimum height  
(c) Find the median and interpret the result

Two-Variable Data

Example: The average annual precipitation by month in Austin, Texas is shown in the table below, where 1 corresponds to January, and so on.

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (inches)</td>
<td>1.89</td>
<td>1.99</td>
<td>2.14</td>
<td>2.51</td>
<td>5.03</td>
<td>3.81</td>
<td>1.97</td>
<td>2.31</td>
<td>2.91</td>
<td>3.97</td>
<td>2.68</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Ordered Pairs of numbers

Relations

Definition:

Domain and Range

Graphing a Relation

Scatterplots

The Distance Formula

Example: Find all points on the x-axis 10 units away from the point (3,4)
Midpoint Formula

Circles
Definition:
Equations of circles:

Example: Write the following equation of a circle in standard form, then determine the center and radius. Sketch a graph

\[ x^2 + y^2 - 4x + 6y - 10 = 0 \]

Example: Find an equation for the circle with a diameter whose endpoints are \((-3, 8)\) and \((4, -2)\). Sketch a graph of this circle

Section 1.3 Functions

Definition:
Domain and Range
Heat-wave handout

Function Notation \( y = f(x) \)

Representations of functions:
Verbal
Numerical
Symbolic
Graphical

Function Workout Handout