Written Homework 2

Due Wednesday, February 4, 2015

1. Determine whether the following functions are one-to-one. Explain why or why not. If a function is one-to-one, give its inverse in the same format that the original function is defined.

   (a) The function given by the following table of values:

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>12</td>
<td>12.7</td>
<td>14.6</td>
<td>16.1</td>
<td>13.2</td>
<td>12.7</td>
</tr>
</tbody>
</table>

   (b) The function whose graph is the following:

   ![Graph](image)

   (c) The function given by the equation:

   \[ f(x) = x^2 - 2x \]

2. Suppose that a ball is thrown in the air such that \( t \) seconds after it’s thrown, it’s height in meters \( h \) is given by the equation

   \[ h(t) = -5t^2 + 3t + 2. \]

   (a) Sketch a graph of the ball’s height with respect to time.
(b) On your graph from part (a), sketch a line whose slope represents the average velocity of the ball from \( t = 0.25 \) seconds to \( t = 0.75 \) seconds. Label your line \( a \).

(c) On the same graph, sketch a line whose slope represents the instantaneous velocity of the ball at \( t = 0.75 \) seconds. Label your line \( i \).

(d) Use a calculator to fill in the following table. Be sure to show your work. Use your results to predict the instantaneous velocity at \( t = 0.75 \) seconds.

<table>
<thead>
<tr>
<th>( t ) (seconds)</th>
<th>Average velocity between ( t ) and 0.75 seconds (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>0.749</td>
<td></td>
</tr>
<tr>
<td>0.7499</td>
<td></td>
</tr>
</tbody>
</table>