1. Discuss the four ways of representing a function by using a specific example of your choice (pg. 77, number 2)

2. For the graph given on page 22, number 10. On what interval(s) is it increasing? Decreasing? Constant?

3. State the domain of the function \( f(x) = \frac{1}{\sqrt{x-5}} \) (similar to 1.1, numbers 29-40)

4. Classify the function \( f(x) = \sqrt{x^2+1} \), and state if it is transcendental or algebraic (1.2, numbers 1-2)

5. The cost of commuting to school depends on the number of credits you take during a semester. One semester you took 12 credits and it cost $480, and another semester you took 9 credits and it cost $320.
   a. Assuming a linear relationship exists between them, express cost as a function of credits
   b. What does the slope of this line represent?
   c. What does the \( y \)-intercept of this function represent?
   d. What is a drawback of this linear model?
   (similar to 1.2, number 14)

6. For \( f(x) = \frac{1}{x+2} \) and \( g(x) = x^2 + 3 \), find \( f \circ g(x) \) and its domain (1.3, numbers 35-40)

7. Does the following set of data seem well represented with an exponential function? If so, what would it be (in the form \( y = kb^t \))?

<table>
<thead>
<tr>
<th>( t )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>1</td>
<td>-1.2</td>
</tr>
<tr>
<td>2</td>
<td>-1.44</td>
</tr>
<tr>
<td>3</td>
<td>-1.728</td>
</tr>
<tr>
<td>4</td>
<td>-2.074</td>
</tr>
<tr>
<td>5</td>
<td>-2.488</td>
</tr>
</tbody>
</table>
8. The bacteria E-coli has a doubling time of 20 minutes. If there are initially 2 cells on the counter at 8pm and you leave them overnight because you don’t properly clean, how many will be there the next morning, 10 hours later? (HINT: you must first find the equation for the number of cells at any time). It has been shown that as few as 10 cells can make you sick. What time will there be enough cells present to make you sick?

9. For \( f(x) = 2^x \), show that \( \frac{f(x+h) - f(x)}{h} = 2^x \left( \frac{2^h - 1}{h} \right) \) (1.5, number 19)

10. How do you test if a graph is a function? Describe how this works, using the definition of a function.

11. How do you test if a function is one-to-one? Describe how this works, using the definition of one-to-one.

12. For the function \( f(x) = \ln(x-2) \)
   a. What is the domain and range of \( f(x) \)?
   b. What is the inverse of \( f(x) \)?
   c. What is the domain and range of the inverse of \( f(x) \)
   d. Prove your inverse is correct by taking the composition (Section 1.6)

13. Find the exact value of \( \ln(e^{\sqrt{2}}) \) (1.6, problems 35-38)

14. Solve the equation for \( x \), and show your solution is correct. \( e^{-x} = 5 \) (1.6, problems 49-52)

15. Solve the equation for \( x \), and show your solution is correct. \( \ln(\ln x) = 1 \) (1.6, problems 49-52)