Reading Questions for Section 3.1

Name ____________________________

Due Date: _________________________

Bring this completed sheet with you to class on the due date to be handed in at the very beginning of the period.

1. Carefully read the first two sentences of Section 3.1 and complete the blanks:
   Exponential functions change at a constant _____________,
   while linear functions change at a constant _____________.

2. Notice in Example 1 how the salary is computed from the previous year's salary.
   Then give the salary for Year 5 (accurate to two decimal places.). ____________________

3. For the salary function in Example 1, give the **annual growth *factor*:** __________

4. For the salary function in Example 1, give the **annual growth *rate*:** __________

5. Circle True or False: The text reports the **growth factor per millenium** of the carbon-14 function from Example 3 as 0.886, even though it is decreasing.
   - o True
   - o False

6. On page 110, suppose there was a row for $t = 4$ years in Table 3.4.
   Would the salary be equivalent to 40,000(1.06)(1.06)(1.06)(1.06)?
   - o Yes
   - o No

7. The blue box on page 110 is VERY important. Read it carefully.
   Which of these represents the **growth factor**? (Circle ONE)
   - o a
   - o b
   - o t
   - o $f(t)$
   - o r

8. In Section 3.1, which of these functions are concave up? (Select **ALL** correct answers.
   - o The salary function in Example 1
   - o The population of Mexico in Example 2
   - o The amount of carbon-14 remaining in Example 3
   - o The Yonkers fine in Example 8.

9. In Example 8, suppose the fine started out at $100 but **tripled** every day instead of *doubled*.
   What would then be the formula in part (b)? _________________

Reading Questions for Section 3.2

Name ____________________________

Due Date: _________________________

Bring this completed sheet with you to class on the due date to be handed in at the beginning of the period.

1. The box on page 115 (and discussion preceding it) is important.
   Complete the blanks below, using any of the words in this list: **sum**, **difference**, **product**, **ratio**
   For linear functions, the _____________ of consecutive *y*-values is constant.
   For exponential functions, the _____________ of consecutive *y*-values is constant.

The data in Table 3.7 on page 115 given in the text is shown. Answer Questions 2-5 about these functions.

x	$f(x)$
20	30
25	45
30	60
35	75

x	$g(x)$
20	1000
25	1200
30	1440
35	1728

2. One of these functions is linear and the other is exponential.
   Select which of the following are true. (Select **ALL** correct answers.)
   - o $f(x)$ is linear
   - o $f(x)$ is exponential
   - o $g(x)$ is linear
   - o $g(x)$ is exponential

3. True or False: The formula for $f(x)$ is not shown in the text, but it would be $f(x) = 3x - 30$.
   Hint: you can check this with a graphing calculator.

4. True or False: The formula for g is $g(x) = 1000(1.2)^x$.

5. In the text, when finding the formula for the exponential function, they solve $b^5 = 1.2$.
   How do they do this? (Select ONE)
   - o divide both sides by 5
   - o multiply both sides by 1/5
   - o raise each side to the 1/5 power
   - o take 5th roots of both sides

6. Pay careful attention to the middle of page 117, **Similarities and Differences between Linear and Exponential Functions,** and how the text finds the parameters m and b for a linear function $y = b + mx$ and the parameters a and b for an exponential function $y = ab^x$ when given two points through which they pass. The value of b in the linear function and the value of a in the exponential function give the *starting value*. What does the text mean by the **starting value**? Select **ALL** correct answers.
   - o the value of y when $x = 0$.
   - o the value of x when $y = 0$.
   - o the first entry in the table
   - o the x-intercept
   - o the y-intercept

7. Read Example 3 thoroughly, produce the graphs on your calculator in appropriate windows, and find the intersection points that they do. For part (c), the text showed that the intersection point occurred when t was about 102 years (found using the intersection feature shown in class last week). What is this value of t, accurate to 4 decimal places? 102. __ __ __ __

Reading Questions for Section 3.3

Name ____________________________
Due Date: _________________________

Bring this completed sheet with you to class on the due date to be handed in at the beginning of the period.

1. The word *parameter* is first introduced in Section 1.5 on page 35.
   Which is true about the parameter b for the exponential function $y = ab^x$? (Select **ALL** possible answers)
   - o It is the growth factor.
   - o It is the average rate of change.
   - o It determines whether the graph is increasing or decreasing
   - o It affects how steep the graph climbs or falls.

2. For the exponential function $y = ab^x$, what does the parameter a tell you?

3. The definition of a **horizontal asymptote** is given in this section in the blue box on page 124.
   Read this blue box, and the discussion preceding it, about the horizontal line $Q = 0$.
   Then complete the boxes below.
   What notation is used to indicate values of x which become large and **negative**? $x \to$ ☐

   What notation is used to indicate values of x which become large and **positive**? $x \to$ ☐

4. Examples 2 and 3 show how to solve exponential functions graphically.
   After you read these examples, solve the equation $2300(1.12)^t = 10^6$ graphically.
   Report the solution accurate to two decimal places: ___ ___ . ___ ___

Reading Questions for Sections 3.4 and 3.5 Name ____________________________
Due Date: _________________________

Bring this completed sheet with you to class on the due date to be handed in at the beginning of the period.

1. Examine the functions P, Q, and R in Section 3.4 Example 1 written in the form $P = ae^{kt}$.
   a. For the function P, what is the value of k? _____
      Is P increasing or decreasing? _____________
   b. For the function Q, what is the value of k? _____
      Is Q increasing or decreasing? _____________
   c. For the function R, what is the value of k? _____
      Is R increasing or decreasing? _____________

2. Each of the functions P, Q, and R in Section 3.4 Example 1 can be written in the form $a(b)^t$ for some numbers a and b. If so, what would be the value of a? _______

3. Each of the functions P, Q, and R in Section 3.4 Example 1 can be written in the form $a(b)^t$ for some numbers a and b.
   Give the value of b for $P = 5e^{0.3t}$ (round to two decimal places)_________
   Give the value of b for $Q = 5e^{0.2t}$ (round to two decimal places)_________
   Give the value of b for $R = 5e^{-0.2t}$ (round to two decimal places)_________

4. Suppose each of the functions P, Q, and R in Section 3.4 Example 1 represented populations of different countries (in millions), where t is given in years.
   For $P = 5e^{0.3t}$ the population grows at an annual rate of _____________% per year
   and at a continuous rate of _____________% per year.
   For $Q = 5e^{0.2t}$ the population grows at an annual rate of _____________% per year
   and at a continuous rate of _____________% per year.
   For $R = 5e^{-0.2t}$ the population decreases at an annual rate of _____________% per year
   and at a continuous rate of _____________% per year.

5. Suppose **Account A** pays 52% interest once per year. (OK, use your imagination.)
   Account B pays 1% interest every week. (Note there are 52 weeks in a year.)
   Without a calculator, decide which account is better after 1 year.
   o Account A
   o Account B
   o Both the same.