

**Reading Questions for Section 8.1** (17 pts) Name \_\_\_\_\_ Due Date: \_\_\_\_\_

Read Example 1 of Section 8.1. Similar tables are below, corresponding to another therapeutic drug.

*Drug level,  $Q = d(t)$ , (milligrams) as a function of time,  $t$ , (hours) since the medication was given.*

$t$ , time (hours)	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
$Q$ , drug level (mg)	<b>250</b>	<b>150</b>	<b>90</b>	54

*Heart rate,  $r = c(Q)$ , as a function of drug level,  $Q$*

$Q$ , drug level (mg)	0	50	100	<b>150</b>	200	<b>250</b>
$r$ , heart rate (beats per minute)	60	85	110	<b>135</b>	160	<b>185</b>

Complete the blanks:

- (2) 1. At the time  $t = 0$ , since the drug level is  $Q =$  \_\_\_\_\_ mg, the patient's heart rate will be  $r =$  \_\_\_\_\_.
- (2) 2. At the time  $t = 1$ , since the drug level is  $Q =$  \_\_\_\_\_ mg, the patient's heart rate will be  $r =$  \_\_\_\_\_.
- (1) 3. The heart rate,  $r$ , is a function of time,  $t$ , in hours since the last dose was given. Suppose  $r = h(t)$ . Which is true?
- A.  $r = h(t) = c(t) \cdot d(t)$
- B.  $r = h(t) = d(c(t))$
- C.  $r = h(t) = c(d(t))$
- (1) 4. It can be shown that when the drug level is  $Q = 90$  mg, the patient's heart rate will be  $r = 105$ ; thus we have  $r = c(90) = 105$ . What does this tell you about the value of  $h(2)$ ?  $h(2) =$  \_\_\_\_\_.
- (1) 5. Circle **ALL** correct answers.
- A.  $d$  is linear.
- B.  $d$  is exponential.
- C.  $c$  is linear.
- D.  $c$  is exponential.
- (2) 6. Construct a formula for  $Q = d(t)$ . **SHOW WORK.** Review Section 3.2 if you need help. Use the table feature of a graphing calculator to check that your formula match the table above.

$$Q = d(t) = \underline{\hspace{2cm}}$$

- (2) 7. Construct a formula for  $r = c(Q)$ . **SHOW WORK.** Review Section 3.2 if you need help. Use the table feature of a graphing calculator to check that your formula match the table above.

$$r = c(Q) = \underline{\hspace{2cm}}$$

- (2) 8. Use your formula in Question 7 to find  $c(54)$ .  $c(54) =$  \_\_\_\_\_  
 What does this tell you about  $h(3)$ ?  $h(3) =$  \_\_\_\_\_

- (4) Use your answers to the above questions to complete the table.

*Heart rate,  $r = h(t)$ , as a function of time,  $t$ , since the medication was given*

$t$ , time (hours)	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
$r$ , heart rate (beats per minute)				

**BONUS (+3):** Construct a formula for  $r = h(t)$ .  $r = h(t) =$  \_\_\_\_\_  
 Use the table feature of a graphing calculator to check that your formula match the table above.