

Name: SOLUTIONS

Sec. 2.1 - Tangent and velocity problems

Math 251 – Fall 2018

Section 2.1

$t$ (mins)	36	38	40	42	44
Heartbeats	2530	2661	2806	2948	3080

1. A cardiac monitor is used to measure the heart rate of a patient after surgery. It compiles the number of heartbeats after  $t$  minutes. When the data in the table is graphed the tangent line represents the heart rate in beats per minute. Use the data to estimate the patient's heart rate after 42 minutes using the secant line between the points with the given values of  $t$

- (a)  $t = 36$  and  $t = 42$

$$\frac{2948 - 2530}{42 - 36} = \frac{418}{6} \approx 69.67 \text{ beats/min}$$

- (b)  $t = 38$  and  $t = 42$

$$\frac{2948 - 2661}{42 - 38} = \frac{287}{4} = 71.75 \text{ beats/min}$$

- (c)  $t = 40$  and  $t = 42$

$$\frac{2948 - 2806}{42 - 40} = \frac{142}{2} = 71 \text{ beats/min}$$

- (d)  $t = 42$  and  $t = 44$ .

$$\frac{3080 - 2948}{44 - 42} = 66 \text{ beats/min}$$

What are your conclusions?

The patient's heart rate is decreasing from about 71 to 66 heart beats/min after 42 minutes.