## 2.3 Estimating Derivatives

**CA #1**

Calculus Name: _____

**Estimate the derivative at the given point by using a calculator.**

1. $f(x) = \sin(\cos x)$; find $f'(6)$.

2. $f(x) = x\ln(2-x)$; find $f'(-3)$.

3. The model $f(t) = t^{50} - t^{31}$ measures the number of bacteria in a petri dish where $t$ is measured in hours. Find $f'(1.6)$.

**For each function, write the equation of the tangent line at the given value of $x$.**

4. $f(x) = x\sqrt{7-x}$ at $x = -2$.

5. $f(x) = \frac{4x}{\ln x}$ at $x = 4.7$.

**Use the tables to estimate the value of the derivative at the given point. Indicate units of measures.**

6.

| $t$ hours | 0 | 1 | 4 | 6 | 10 |
|---|---|---|---|---|---|
| $s(t)$ skiers | 0 | 320 | 2018 | 2305 | 260 |

a. $s'(2.5)$

b. $s'(5)$

7.

| $s$ Attempts | 3 | 8 | 16 | 20 | 25 |
|---|---|---|---|---|---|
| $f(s)$ Made shots | 1 | 7 | 10 | 13 | 15 |

a. $f'(12)$

b. $f'(18)$

8.

| $t$ hours | 1 | 3 | 9 | 12 | 18 |
|---|---|---|---|---|---|
| $v(t)$ miles per hour | 184 | 160 | 194 | 201 | 186 |

a. $v'(15)$

b. $v'(10.5)$

Answers to 2.3 CA #1

| | | | | |
|---|---|---|---|---|
| 1. 0.160 | 2. 2.209 | 3. $5.022 \times 10^{11}$ bacteria per hour | 4. $y + 6 = 3.333(x+2)$ | 5. $y - 12.148 = 0.9145(x-4.7)$ |
| 6. a. 566 skiers / hr<br>b. 143.5 skiers / hr | | | 7. a. 0.375 made shots per attempt<br>b. 0.75 made shots per attempt | 8. a. $-2.5$ miles/hr$^2$<br>b. 2.333 miles/hr$^2$ |