9.3 Arc Length (Parametric Form)

Calculus Name: _____ **CA #1**

What is the length of the curve defined by the parametric equations? Solve without the use of a calculator.

1. $x(t) = 7t + 1$ and $y(t) = 3 - 6t$ for the interval $-1 \le t \le 3$.

2. $x(t) = 4at^2$ and $y(t) = 4bt^2$, where a and b are constants. What is the length of the curve from $t = 0$ to $t = 1$?

3. $x(t) = 9\cos\theta$ and $y(t) = 9\sin\theta$ for the interval $0 \le \theta \le \frac{\pi}{2}$.

4. $x(\theta) = \cos\theta + \theta\sin\theta$ and $y(\theta) = \sin\theta - \theta\cos\theta$ on the interval $0 \le \theta \le \pi$.

5. Which of the following gives the length of the path described by the parametric equations $x = e^{2t}$ and $y = 1 - 2t$ from $0 \le t \le 3$?

A. $\int_0^3 \sqrt{4e^{2t} + 4}\, dt$

B. $\int_0^3 \sqrt{2e^{2t} + 2}\, dt$

C. $\int_0^3 \sqrt{4e^{4t} + 4}\, dt$

D. $\int_0^3 \sqrt{e^{4t} + 4}\, dt$

Answers to 9.3 CA #1

1. $4\sqrt{85}$	2. $4\sqrt{a^2 + b^2}$	3. $\frac{9\pi}{2}$	4. $\frac{\pi^2}{2}$	5. C