9.3 Arc Length (Parametric Form)

Calculus Name: _____ **CA #2**

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

1. $x(t) = 5t + 3$ and $y(t) = 2 - 7t$ for the interval $0 \le t \le 4$.

2. $x(t) = \frac{a}{3}t^2$ and $y(t) = \frac{b}{3}t^2$, where a and b are constants. What is the length of the curve from $t = 0$ to $t = 1$?

3. $x(\theta) = 6\cos\theta$ and $y(\theta) = 6\sin\theta$ for the interval $0 \le \theta \le \frac{3\pi}{2}$.

4. $x(t) = 2\cos 3t$ and $y(t) = 2\sin 3t$ on the interval $0 \le t \le 2\pi$.

5. Which of the following gives the length of the path described by the parametric equations $x = \ln t$ and $y = 1 + 3t$ from $1 \le t \le 3$?

A. $\int_1^3 \sqrt{\frac{1+9t^2}{t}}\,dt$

B. $\int_1^3 \sqrt{\frac{1+3t^2}{t^2}}\,dt$

C. $\int_1^3 \sqrt{\frac{1+9t^2}{t^2}}\,dt$

D. $\int_1^3 \sqrt{(\ln t)^2 + (1+3t)^2}\,dt$

Answers to 9.3 CA #2

1. $4\sqrt{74}$	2. $\frac{1}{3}\sqrt{a^2+b^2}$	3. 9π	4. 12π	5. C