DATE: _____

Arc Length Practice

1. The length of the curve $y = \ln(\sec x)$ from $x = 0$ to $x = b$, where $0 < b < \frac{\pi}{2}$, may be expressed by which of the following integrals?

   (A) $\int_0^b \sec x \, dx$

   (B) $\int_0^b \sec^2 x \, dx$

   (C) $\int_0^b (\sec x \tan x) \, dx$

   (D) $\int_0^b \sqrt{1 + (\ln(\sec(x))^2} \, dx$

   (E) $\int_0^b \sqrt{1 + (\sec^2 x \tan^2 x)} \, dx$

2. The length of the curve $y = x^3$ from $x = 0$ to $x = 2$ is given by:

   (A) $\int_0^2 \sqrt{1 + x^6} \, dx$

   (B) $\int_0^2 \sqrt{1 + 3x^2} \, dx$

   (C) $\pi \int_0^2 \sqrt{1 + 9x^4} \, dx$

   (D) $2\pi \int_0^2 \sqrt{1 + 9x^4} \, dx$

   (E) $\int_0^2 \sqrt{1 + 9x^4} \, dx$

3. What is the length of the arc of $y = \frac{2}{3}x^{3/2}$ from $x = 0$ to $x = 3$?

   (A) $\frac{8}{3}$

   (B) 4

   (C) $\frac{14}{3}$

   (D) $\frac{16}{3}$

   (E) 7

4. The length of a curve from $x = 1$ to $x = 4$ is given by $\int_1^4 \sqrt{1 + 9x^4} \, dx$. If the curve contains the point (1,6), which of the following could be an equation for this curve?

   (A) $y = 3 + 3x^2$

   (B) $y = 5 + x^3$

   (C) $y = 6 + x^3$

   (D) $y = 6 - x^3$

   (E) $y = \frac{16}{5} + x + \frac{9}{5}x^5$

5. Find the exact length of the given curve $y = x^{3/2}$ from $x = 0$ to $x = 3$.

6. Find the exact length of the given curve $y = \frac{3}{4}x^{4/3} - \frac{3}{8}x^{2/3}$ from $x = 1$ to $x = 8$.

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7. Let R be the region bounded by the graphs of $y = \sin(\pi x)$ and $y = x^3 - 4x$ on [0,2]. Find the perimeter of the region R.