

Solutions

Each answer shows the steps, then the **result**.

2.1

- $L = \int_a^b \sqrt{1 + (f'(x))^2} dx$

2.2

- $f'(x) = x^{1/2}; (f'(x))^2 = x$

2.3

- $f'(x) = 2x$, so $L = \int_0^2 \sqrt{1 + 4x^2} dx$

3.1 B

- arc length integrates $\sqrt{1 + (f')^2}$

3.2

(a)

- $f'(x) = x^{1/2}$, so $L = \int_0^3 \sqrt{1 + x} dx$

(b)

- $\left[\frac{2}{3}(1+x)^{3/2}\right]_0^3 = \frac{2}{3}(8-1) = \frac{14}{3}$

3.3

- $f'(x) = -\tan x$, so $1+(f')^2 = 1+\tan^2 x = \sec^2 x$; $L = \int_0^{\pi/4} \sqrt{\sec^2 x} dx = \int_0^{\pi/4} \sec x dx$