

Problem Set 87

2a. $x = 1$

b. maximum: $\left(1, \frac{1}{e}\right)$

c. $x = 2$

4a. 6.389 sec

b. 255.551 m

6. $2\pi \int_0^{\pi/4} x \tan x \, dx$

8. $24\pi \text{ units}^3$

10. $2L$

12. No. The function is neither defined nor continuous at $x = 1$.

14. No. The function is not differentiable at $x = 0$.

16. $\frac{f'(x)}{f(x)} = -\frac{9}{2(x-1)} + \cot x - \frac{300x^2}{x^3 + 1}$

18. $\arctan \frac{x}{4} + 2\ln(x^2 + 16) + C$

20. $\frac{99}{10 \ln 10} \text{ units}^2$

22a. $x = y^3 + y$

b. $f^{-1}(2) = 1$

24. D