Practice 4.1: Arc Lengths & Parametrics Review

Part 1: Write the corresponding rectangular equation by eliminating the parameter, then sketch the curve represented by the parametric equations.

1) $x = 3t - 1, \quad y = 2t + 1$

2) $x = t + 1, \quad y = t^2$

3) $x = t^3, \quad y = \frac{t^2}{2}$

4) $x = \sqrt{t}, \quad y = t - 2$

5) $x = t - 1, \quad y = \frac{t}{t-1}$

6) $x = 2t, \quad y = |t - 2|$

7) $x = e^t, \quad y = e^{3t} + 1$

8) $x = \sec\theta, \quad y = \cos\theta$

9) $x = 3\cos\theta, \quad y = 3\sin\theta$

10) $x = 4\sin 2\theta, \quad y = 2\cos 2\theta$

11) $x = 4 + 2\cos\theta, \quad y = -1 + \sin\theta$

12) $x = 4 + 2\cos\theta, \quad y = -1 + 4\sin\theta$

13) $x = 4\sec\theta, \quad y = 3\tan\theta$

14) $x = t^3, \quad y = 3\ln t$

15) $x = e^{-t}, \quad y = e^{3t}$

Part 2: Find the arc length of the graph of the function over the indicated interval.

16) $y = \frac{x^5}{10} + \frac{1}{6x^3}, \ [1, 2]$

17) $y = \ln(\sin x), \ \left[\frac{\pi}{4}, \frac{3\pi}{4}\right]$

18) $y = \frac{1}{2}(e^x + e^{-x}), \ [0, 2]$