Math 122 - #29
Parametric Equations Arc Length

Find the arc length of the given curve on the indicated interval:

1. $x = t^2 \qquad y = 2t^2 - 1 \qquad 1 \le t \le 4.$

2. $x = e^{-t}\cos t, \quad y = e^{-t}\sin t, \quad 0 \le t \le \pi/2$

3. $x = t^2, \quad y = 4t^3 - 1, \quad -1 \le t \le 1$

4. $x = \arcsin t, \quad y = \ln\sqrt{1-t^2}, \quad 0 \le t \le 1/2$

5. $x = a(t - \sin t) \qquad y = a(1 - \cos t) \qquad 0 \le t \le \pi$

Find the speed s at time t for:

6. $c(t) = (3\cos 5t, 8\cos 5t)$ at $t = \frac{\pi}{4}$

7. $c(t) = (\ln(t^2+1), t^3)$ at $t = 1$

Answers

1. $15\sqrt{5}$

2. $\sqrt{2}(1 - e^{-\pi/2})$

3. $\frac{1}{27}(37\sqrt{37} - 1)$

4. $\frac{1}{2}\ln 3$

5. $4a$

6. 30.21

7. 3.16