

$$451 \quad I = \int_c \sqrt{2y} \, ds = f(x,y)$$

19.4.

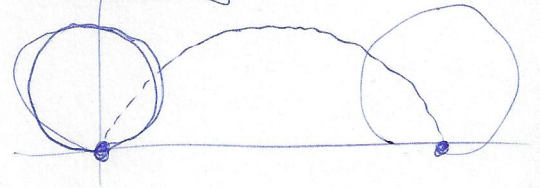
$c$ : oblong cycloid

$$R=1$$

P:

$$x = R(1 - \sin t) \quad t \in (0, 2\pi)$$

$$y = R(1 - \cos t)$$



$$P: \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 - \sin t \\ 1 - \cos t \end{pmatrix}$$

$$\dot{P} = \begin{pmatrix} 1 - \cos t \\ \sin t \end{pmatrix}$$

$$\|\dot{P}\| = \sqrt{1 - 2\cos t + 1} = \sqrt{2 - 2\cos t}$$

$$f(t) = \sqrt{2 - 2\cos t}$$

$$I = \int_0^{2\pi} \sqrt{2 - 2\cos(t)} \sqrt{2 - 2\cos(t)} \, dt = \int_0^{2\pi} 2(1 - \cos t) \, dt =$$

$$= 4\pi - 2 \left[ \sin t \right]_0^{2\pi} = \underline{\underline{4\pi}}$$

$= 0$