MATH 223

Some Hints and Answers for Assignment 28

Exercises 17ace, 18ad, 19a, 20, and 21 of Chapter 7.

28abcd: Hint: Review properties of the natural logarithm function.

(a) Use parametrization $\mathbf{g}(t) = (t, t^2)$

(c) $\mathbf{g}(t) = (t, e^{2t}$.

(e) $\pi/2$.

18ad:

(a) $\mathcal{L}(\gamma) = \int_1^3 \frac{\sqrt{4+9t^{2/3}}}{3t^{1/3}}\, dt$ Use $u = 4 + 9t^{2/3}$ as change of variable.

(d) $\mathcal{L}(\gamma) = \int_0^{\frac{\pi}{2}} 2\cos\frac{t}{2}\, dt = 2\sqrt{2}$. *Solution*

19a: The curve is the circle of radius 3, centered at origin with $x = 3\cos t, y = 3\sin t$. Show $\mathbf{F}(x, y) = \big(-frac13\sin t, \frac{1}{3}\cos t\big)$. The winding number is 1.

20: Let $\mathbf{g}(t) = (t, f(t))$.

21: $\mathbf{g}(\theta) = (f(\theta)\cos\theta, f(\theta)\sin\theta)$ with θ as the parameter.