

Multiple choice problems for sections 11.3, 11.4, 12.1

Spring 2007, Math 104.

Credit is given only if you choose the correct answer *and* show supporting work.

1. Find the length of the spiral

$$r = 4\theta$$

for the values $0 \leq \theta \leq 2\pi$.

A.) $4\pi\sqrt{4\pi^2 + 1} + 2 \ln(2\pi + \sqrt{4\pi^2 + 1})$

B.) $\arctan 1 + \frac{\pi+1}{\pi-1}$

C.) $\frac{\sqrt{5}}{2}(e^{2\pi} - 1)$

D.) 6π

E.) 12π

F.) 12

2. Sketch the polar curve,

$$r = 2 + 4 \sin \theta.$$

This curve intersects itself at the origin, and consists of a smaller loop inside a larger loop. Find the area of the region inside the smaller loop.

- A.) $\frac{1}{3}$ B.) $2\pi - 6$ C.) $3\pi - 6\sqrt{2}$ D.) $\frac{5}{6}\pi$ E.) $4\pi - 6\sqrt{3}$ F.) $\frac{1}{4}\pi$

3. Find the limit of the sequence

$$\lim_{n \rightarrow \infty} \frac{6n + 24\sqrt{n}}{\sqrt{4n^2 + 3n}}.$$

- A.) $\frac{3}{2}$ B.) 2 C.) 3 D.) 4 E.) 6 F.) The sequence diverges.