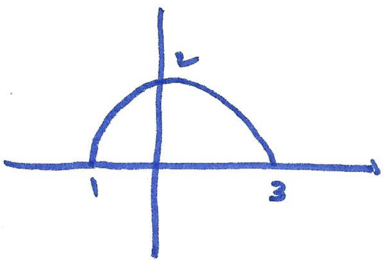
ClassWork 16

Names: Sols

Sketch the curve given by r=2+cos (θ). Find the area of the region enclosed by the curve and the x-axis.



$$\frac{1}{2}\int_0^{\pi} (4+4\cos\theta+\cos^2\theta)\, d\theta =$$

$$= \frac{1}{2}\left[4\theta+4\sin\theta+\frac{1}{2}\theta+\frac{1}{4}\sin 2\theta\right]_0^{\pi} = \frac{9\pi}{4}$$

Find the exact length of r= cos (θ) with $0 \le \theta \le \pi$.

$$\int_0^{\pi} \sqrt{r^2+\left(\frac{dr}{d\theta}\right)^2}\, d\theta = \int_0^{\pi} \sqrt{\cos^2\theta+\sin^2\theta}\, d\theta = \pi$$

Write the sequence of partial sums generated by the sequence $\left\{\cos\frac{n\pi}{2}\right\}_n$.

$\left\{\cos\frac{n\pi}{2}\right\}_{n=1,2\ldots}$ $\quad$ $0, -1, 0, 1, 0, -1, 0, 1, \ldots$

$S_1 = 0$ $\quad$ $S_4 = 0$

$S_2 = -1$ $\quad$ $S_5 = 0$

$S_3 = -1$

$0, -1, -1, 0, 0, -1, -1, 0, \ldots$

Is the series $\sum_{n=1}^{\infty} [\ln(n^3+2n+1) - \ln(2n^3+n)]$ convergent or divergent? Explain your answer.

$$\lim_{n\to\infty} \ln\frac{n^3+2n+1}{2n^3+n} = -\ln 2 \neq 0$$

$$\sum_{1}^{\infty}\left[\ln(n^3+2n+1) - \ln(2n^3+n)\right] \text{ divergent.}$$