

Mathematics V1208y
Honors Mathematics B

Assignment #9

Due April 2, 2010

No reading this week.

1. Apostol §8.17 (pp. 268–9) *12.

Hint: compose with a suitable curve and use the chain rule.

2. Apostol §8.22 (pp. 275–7) *3ab (and evaluate explicitly for $X(s, t) = s+t$, $Y(s, t) = st$, and $f(x, y) = e^{x-y}$), 8, 9, *14, 15.

3. Apostol §8.24 (pp. 281–2) *1, 2, *3, *4, *12a, *13.

Hint for 13: you may use the fact, asserted in class and in Figure 8.8, that for any scalar field $f : \mathbb{R}^3 \rightarrow \mathbb{R}$, its gradient vectors $\nabla f(x, y, z)$ are perpendicular to the tangent planes of its level surfaces $f(x, y, z) = c$. We will speak more rigorously about surfaces and tangent planes in the future.