

MAT 397 — FALL 2007 — CHAPTER 16 REVIEW ANSWERS

1. Sketches omitted.
2. They are all conservative (and no, you can always add a constant to a potential function to get another one). Here are some potential functions.
 - (a) $\frac{1}{2}(x^2 + y^2)$
 - (b) $x + e^y$
 - (c) $\frac{1}{4}(x^4 + 8xy - y^4)$
 - (d) $x + x^2y + \ln x$
 - (e) $x^2 \sin(5y)$
 - (f) ze^{-xy}
3. There is more than one right answer for each of these.
 - (a) $\vec{r}(t) = \langle -2 + 3t, -1 + 3t \rangle$ for $0 \leq t \leq 1$
 - (b) $\vec{r}_1(t) = \langle \cos t, \sin t \rangle$ for $0 \leq t \leq \pi$ and $\vec{r}_2(t) = \langle -1 - t, 3t \rangle$ for $0 \leq t \leq 1$
 - (c) $\vec{r}(t) = \langle -t, t^2 - 1 \rangle$ for $-1 \leq t \leq 1$
4.
 - (a) $\frac{1}{12}(17\sqrt{17} - 1)$
 - (b) $8192/5$
 - (c) $-16 + \frac{2}{27}(10\sqrt{10} - 1) + 8.$
 - (d) $-3\sqrt{10}\pi$
5.
 - (a) $\frac{464}{5} + 9\ln 3$
 - (b) $7/6$
 - (c) $-7/6$
 - (d) $8\pi^4.$
6.
 - (a) $3\pi + \frac{2}{3}$
 - (b) $11/12 - 4/e$
 - (c) 1
7.
 - (a) 77
 - (b) 0
 - (c) $-2e$
8.
 - (a) $2/3$
 - (b) 24π
 - (c) -8π