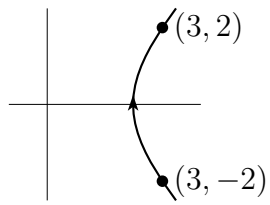
MATHEMATICS 317 December 2001 Final Exam Answers

1. (a) 8 (b) $\frac{1}{8}$ (c) $-\frac{16}{5}(3^5 - 1) \approx -774.4$ (d) $\mathbf{a}(t) = -\frac{9}{8}\hat{\mathbf{k}}$

2. (a) The field line is $x^2 = y^2 + 5$



   (b) 12

3. $A = -2$

4. For the two possible orientations of C, $\oint_C \mathbf{F} \cdot d\mathbf{r} = \mp 4\pi$. For the standard orientation of C, $\oint_C \mathbf{F} \cdot d\mathbf{r} = 4\pi$.

5. $\iint_S \nabla \times \mathbf{F} \cdot \hat{\mathbf{n}} \, \mathrm{d}S = 2\pi$

6. (a) $\oint_C \mathbf{F} \cdot d\mathbf{r} = -\pi$ (b) $\oint_{C_0} \mathbf{F} \cdot d\mathbf{r} = \oint_C \mathbf{F} \cdot d\mathbf{r}$