

MATHEMATICS 317 April 2004 Final Exam Answers

1. (a) 8 (b) $\hat{\mathbf{T}}(1) = \frac{1}{\sqrt{2}}(1, 1, 0)$, $\hat{\mathbf{N}}(1) = (0, 0, -1)$ (c) $\kappa(1) = \frac{1}{8}$
2. (a) True (b) False
3. (a) $\alpha = \beta = -1$ (b) Any function of the form $g(x, y, z) = xyz + w(z)$ will work.
4. See the solution.
5. $A = \frac{3\pi}{8}$
6. (a) $\nabla \cdot \mathbf{F} = 0$ (b) $\frac{625}{2}\pi$
7. $\oint \mathbf{F} \cdot d\mathbf{r} = \sqrt{2}\pi$