

MATH 324 C – EXAM I Answers
Autumn 2012

1. $m = \frac{1}{12}(17^{3/2} - 1) + 8 + 6\sqrt{5}$

2. (5 points each)

(a) $-\frac{4}{3} - \frac{\pi}{2} + e$

(b) $\frac{260}{3}$

3. (5 points each)

(a) $f(x, y, z) = \frac{1}{4}x^4 - \frac{3}{2}x^2y^2 + \frac{1}{4}y^4 + 15z^2$

(b) $15\pi^2$

4. (a) (7 points) $\nabla T(3, 2) = \left\langle \frac{3}{2}, -\frac{1}{8} \right\rangle$

(b) (3 points) $\frac{\sqrt{145}}{8}$ degrees Celcius per centimeter

5. (a) i. (3 points) any point whose z -coordinate is -2

ii. (2 points) NO! The divergence of \mathbf{F} is not 0.

(b) (3 points) Any parameterization of the plane $-2x + 4y - z = 3$ will suffice. Here are a few: $\mathbf{r}(u, v) = \langle u + 2v, 1 + u + v, 1 + 2u \rangle$, $\mathbf{r}(u, v) = \langle u + 2v, 1 + 2u + 2v, 1 + 3u + v \rangle$, or $\mathbf{r}(u, v) = \langle u, v, -2u + 4v - 3 \rangle$.

(c) (2 points) -5