

Math 392 Quiz 5A

July 9, 2019

Name: _____

Instructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

In this quiz, the less shorthand the better. For example, when writing a formula for which you need a normal vector \vec{n} , don't just write " \vec{n} ", but rather the formula used to find it. Everything is positively oriented.

1. Let S_1 be a surface given by $z = g(x, y)$. Find a formula for a normal vector \vec{n}_1 to S_1 : $\vec{n}_1 =$ _____

2. Let S_2 be a surface parametrized by $\vec{r}(s, t)$. Find a formula for a normal vector \vec{n}_2 to S_2 : $\vec{n}_2 =$ _____

3. For S_1 above, define $\iint_{S_1} \vec{F}(x, y, z) \cdot d\vec{S} =$ _____

4. For S_2 above, define $\iint_{S_2} \vec{F}(x, y, z) \cdot d\vec{S} =$ _____

5. State the equation in Stokes' Theorem: _____

6. Describe what the symbols above are and how they relate to each other: _____

7. State the equation in the Divergence Theorem: _____

8. Describe what the symbols above are and how they relate to each other: _____

9. Let $\vec{F} = \langle x, y, xyz \rangle$. Let S be the part of $z = x^2 + y^2$ that is below $z = 4$. Let C be the boundary curve of S . Fully set-up two integrals to compute the work done by \vec{F} in moving a particle around C counter-clockwise.

(a) Line integral: _____

(b) Double integral: _____

10. Let $\vec{F} = \langle x, y, xyz \rangle$. Let E be the region bounded by $z = x^2 + y^2$ and $z = 4$. Let S be the boundary of E . Fully set-up two integrals to compute the flux out of the surface of E .

(a) Surface integral: _____

(b) Triple integral: _____