

Assignment #14 – MATH 2421
Summer 2008

Harder

Name: _____

- Due on Friday, 18 July 2008 at 10:30 a.m.
- Attach this cover sheet to this assignment.
- Copy all of your work onto engineering pad paper!
- Give enough details about each problem so that I should NOT need to refer back to the text.

Section 12.2

- (I) Complete Problems #10 & #11 on p. 1026.
- (II) Complete Problem #26 on p. 1026.
- (III) Complete Problem #28 on p. 1026.
- (IV) Complete Problems #32 & #36 on p. 1027. JUSTIFY YOUR CHOICE (positive, negative, or zero)!
- (V) Complete Problem #45 on p. 1027.

If a scalar function is function of r , then everywhere an r appears, we can replace it with $\sqrt{x^2 + y^2}$.

$$f(r) = f\left(\sqrt{x^2 + y^2}\right)$$

So now the expression is a function of x and y .

Since $\nabla f = \langle f_x, f_y \rangle$, you can now use the Multivariable Chain Rule to find f_x and f_y .

Perform the appropriate bookkeeping and show that

$$\nabla f(r) = f'(r) \left(\frac{\mathbf{r}}{r}\right) = \left(\frac{df}{dr}\right) \left(\frac{\langle x, y \rangle}{\sqrt{x^2 + y^2}}\right).$$

Section 12.3

- (VI) Complete Problem #2 on p. 1041.
- (VII) Complete Problem #8 on p. 1041.
- (VIII) Complete Problem #14 on p. 1042.
- (IX) Complete Problem #23 on p. 1042.
- (X) Complete Problem #46. Use technology to evaluate the integrals. [Preferably, attach a Derive5 print out of the integrals.]

You will need to evaluate the mass integral first.