Math 324A & 324B Advanced Multivariable Calculus I **Spring 1997**

WORKSHEET #3: 4/14/97

The vector field $\vec{F}$ and the function h are defined as follows:

$$\vec{F}(x,y,z) = (3x^2, 4y+z, 4x+y+2z^3);$$
$$h(x,y,z) = x^2yz.$$

Decide which of the following expressions make sense. Then compute those that do.

1. grad h
2. curl h
3. div h
4. ∇h
5. $\nabla \times h$
6. $\nabla \cdot h$
7. grad $\vec{F}$
8. curl $\vec{F}$
9. div $\vec{F}$
10. $\nabla \vec{F}$
11. $\nabla \cdot \vec{F}$
12. $\nabla \times \vec{F}$
13. $\nabla \cdot (\nabla h)$
14. $\nabla \cdot (\nabla \times h)$
15. $\nabla \cdot (\nabla \cdot h)$
16. $\nabla \times (\nabla h)$
17. $\nabla \times (\nabla \cdot h)$
18. $\nabla \times (\nabla \times h)$
19. $\nabla (\nabla \cdot \vec{F})$
20. $\nabla \times (\nabla \cdot \vec{F})$
21. $\nabla \cdot (\nabla \times \vec{F})$
22. $\nabla \cdot (\nabla \cdot \vec{F})$