B. Cole  
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1. (a) $g$ does not exist. 
   
   (b) $g(x, y, z) = e^z y^2 + (2/3)y^3 + x^2 yz$. 

2. (a) $G = \langle -(1/2)y^2 + xz - (1/2)z^2, (y - x)z, 0 \rangle$. 
   
   (b) $G = \langle -(1/3)y^3 + xe^z - xyz, -(x^2 + y)z, 0 \rangle$. 

3. (a) $I = -1/3 + \pi/4$. 
   
   (b) Integral is not independent of path. 

4. $I = 1 - \tan^{-1}(1/3)$. 

5. (b) $I = -9\pi/64$. 
   
   (c) $I = 0$. 

7. $I = \pi$. 

8. $I = 25/3$. 

9. (a) $C = \{ (x, y, z) : f(x, y, z) = 0, g(x, y, z) = 0 \}$. 
   
   (b) $\pm \nabla g/|\nabla g|$. 