Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work correct, complete and coherent.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 6, Monday, March 15, 2021

Find the gradient of $f(x,y,z) = (x^2+y^2+z^2)^{-1/2} + \ln(xyz)$ at the point $(-1,2,-2)$.

ANSWER: We compute

$$\vec{\nabla} f = -(1/2)(x^2+y^2+z^2)^{-3/2}(2x\vec{i} + 2y\vec{j} + 2z\vec{k}) + \frac{yz\vec{i} + xz\vec{j} + xy\vec{k}}{xyz}.$$

It follows that

$$\vec{\nabla} f|_{(-1,2,-2)} = \frac{-2\vec{i} + 4\vec{j} - 4\vec{k}}{-2(9)^{3/2}} + \frac{-4\vec{i} + 2\vec{j} - 2\vec{k}}{4}$$

$$\vec{\nabla} f|_{(-1,2,-2)} = \frac{-\vec{i} + 2\vec{j} - 2\vec{k}}{-27} + \frac{-2\vec{i} + \vec{j} - \vec{k}}{2}$$

$$\boxed{\vec{\nabla} f|_{(-1,2,-2)} = \frac{-26}{27}\vec{i} + \frac{23}{54}\vec{j} - \frac{23}{54}\vec{k}.}$$