9.8.2

$$v = [0,\ \cos(xyz),\ \sin(xyz)]$$

$$\operatorname{div}(v) = \frac{\partial v_1}{\partial x} + \frac{\partial v_2}{\partial y} + \frac{\partial v_3}{\partial z}$$

$$= \boxed{0 - xz\sin(xyz) + xy\cos(xyz)}$$

$$f : \mathbb{R}^n \to \mathbb{R}$$

$$\operatorname{div}(\nabla f) =$$

$$= \frac{\partial}{\partial x}\nabla f_1 + \frac{\partial}{\partial y}\nabla f_2 + \cdots$$

$$= \frac{\partial}{\partial x}\frac{\partial}{\partial x} f + \frac{\partial}{\partial y}\frac{\partial}{\partial y} f + \cdots$$

$$\frac{\partial}{\partial t} u = \alpha \operatorname{div}(\nabla u)$$ ← heat eq'n