

Name:

1. The temperature on metal plate is given by

$$T(x, y) = 100e^{-(x^2+y^2)/100}$$

where T is measured in $^{\circ}\text{C}$ and x and y are measured in inches from the center of the plate.

1. Compute $\vec{\nabla}T(x, y)$.

2. At high noon a bug is standing at position $P(0, 1)$ and has velocity $\mathbf{v} = \langle -2, 1 \rangle$ inches/second.

(a) What temperature does the bug see at high noon?

(b) What is the rate of change in temperature that the bug sees at high noon?

2. Consider a position function $\mathbf{r}(t) = \langle \sin(2t), e^{-3t} - 1 \rangle$. For another function $T(x, y)$ you know that

$$T(0, 0) = 7$$

$$T_x(0, 0) = 3$$

$$T_y(0, 0) = -2.$$

Compute

$$\frac{d}{dt}T(\mathbf{r}(t))$$

at $t = 0$.