

$$3.3 \quad f(x,y) = -(y+47) \sin \sqrt{\left| \frac{x}{2} + (y+47) \right|} - x \sin \sqrt{|x - (y+47)|}$$

$$\frac{\partial f(x,y)}{\partial x} = \frac{1}{2} \cdot \frac{\frac{x}{2} + (y+47)}{\left| \frac{x}{2} + (y+47) \right|} \cdot \frac{1}{2 \sqrt{\left| \frac{x}{2} + (y+47) \right|}} \cdot \cos \sqrt{\left| \frac{x}{2} + (y+47) \right|} \cdot (-y-47)$$

$$- \sin \sqrt{|x - (y+47)|}$$

$$- x \cdot \frac{x - (y+47)}{|x - (y+47)|} \cdot \frac{1}{2 \sqrt{|x - (y+47)|}} \cdot \cos \sqrt{|x - (y+47)|}$$

$$= - \frac{(y+47) \left(\frac{x}{2} + y + 47 \right) \cos \sqrt{\left| \frac{x}{2} + y + 47 \right|}}{4 \left| \frac{x}{2} + y + 47 \right|^{3/2}}$$

$$- \sin \sqrt{|x - y - 47|} - \frac{x(x - y - 47) \cos \sqrt{|x - y - 47|}}{2 |x - y - 47|^{3/2}}$$

$$\frac{\partial f(x,y)}{\partial y} = - \sin \sqrt{\left| \frac{x}{2} + (y+47) \right|}$$

$$- (y+47) \cdot \frac{\frac{x}{2} + (y+47)}{\left| \frac{x}{2} + (y+47) \right|} \cdot \frac{1}{2 \sqrt{\left| \frac{x}{2} + (y+47) \right|}} \cdot \cos \sqrt{\left| \frac{x}{2} + (y+47) \right|}$$

$$- x \cdot \frac{x - (y+47)}{|x - (y+47)|} \cdot \frac{1}{2 \sqrt{|x - (y+47)|}} \cdot \cos \sqrt{|x - (y+47)|}$$

$$= - \frac{(y+47) \left(\frac{x}{2} + y + 47 \right) \cos \sqrt{\left| \frac{x}{2} + y + 47 \right|}}{2 \left| \frac{x}{2} + y + 47 \right|^{3/2}}$$

$$- \sin \sqrt{\left| \frac{x}{2} + y + 47 \right|} - \frac{x(x - y - 47) \cos \sqrt{|x - y - 47|}}{2 |x - y - 47|^{3/2}}$$