2.2 $f(x) \cong f(x_0) + \left(\frac{dg}{dx}\right)_{x_0,y_0} (x - x_0) + \left(\frac{dg}{dy}\right)_{x_0,y_0} (y - y_0)$

2. a) $f(x) = \sin(x) \quad x_0 = 0$

$$f(x) \cong \sin 0 + \cos 0 (x - 0)$$
$$= x$$

c) $f(x) = e^{x^2}$, $x_0 = 0$ a $x_0 = 1$

$$\frac{df}{dx} = e^{x^2} (x^2)' = 2x e^{x^2} \Rightarrow \begin{cases} 0 \\ 2e \end{cases}$$

$$\underset{x_0 = 0}{f(x)} \cong 1 + 0(x - 0) = 1$$

$$\underset{x_0 = 1}{f(x)} = e + 2e(x - 1) = e(2x - 1)$$

e) $g(x, y) = \sin x \cos y$ om punkt $(x_0, y_0) = (0, 0)$

$$\frac{dg}{dy} = \sin x \cdot (-\sin y) \Rightarrow \frac{dg}{dx}_{(x_0, y_0)} = 0$$

$$\frac{dg}{dx} = \cos x \sin y \Rightarrow \frac{dg}{dy}_{(x_0, y_0)} = 1$$

$$g(x, y) \cong 0 + 1(x - 0) + 0(y - 0) = x$$

4) $g(x,y) = xy^2 - e^{x+y}$, $(x_0, y_0) = (1,-1)$

$$\frac{dg}{dx} = y^2 - e^{x+y}(1) =$$

.

.

.

.

5) $$\Delta\beta = \frac{d\beta}{dx}\Delta x + \frac{d\beta}{dy}\Delta y + \frac{d\beta}{dz}\Delta z$$

a) $\beta(x,y,z) = x^2 + xy + z^2$

$$\frac{d\beta}{dx} = 2x + y \quad , \quad \frac{d\beta}{dy} = x \quad , \quad \frac{d\beta}{dz} = 2z$$

$$\underline{\underline{2x + y\,\underline{i} + x\underline{j} + 2z\underline{k}}}$$

b) $\beta(x,y,z) = e^{-(xy+z)}$

$$\frac{d\beta}{dx} = e^{-(xy+z)} \cdot (-(xy+z))' = e^{-xy+z} \cdot -y = -ye^{-(xy+z}$$

$$\frac{d\beta}{dy} = e^{-(xy+z)} \cdot -x = -xe^{-(xy+z)}$$

$$\frac{d\beta}{dz} = e^{-(xy+z)} \cdot 1 = -e^{-(xy+z)}$$

$$\nabla\beta = -ye^{-(xy+z)}\underline{i} - xe^{-(xy+z)}\underline{j} + -e^{-(xy+z)}\underline{k}$$

$$\underline{\underline{= -e^{-(xy+z)}(y\,\underline{i} + x\underline{j} + \underline{k})}}$$