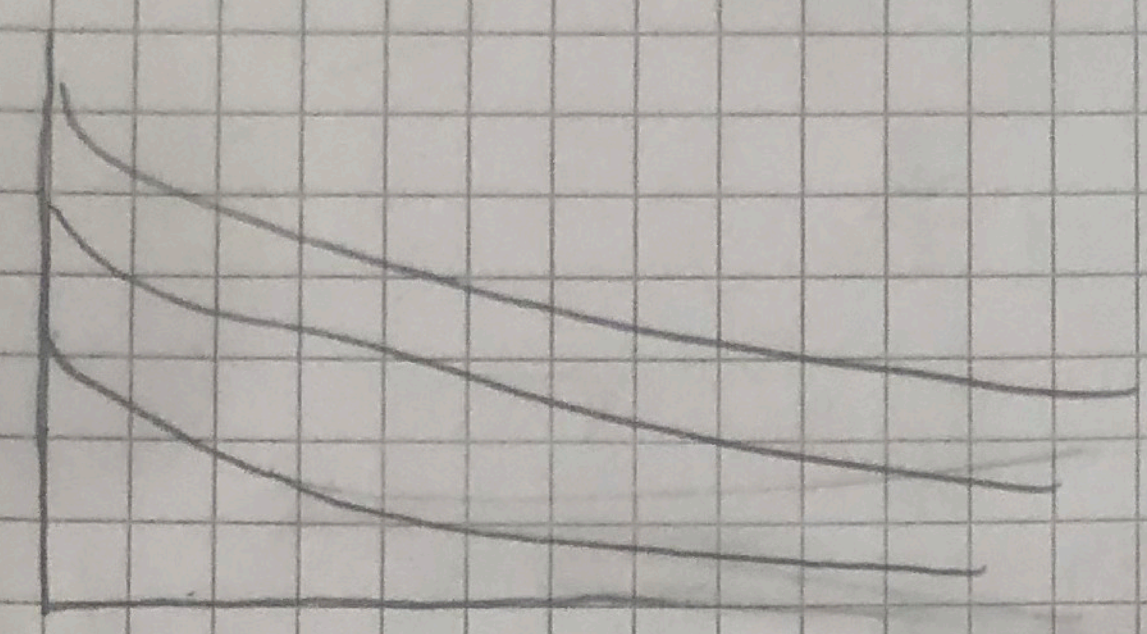
Mikro 1 H02

a) $U(x_1, x_2) = 24\sqrt{x_1} + 2x_2$

$U_0 = 24\sqrt{x_1} + 2x_2 \Leftrightarrow \frac{U_0}{2} - 12\frac{\sqrt{x_1}}{2} = x_2$



b) $U_1' = 12\frac{1}{\sqrt{x_1}}$ $\quad U_2' = 2$ $\quad = MRS \quad -\frac{12\frac{1}{\sqrt{x_1}}}{\frac{2}{1}} = -\frac{\frac{12}{\sqrt{x_1}}}{\frac{2}{1}} = \frac{12}{2\sqrt{x_1}} = -\frac{6}{\sqrt{x_1}}$

$\lim_{x_1 \to 0} |MRS| = \infty$

$\lim_{x_2 \to 0} |MRS| = \frac{12\frac{1}{\sqrt{x_1}}}{2}$

Derfor er $x_1$ essentiell, mens $x_2$ ikke er essentiell

c) Da $x_2$ ikke er en essentiell vare, kan det være randløsninger. Derfor er $x_2 = 0$ en mulig løsning

d) Da $|MRS|$ er avtagende er $|MRS| = \frac{p_1}{p_2}$, og derfor er løsningen optimal.

e) $L(x_1, x_2, \lambda) = 24\sqrt{x_1} + 2x_2 - \lambda(p_1 x_1 + p_2 x_2 - m)$

$\frac{dL}{dx_1} = \frac{12}{\sqrt{x_1}} - \lambda p_1 \quad \frac{dL}{dx_2} = 2 - \lambda p_2$ Deler får

$\frac{\frac{12}{\sqrt{x_1}}}{2} = \frac{\lambda p_1}{\lambda p_2} \rightarrow |MRS| = \frac{p_1}{p_2} \rightarrow \frac{6}{\sqrt{x_1}} = \frac{p_1}{p_2}$

Isolerer for $x_1$ og havner $\sqrt{\ }$

$\frac{6}{p_1} \cdot \frac{p_2}{p_1} = \sqrt{x_1} \rightarrow 36 \cdot \left(\frac{p_2}{p_1}\right)^2 = x_1$ Innsettes i bibetingelsen

$p_1\left(36\left(\frac{p_2}{p_1}\right)^2\right) + p_2 x_2 = m \rightarrow \frac{\cancel{p_1} 36\, p_2^2}{p_1^2} + p_2 x_2 = m$

$36\frac{p_2^2}{p_1} + p_2 x_2 = m \rightarrow p_2 x_2 = -36\frac{p_2^2}{p_1} + m$

$x_2 = \frac{m}{p_2} - 36\frac{p_2}{p_1}$

f)

$x_2 = \frac{m - p_1}{p_2} - 36\frac{p_2}{p_1}$