Question #76165, Economics / Microeconomics

Question:

Given the utility function: $U(x1, x2) = x_1^{1/2} * x_2^{1/2}$

$$MRS(x_1, x_2) = -\frac{\left(\frac{\partial U}{\partial x_1}\right)}{\left(\frac{\partial U}{\partial x_2}\right)}$$

a) calculate marginal rate of substitution for X1 and X2

$$MRS(x_1, x_2) = -\frac{\frac{1}{2\sqrt{x_1}}}{\frac{1}{2\sqrt{x_2}}} = -\frac{\sqrt{x_2}}{\sqrt{x_1}}$$

b) calcualte the MRS for the indifference curve that passes through (800, 1200)

$$MRS(800{,}1200) = -\frac{\sqrt{1200}}{\sqrt{800}} = -\sqrt{\frac{3}{2}}$$

c) estimate the increase in X2 required to maintain current utility when X1 falls by 14 units. Evaluate the condition to show that the points lie on the same indifference curve.

The points lie on the same indifference curve when utility is the same in each point.

$x_1^{1/2} * x_2^{1/2} = (x_1 - 14)^{1/2} * (x_2 + z)^{1/2}$

$z = \Delta x_2 = \frac{14x_2}{(x_1 - 14)}$

Answer: a) $MRS(x_1, x_2) = -\frac{\sqrt{x_2}}{\sqrt{x_1}}$

b) $MRS(800{,}1200) = -\sqrt{\frac{3}{2}}$

c) $\Delta x_2 = \frac{14x_2}{(x_1 - 14)}$