Quiz 4 - SOLUTION

Tamás, Zsuzsanna's younger brother, likes both *exes* and *whys* too. Just like Zsuzsanna, he consumes nothing else and he prefers more to less from both goods. Tamás firmly believes that *exes* and *whys* should be consumed in fixed proportions: four *exes* with three *whys*.

- Mark the correct answer!

  If x denotes the amount of *exes* and y the amount of *whys* that Tamás consumes, then Tamás's preferences can be represented by the following utility function:

  - ☐ $u(x,y) = \min\{4x, 3y\}$.
  - ☑ $u(x,y) = \min\{3x, 4y\}$.
  - ☐ $u(x,y) = 4x + 3y$.
  - ☐ $u(x,y) = 3x + 4y$.

Let p_x denote the unit price of *exes* and p_y the unit price of *whys*. Assume that Tamás has *m* monetary units to spend on *exes* and *whys*.

- Write and solve Tamás's constrained utility-maximization problem.
  Hint: you should look for x and y as functions of prices and income, i.e. $x(p_x, p_y, m)$ and $y(p_x, p_y, m)$.

$$\max_{x,y} \min\{3x, 4y\} \text{ subject to } p_x x + p_y y = m$$

The utility-maximizing bundle must satisfy the following two conditions: $3x = 4y$ and $p_x x + p_y y = m$.

From the first, we have that $y = \frac{3}{4}x$. After substituting this result into the equation of the budget line, we can write that $p_x x + p_y \frac{3}{4} x = m$.

That is $x = \frac{m}{p_x + \frac{3}{4}p_y}$.

Since $y = \frac{3}{4}x$, we have that $y = \frac{3}{4}\frac{m}{p_x + \frac{3}{4}p_y} = \frac{m}{\frac{4}{3}p_x + p_y}$.

- Are *exes* ordinary goods for Tamás? Why?

  Yes, *exes* are ordinary goods for Tamás, because as p_x increases, Tamás would want to consume less of them.

  $\frac{\partial x}{\partial p_x} = -\frac{m}{(p_x + \frac{3}{4}p_y)^2} < 0$.

- Are *exes* normal goods for Tamás? Why?

  Yes, *exes* are normal goods for Tamás, because as m increases, Tamás would want to consume more of them.

  $\frac{\partial x}{\partial m} = \frac{1}{p_x + \frac{3}{4}p_y} > 0$.