1. Why must budget constraints be binding?
   - A. We do not model savings so we would never save
   - **B. We maximize utility and more goods bought = more utility**
   - C. Money has no value
   - D. Money loses value so it will be worth less tomorrow

2. Find the utility maximizing amount of each good for the following utility functions subject to budgets $M = P_x X + P_y Y$:
   - (a) $U(x,y) = x^{1/2}y^{1/2} \quad s.t. \quad 120 = 4x + y$
   - (b) $U(x,y) = \alpha ln(x) + y \quad s.t. \quad M = P_x x + P_y y$
   - (c) $U(x,y) = min\{2x, y\} \quad s.t. \quad 16 = 2x + y$
   - (d) $U(x,y) = 4x + 5y \quad s.t. \quad 10 = 2x + 3y$

Solution:

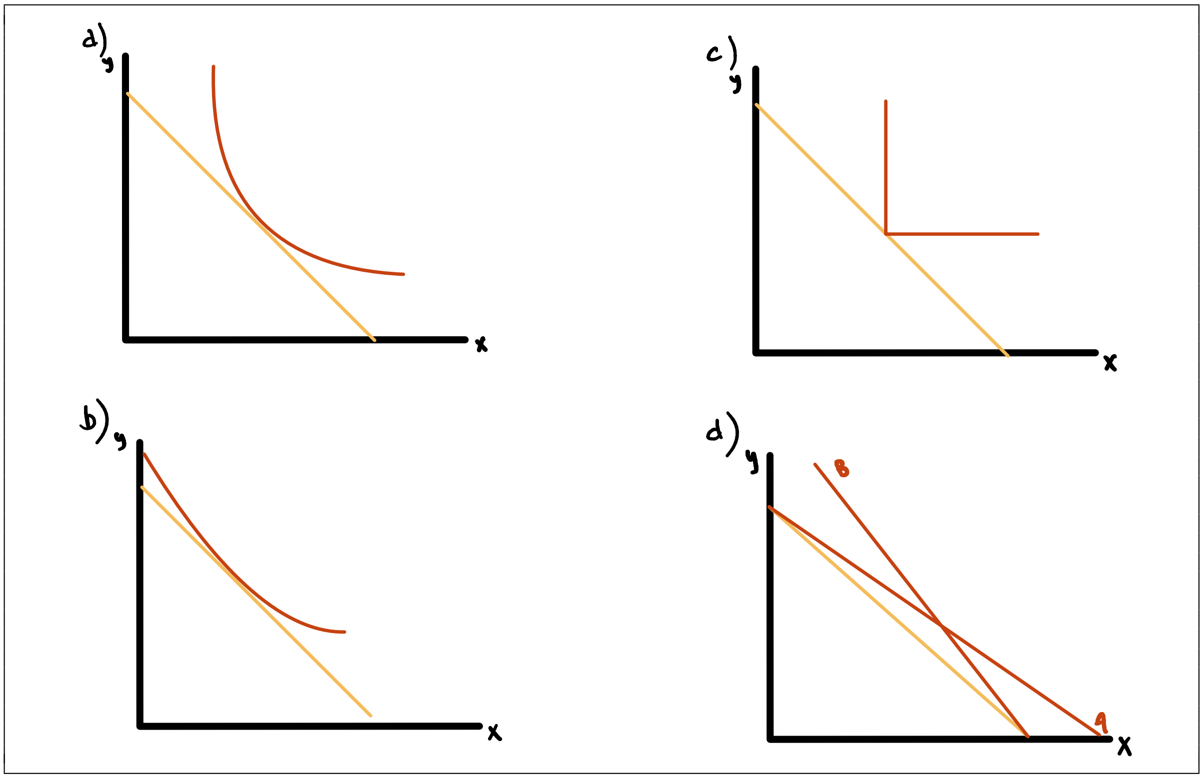
(a) $x^* = \frac{1}{2} \cdot \frac{120}{4} = 15 \qquad \& \qquad y^* = \frac{1}{2} \cdot \frac{120}{1} = 60$

(b) $x^* = \frac{\alpha}{x} = \frac{4}{1} \rightarrow 4x = \alpha \rightarrow x^* = \frac{\alpha}{4} \qquad \& \qquad 120 = 4\left(\frac{\alpha}{4}\right) + y \rightarrow y^* = 120 - \alpha$

(c) $2x = y \rightarrow 16 = 2 \cdot x + 2x \rightarrow x^* = 4 \qquad \& \qquad y^* = 2(4) = 8$

(d) $MRS = \frac{P_x}{P_y} \rightarrow \frac{4}{5} = \frac{2}{3} \rightarrow MRS > Price\ Ratio \rightarrow y^* = 0 \rightarrow x^* = 5$

3. Draw a utility maximizing Indifference Curve subject to an arbitrary budget for the following function types:
   - (a) Cobb-Douglas
   - (b) Quasi-linear
   - (c) Perfect Complements
   - (d) Perfect Substitutes (Show both possible corner solutions)


a)
y
x
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