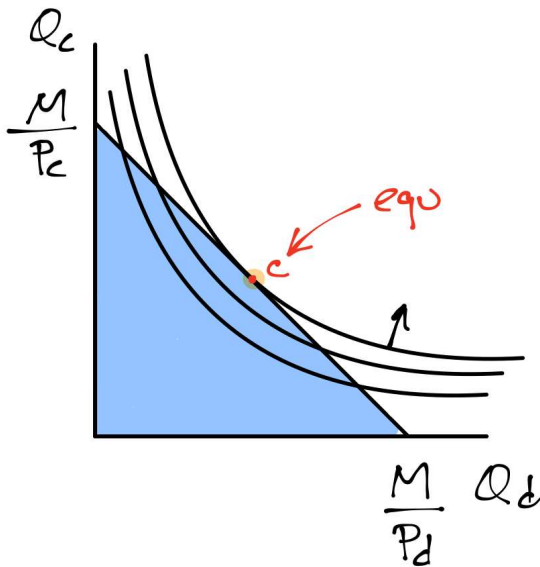# Finding an Interior Solution

Typical equilibrium:

Not a corner so the slope rule applies:
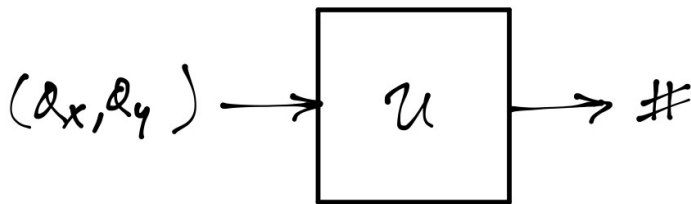
$$MRS = -\frac{P_x}{P_y}$$

To find, will need a compact way to represent ICs
  Will use *utility functions*

Utility function

- Takes a *bundle* as an input
- Returns a *number* indicating the IC of the bundle

Conceptually:

$(Q_x, Q_y) \longrightarrow \boxed{\;\mathcal{U}\;} \longrightarrow \#$
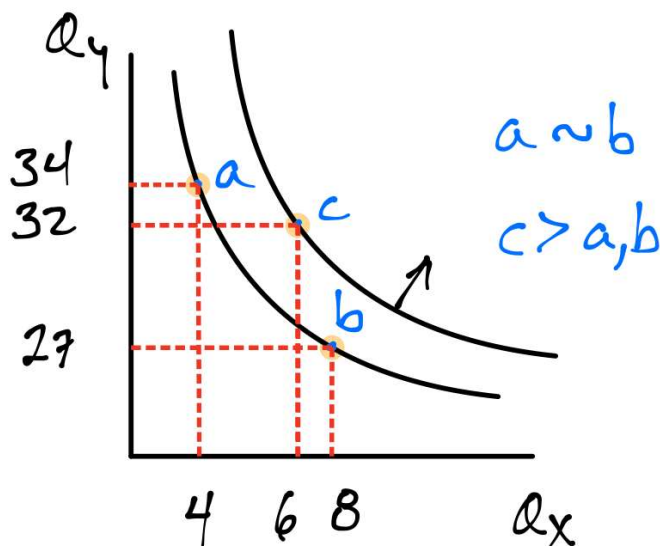
To represent ICs correctly, the function must have two properties:

1. **Equally good** bundles get the **same** number
2. **Better** bundles get **bigger** numbers

Reproduces the ICs: can rank any two bundles A and B

Example:

Suppose someone has the ICs below

Could *try* the following as a utility function (has curved ICs):

$$U(Q_x, Q_y) = (Q_x)^{0.25}(Q_y)^{0.75}$$

Applying it to the bundles:

Bundle	Q_x	Q_y	U	Check
a	4	34	$(4)^{0.25}(34)^{0.75} = 19.9$	
b	8	27	$(8)^{0.25}(27)^{0.75} = 19.9$	$a \sim b$ ✔
c	6	32	$(6)^{0.25}(32)^{0.75} = 21.1$	$c \succ a, b$ ✔