

A

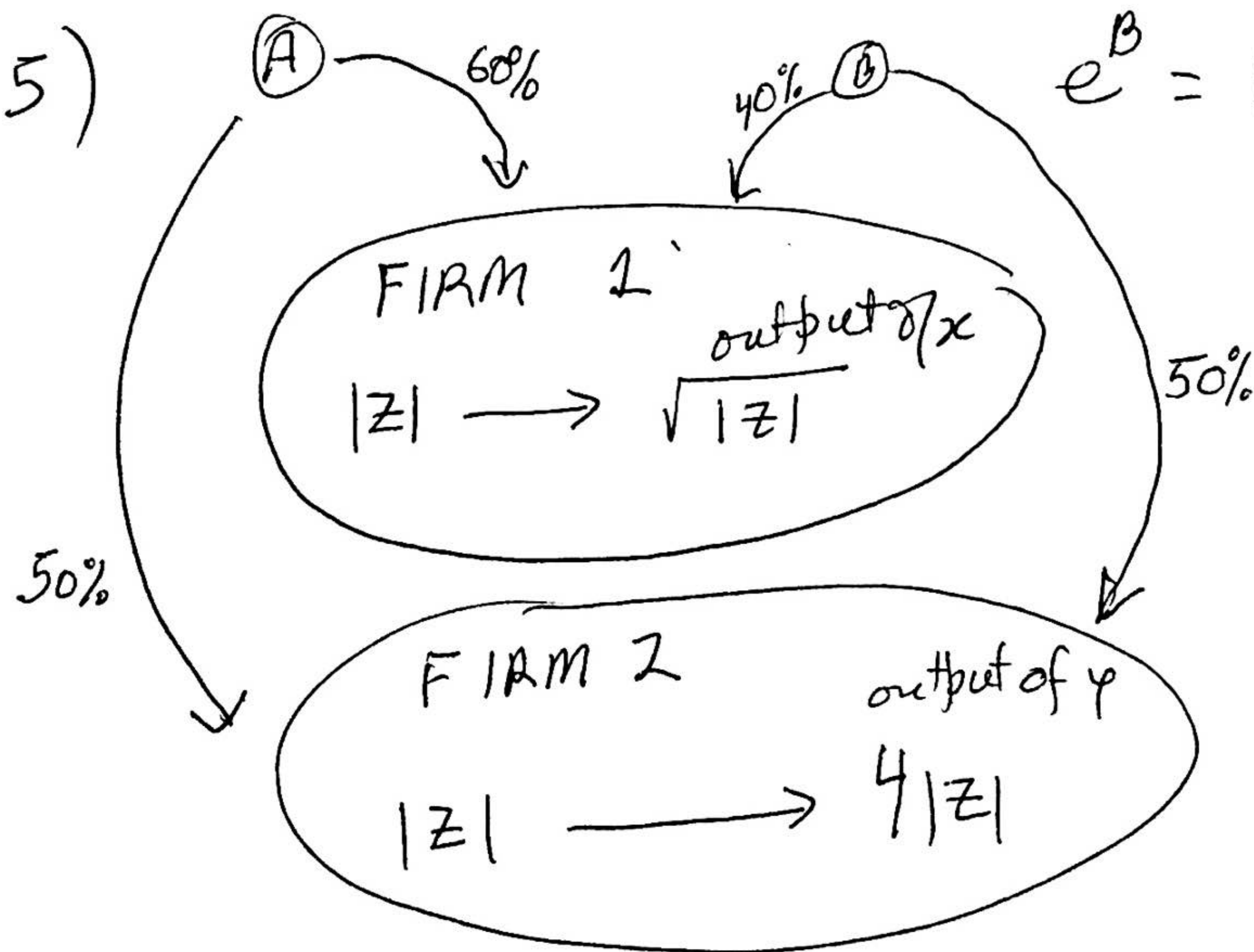
$$u^A(x, y, z) = x^{\frac{2}{5}} y^{\frac{3}{5}}$$

$$e^A = (0, 0, 5)$$

B

$$u^B(x, y, z) = x^{\frac{1}{2}} y^{\frac{1}{2}}$$

$$e^B = (0, 0, 5)$$



①

Prices

$$(p, \frac{1}{4}, 1)$$

(2)

FIRM 1

$$\max_{0 < z < \infty} \Pi(p, z) = \max_z p\sqrt{z} - z$$

$$\Rightarrow \frac{\partial \Pi}{\partial z} = 0 \Rightarrow \frac{p}{2\sqrt{z^*}} = 1 \Rightarrow z^* = \frac{p^2}{4} \quad \text{INPUT of FIRM 1}$$

$$\text{So profit} = p\sqrt{z^*} - 1 \cdot z^* = p\sqrt{\frac{p^2}{4}} - \frac{p^2}{4} = \frac{p^2}{4}$$

So

$$I_A = 5 + \frac{3}{5} \frac{p^2}{4} + \frac{1}{2} 0$$

$$I_B = 5 + \frac{2}{5} \frac{p^2}{4} + \frac{1}{2} 0$$

$$\text{ALSO output of FIRM 1} = \sqrt{z^*} = \frac{p}{2}$$

DEMAND

SUPPLY

$$x \quad \begin{matrix} A \\ \frac{2}{5} \frac{I_A}{p} \end{matrix} + \begin{matrix} B \\ \frac{1}{2} \frac{I_B}{p} \end{matrix} = \frac{p}{2} \quad \leftarrow \text{produced by FIRM 1} \quad *$$

$$y \quad \begin{matrix} \frac{3}{5} \frac{I_A}{\frac{1}{4}} \end{matrix} + \begin{matrix} \frac{1}{2} \frac{I_B}{\frac{1}{4}} \end{matrix} = 4 \left(10 - \underbrace{\text{input of Firm 1}}_{\text{Input of Firm 2}} \right)$$

* gives ~~the~~

$$\frac{\frac{3}{5} \left(5 + \frac{3}{5} \frac{p^2}{4} \right)}{p} + \frac{\frac{1}{2} \left(5 + \frac{2}{5} \frac{p^2}{4} \right)}{p} = \frac{p}{2} \quad *$$

$$\Rightarrow p = \frac{10}{\sqrt{6}}$$

So output of Firm 1 = $\frac{p}{2} = \frac{5}{\sqrt{6}}$, input of Firm 1 = $\frac{p^2}{4} = \frac{25}{24}$ 4

Output of Firm 2 = $4(10 - \sqrt{\quad}) = 4(10 - \frac{25}{24})$

Check the rest yourself!