Tutorial 1

① the monopolist faces $D(p) = 100 - 2p$ (↖ y) $C(y) = 2y$ optimal?

$y = 100 - 2p$

so $p = 50 - \frac{y}{2}$

TR: $50y - \frac{y^2}{2}$

→ MC = MR

$2y = 50y - \frac{y^2}{2}$ ⤵ Derive

$2 = 50 - \frac{1}{2} \cdot 2y$

$y = 48$ so $p = 26$

② monopolist $D(p) = 10p^{-3}$ $C(y) = 2y$

$y = 10p^{-3} = \frac{10}{p^3}$ so $p^3 = \frac{y}{10} = \frac{\sqrt[3]{10}}{y^{1/3}}$

Rev: $p \cdot y = \frac{\sqrt[3]{10}\, y}{y^{1/3}} = \frac{\sqrt[3]{10}}{y^{-2/3}} = \sqrt[3]{10} \cdot y^{2/3}$

$\therefore MR = \frac{2}{3} \cdot \sqrt[3]{10}\, y^{-1/3}$

$\frac{2}{3} \cdot \sqrt[3]{10} \cdot y^{-1/3} = 2$

$\frac{\frac{2}{3} \cdot \sqrt[3]{10}}{y^{1/3}} = 2$

$y^{1/3} = \frac{\frac{2}{3} \cdot \sqrt[3]{10}}{2}$

$y = \left(\frac{\frac{2}{3} \cdot \sqrt[3]{10}}{2}\right)^3$

$y = 0.37$ $p = 3$

Shortcut: elasticity $= -3$

$\left(MC = p\left(1 + \frac{1}{\varepsilon}\right)\right.$

↳ constant elasticity (cobb-douglas)

③ $D_1(p_1) = 100 - p_1$ $D_2(p_2) = 100 - 2p_2$ and $MC = 20$

a) can discrim b) can't

a) $p = 100 - y$ $p = 50 - \frac{y}{2}$

$R = 100y - y^2$ $R = 50y - \frac{y^2}{2}$

$MR = 100 - 2y$ $MR = 50 - y$

$MC = MR$ $MC = MC$

$100 - 2y = 20$ $20 = 50 - y$

$y = 40$ $y = 30$

$p = 60$ $p = 55$

b) Sum up both

$D(p) = 100 - p_1 + 100 - 2p_2 = 200 - 3p$

So $y = 200 - 3p$ and $p = \frac{200 - y}{3}$

Revenue: $\frac{200y}{3} - \frac{y^2}{3}$ MR: $\frac{200}{3} - \frac{2}{3}y$

$MR = MC$

$\frac{200}{3} - \frac{2}{3}y = 20$

$\frac{2}{3}y = \frac{140}{3}$

$\therefore y = 70$

$p = \frac{130}{3}$