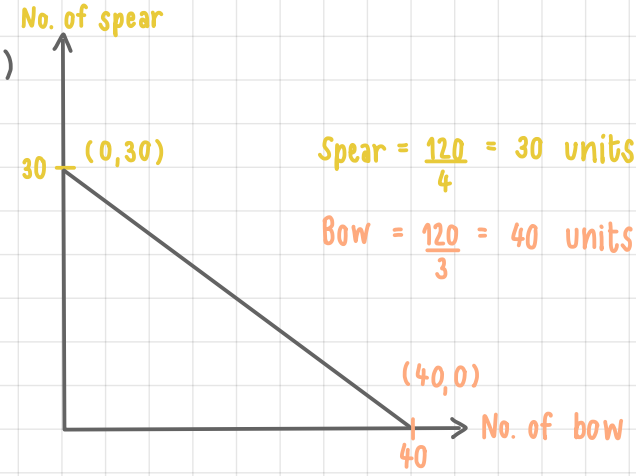
1.a)



Spear = $\frac{120}{4}$ = 30 units

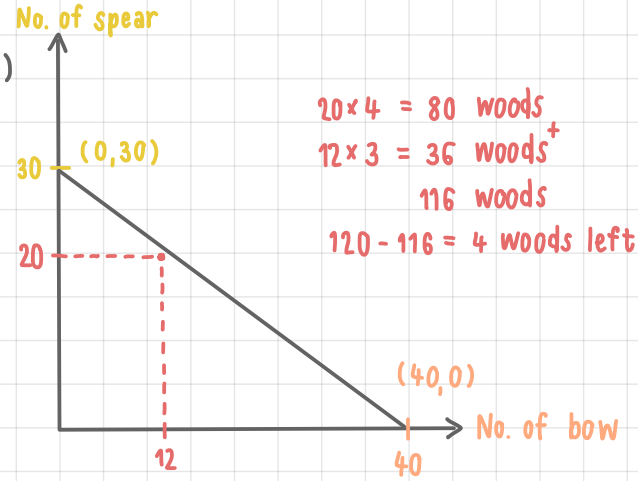
Bow = $\frac{120}{3}$ = 40 units

1.b) To produce 30 spears, we will lost 40 bows

To produce 1 spear, we will lost $\frac{40}{30}$ = 1.33 bows

∴ opportunity cost for a spear is 1.33 in terms of bow #

1.c)



20 × 4 = 80 woods

12 × 3 = 36 woods +

116 woods

120 - 116 = 4 woods left

$y - y_1 = m(x - x_1)$

$30 - 0 = m(0 - 40)$

$30 = m(-40)$

$m = \frac{30}{-40} = \frac{-3}{4}$

$y = mx + c$

$y = \frac{-3}{4}x + 30$

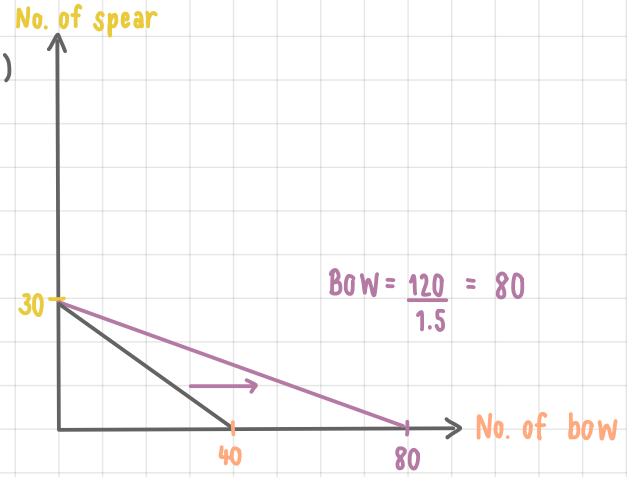
$20 = \frac{-3}{4}x + 30$

$-10 \times \frac{4}{-3} = x$

$x = 13.33$

This option is possible but not efficient because it is below the PPC curve means that there are some resources left #

1.d)



Bow = $\frac{120}{1.5}$ = 80

To produce 30 spears, we will lost 80 bows

To produce 1 spear, we will lost $\frac{80}{30}$ = 2.67 bows

∴ opportunity cost for spear is increase from 1.33 to 2.67 in terms of bow #

2.a) $\varepsilon_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{42}{20{,}000} \cdot \frac{21{,}000 - 20{,}000}{29 - 42}$

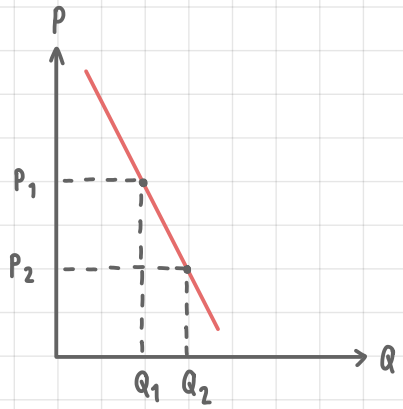
$= \frac{42^{21}}{{}_{10}\,20{,}000} \cdot \frac{1000}{-13} = -\frac{21}{130} = -0.1615$ #

When price go up by 1% quantity demand go down by 0.1615%

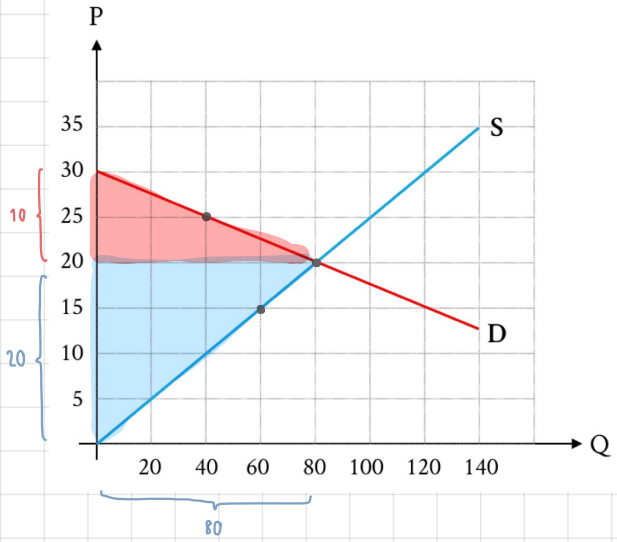
2.b) $\varepsilon_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{29}{21{,}000} \cdot \frac{Q_2 - 21{,}000}{15 - 29}$

As ε_d from 2.a) = -0.1615 → $|-0.1615| < 1$ means the demand is inelastic



When the demand is inelastic price-reduction stradegy will not help increase total revenue of MRT Purple line. Because when price decrease, quantity demand increase only a little. #



3.a) $\varepsilon_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{25}{40} \cdot \frac{80-40}{20-25}$

$= \frac{25}{40} \cdot \frac{40}{-5} = -5$ #

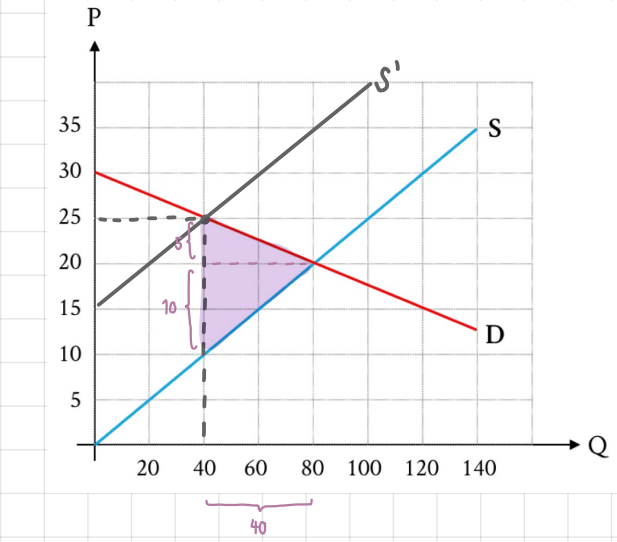
$\varepsilon_s = \frac{\%\Delta Q_s}{\%\Delta P} = \frac{P_1}{Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

$= \frac{15}{60} \cdot \frac{80-60}{20-15}$

$= \frac{15}{60_3} \cdot \frac{20}{5} = 1$ #

3.b) consumer surplus (CS) $= \frac{1}{2} \times 80 \times 10 = 400$ #

producer surplus (PS) $= \frac{1}{2} \times 80 \times 20 = 800$ #



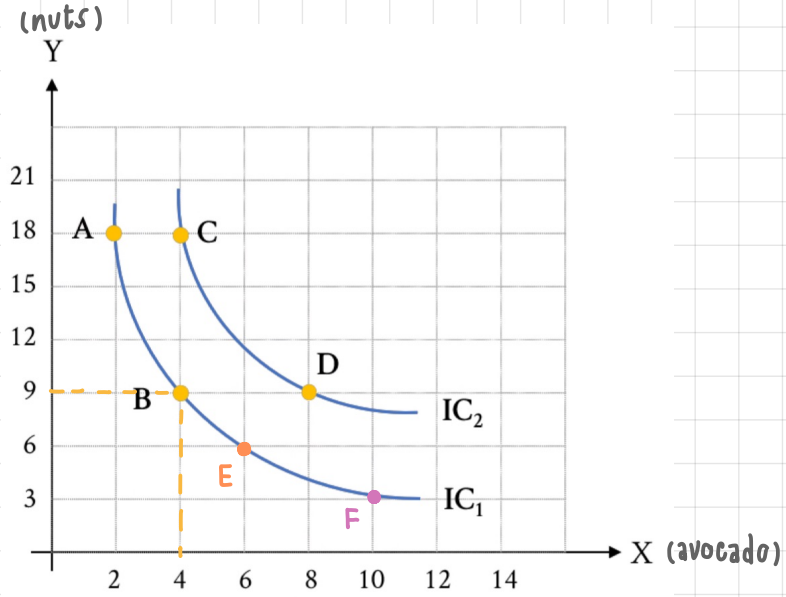
3.c) Price is higher, so producers can sell less number of headphone. Then
- producer surplus become smaller
- consumer surplus become smaller

3.d) Due to the collusion there is deadweight lost

$= \left(\frac{1}{2} \times 10 \times 40\right) + \left(\frac{1}{2} \times 5 \times 40\right)$

$= 200 + 100$

$= 300$ #



4.a) slope of budget line $= \frac{P_x}{P_y} = \frac{P_x}{10}$

slope of IC curve $= |MRS_{xy}| = \left|\frac{\Delta y}{\Delta X}\right| = \left|\frac{y_b - y_a}{x_b - x_a}\right| = \left|\frac{9-18}{4-2}\right| = \left|\frac{-9}{2}\right| = \frac{9}{2}$

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$
$$|MRS_{xy}| = \frac{P_x}{P_y}$$
$$\frac{9}{2} = \frac{P_x}{10}$$
$$P_x = \frac{90}{2} = 45 \ \#$$

4.b) $\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$

$|MRS_{xy}| = \frac{P_x}{P_y}$

$\frac{9}{2} = \frac{180}{P_y}$

$P_y = 40$

$\rightarrow I = P_x x \cdot P_y y$

$I = (180)(4) \cdot (40)(9)$

$I = 1080 \ \#$

4.c) From point C to D (C→B→D)

C→B, consumer loses 4 utils from consuming less 9 units of nuts (from IC_2 to IC_1)

B→D, consumer gains 4 utils from consming more 4 units of avocado (back to IC_2)

So, consuming 4 more avocadoes yields 4 util of MU_x

∴ Average marginal per unit of avocado is $\frac{4}{4} = 1$ util #

4.d) $|MRS_{xy(B)}| = \left|\frac{\Delta y}{\Delta X}\right| = \left|\frac{y_B - y_A}{x_B - x_A}\right| = \left|\frac{9-18}{4-2}\right| = \left|\frac{-9}{2}\right| = 4.5$

$|MRS_{xy(E)}| = \left|\frac{\Delta y}{\Delta X}\right| = \left|\frac{y_E - y_B}{x_E - x_B}\right| = \left|\frac{6-9}{6-4}\right| = \left|\frac{-3}{2}\right| = 1.5$

$|MRS_{xy(F)}| = \left|\frac{\Delta y}{\Delta X}\right| = \left|\frac{y_F - y_E}{x_F - x_E}\right| = \left|\frac{3-6}{10-6}\right| = \left|\frac{-3}{4}\right| = 0.75$

∴ Consumer's utility received from consuming avocado is in accordance with the law of diminishing marginal utility, as the consumers consume more avocado, consumers will get less marginal utility (MU) #