Question #1

Solution:

$$P = 1658 - 420D$$

Variable cost = $520/service

Fixed cost = $42500

As $P = a - bd$

$a = 1658$

$b = 420$

Demand at which max Profit occurs =

$$= \frac{(a - C_{var})}{2b}$$

$$= \frac{1658 - 520}{2 \times 420}$$

$$= \frac{1138}{840}$$

$$\boxed{D_{maxProfit} = 1.354}$$

Demand at which max income occurs $= \frac{a}{2b}$

$$D_{maxIncome} = \frac{a}{2b}$$

$$= \frac{1658}{840}$$

$$\boxed{D_{maxIncome} = 1.97}$$

To plot these in total income function we need Total income on these demands value.

Total income in $D_{maxprofit}$:

$$\text{Total income} = a\,D_{maxprofit} - b\,D^2_{maxprofit}$$

$$= 1658 \times 1.35 - (420 \times (1.35)^2)$$

$$= 2238.3 - 765.45$$

$$= 1472.85$$

Total Income on max Demand $= aD - bD^2$

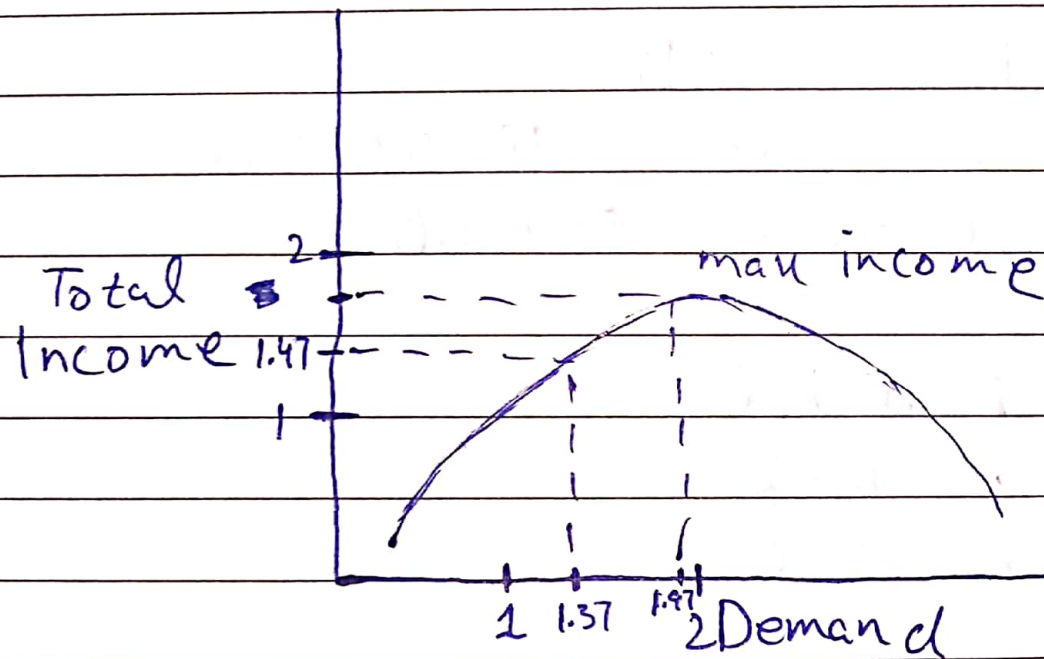$$= 1858 \times 1.97 - (420 \times (1.97)^2)$$

$$= 3266.26 - 1629.6$$

$$= 1637.06$$

No: _____ Date: _____

Graph:

Total Income 2 ─ ─ ─ ─ ─ ─ max income
Income 1.47 ─ ─ ─ ─ ─
1 ─
  1 1.37 1.97 2 Demand

$$D(1.97) = D_{maxincome}$$
$$D(1.354) = D_{maxprofit}$$