i. Calculate the price elasticity of demand from point A to point B. Interepret your answer.

At point A,

the price of car $P_1 = 5000$

and the quantity demand of car $Q_1 = 1800$

At point B,

the price of car $P_2 = 4500$

and the quantity demand of car $Q_2 = 2600$

Therefore,

the price elasticity of demand =

$$\frac{\frac{Q_2 - Q_1}{(Q_2 + Q_1)/2}}{\frac{P_2 - P_1}{(P_2 + P_1)/2}} = \frac{\frac{2600 - 1800}{(2600 + 1800)/2}}{\frac{(4500 - 5000)}{(4500 + 5000)/2}}$$

$$= \frac{\frac{800}{2200}}{\frac{-500}{4750}}$$

$$= \frac{0.3636}{-0.1052}$$

$$= -3.46$$

In absolute value the price elasticity of demand = 3.46; which is greater than 1. Therefore, the price elasticity of demand is elastic in this

ii. Calculate cross-price elasticity of demand for car from point D to point A. Based on your answer identify whether the goods are complements or substitutes.

At point D,

the price of oil $P_{O_1} = 75$

and the quantity demand for car $Q_1 = 5600$

At point A,

the price of oil $P_{O_2} = 100$

and the quantity demand for car $Q_2 = 1800$

Now, the cross-price elasticity of demand =

$$\frac{\frac{Q_2 - Q_1}{(Q_2 + Q_1)/2}}{\frac{P_{O2} - P_{O1}}{(P_{O2} + P_{O1})/2}} = \frac{\frac{1800 - 5600}{(1800 + 5600)/2}}{\frac{100 - 75}{(100 + 75)/2}}$$

$$= \frac{\frac{-3800}{3700}}{\frac{25}{87.5}} = \frac{-1.027}{0.2857}$$

$$= -3.595$$

Here, the cross-price elasticity is about -3.595; which is negative. This implies that oil and car are complements.