3. a.) $\Delta P\% \rightarrow (2.20-1.80)/2 = 20\%$.
• short run, $\eta_D = 0.2$, $Q_D$ decrease 4%. $(0.2 \times 0.2)$
• long run, $\eta_D = 0.7$, $Q_D$ decrease 14%. $(0.2 \times 0.7)$

b.) In long run, the consumers can use substitutes instead of heat oil. So the $\eta_D$ in long run > short run

HW#5 Due February 25, 2021

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3. Suppose the price elasticity of demand for heating oil is 0.2 in the short run and 0.7 in the long run.

   a. If the price of heating oil rises from \$1.80 to \$2.20 per gallon, what happens to the quantity of heating oil demanded in the short run? In the long run? (Use the midpoint method in your calculations.)

   b. Why might this elasticity depend on the time horizon?

b. short run: less time to find the substitutes
long run: consumer can find other heats.

7. Suppose that your demand schedule for pizza is as follows:

| Price | Quantity Demanded (income = \$20,000) | Quantity Demanded (income = \$24,000) |
|---|---|---|
| \$8 | 40 pizzas | 50 pizzas |
| 10 | 32 | 45 |
| 12 | 24 | 30 |
| 14 | 16 | 20 |
| 16 | 8 | 12 |

   a. Use the midpoint method to calculate your price elasticity of demand as the price of pizza increases from \$8 to \$10 if (i) your income is \$20,000 and (ii) your income is \$24,000.

   b. Calculate your income elasticity of demand as your income increases from \$20,000 to \$24,000 if (i) the price is \$12 and (ii) the price is \$16.

7. midpoint $\frac{1}{\text{slope}} \cdot \frac{\bar{p}}{\bar{q}}$

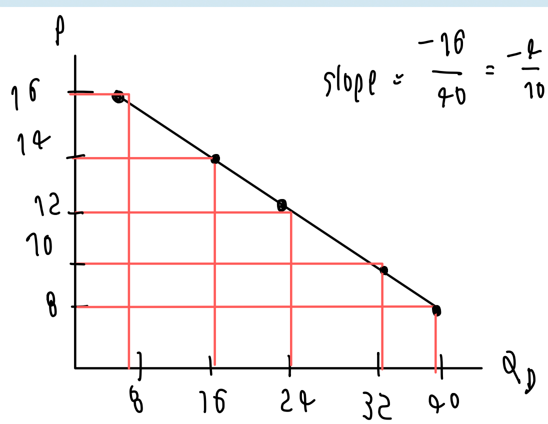
a. (i)

$$-\frac{10}{4} \cdot \frac{\frac{8+10}{2}}{\frac{40+32}{2}}$$

$$= -\frac{10}{4} \cdot \frac{9}{36}$$

$$= -10$$

$\eta_D = -10$




slope $= \frac{-16}{40} = -\frac{4}{10} = -0.4$

(ii) $\frac{1}{\text{slope}} \cdot \frac{\bar{p}}{\bar{q}}$

$$-\frac{10}{4} \cdot \frac{\cancel{\frac{8+10}{2}}\ 9}{\cancel{\frac{50+45}{2}}\ 47.5}$$

$= -4.7368$ $\eta_D$

b. (i)

| Income | $Q_D$ |
|---|---|
| 20,000 | 24 |
| 24,000 | 30 |

$$\eta_I = \frac{\%\Delta Q_D}{\%\Delta I} = \frac{1/4}{1/5} = \frac{5}{4} = 1.25$$

(ii)

| Income | $Q_D$ |
|---|---|
| 20,000 | 8 |
| 24,000 | 12 |

$$\eta_I = \frac{\%\Delta Q_D}{\%\Delta I} = \frac{1/2}{1/5} = 2.5$$