Qno 1

Price elasticity of Demand = $\frac{\% \Delta Q}{\% \Delta P}$ → (i)

$$\% \Delta P = \frac{(P_2 - P_1)}{P_1} \times 100$$

$P_1 = \$6 \quad P_2 = \$5.40$

$$\% \Delta P = \left(\frac{\$5.40 - \$6}{\$6}\right) \times 100$$

$$= \left(\frac{-0.6}{6}\right) \times 100$$

$$= -0.1 \times 100$$

$$= -10\ \%$$

Now put values in eq(i)

$$= \frac{20\ \%}{-10\ \%}$$

$$= -2\ \%$$

The elasticity coefficient of envelopes is 2

Qno2

(a) $Q = 20 - 2P$

at $P = 5$

$Q = 20 - 2(5)$

$Q = 20 - 10$

$Q = 10$

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$= -2 \times \frac{5}{10}$$

$$\boxed{\varepsilon_{PT} = -1}$$

at $P = 9$

$Q = 20 - 2(9)$

$Q = 20 - 18$

$$\boxed{Q = 2}$$

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$= -2 \times \frac{9}{2}$$

$$\boxed{\varepsilon_{PT} = -9}$$

(b) $Q = 20 - 2P$

at $P_1 = 5$

$Q = 20 - 2(5)$

$Q = 20 - 10$

$\boxed{Q_1 = 10}$

at $P_2 = 6$

$Q = 20 - 2(6)$

$Q = 20 - 12$

$\boxed{Q_2 = 8}$

Apply ARC elasticity formula.

$$e_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$= \frac{\frac{8 - 10}{\frac{8 + 10}{2}}}{\frac{6 - 5}{\frac{6 + 5}{2}}}$$

$$= \frac{-2 \times 2}{18} \Rightarrow \frac{\frac{-4}{18}}{\frac{2}{11}}$$

$$\frac{1 \times 2}{11}$$

$$= \frac{-\cancel{4}^{2}}{18} \times \frac{11}{\cancel{2}}$$

$$\varepsilon_{arc} = \frac{-22}{18} = -1.2222$$

(c) Part

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$-1 = -2 \times \frac{P}{20-2P}$$

$$1 = \frac{2P}{20-2P}$$

$$20 - 2P = 2P$$

$$20 = 2P + 2P$$

$$20 = 4P$$

$$P = \frac{\cancel{20}^{5}}{\cancel{4}_{1}}$$

$$P = 5$$

At price $P = 5$ there will be no change in Total Revenue

$P = 5$ is on the unit elastic portion of demand curve therefore, Revenue will not change.

Q no 3

$$Q = 2,000 - 100P$$

(a) at $P = \$6$

$$Q = 2,000 - 100P$$
$$Q = 2,000 - 100(6)$$
$$Q = 2,000 - 600$$
$$\boxed{Q = 1400}$$

(b) $Q = 1800$

$$Q = 2,000 - 100P$$
$$1800 = 2,000 - 100P$$
$$100P = 2,000 - 1800$$
$$100P = 200$$
$$P = 200/100$$
$$\boxed{P = \$2}$$

(c) when $P = 0$ (free Caps)

$$Q = 2,000 - 100P$$
$$Q = 2,000 - 100(0)$$

$$Q = 2,000 - 100(0)$$
$$\boxed{Q = 2,000}$$

(d) let assume at $P = 20$ when no caps were sold

$$Q = 2000 - 100P$$
$$Q = 2000 - 10(20)$$
$$Q = 2000 - 2000$$
$$\boxed{Q = 0}$$

(e) $Q = 2,000 - 100P$

$$Q = 2,000 - 100(6)$$
$$= 2,000 - 600$$
$$Q = 1400$$

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$= -100 \times \frac{6}{1400}$$

$$= \frac{-600}{1400} = \frac{-3}{7}$$

$$= -0.4285$$

Q no 4

$$Q = 100 - 10P + 0.5Y$$

(a) $P = 7, Y = 50$

$$Q = 100 - 10(7) + 0.5(50)$$

$$Q = 55$$

Q is inversely Related to price & and income is positively related to quantity.

(b) $\varepsilon_{PT} = \text{slope} \times \frac{\text{Price}}{\text{Quantity}}$

$$= -10 \times \frac{-7}{55}$$

$$= 1.272727$$

(c) $\varepsilon_{\text{Income}} = \text{slope} \times \frac{Y \text{ (Income)}}{\text{Quantity}}$

$$= 0.5 \times \frac{50}{55}$$

$$= 0.4545$$

(d) $Y = 70, P = 8$

$$Q = 100 - 10P + 0.5Y$$

$Q = 100 - 10$ $\quad Q = 100 - 10(8) + 0.5(70)$

$$\boxed{Q = 55}$$

$\varepsilon_{PT} = \text{slope} \times \text{Price} \Rightarrow -10 \times \frac{8}{55} =$

$$e_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$= -10 \times \frac{70}{500}$$

$$= -10 \times \frac{8}{55}$$

$$e_{PT} = -1.4545$$

Qno 5

$$Q = 30 - 2p$$

$$Q = 30 - 2p$$

(a) at $P = \$7$

$$Q = 30 - 2(7)$$

$$Q = 30 - 14$$

$$\boxed{Q = 16}$$

$$e_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$= -2 \times \frac{7}{16}$$

$$\boxed{e_{PT} = -0.875}$$

(b part)

at $P_1 = 5$

$$Q = 30 - 2P$$
$$Q = 30 - 2(5)$$
$$Q = 30 - 10$$
$$\boxed{Q_1 = 20}$$

at $P_2 = 6$

$$Q = 30 - 2P$$
$$Q = 30 - 2(6)$$
$$Q = 30 - 12$$
$$\boxed{Q_2 = 18}$$

$$E_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$= \frac{\frac{18 - 20}{\frac{18 + 20}{2}}}{\frac{6 - 5}{\frac{6 + 5}{2}}} \Rightarrow \frac{-2 \times \frac{2}{38}}{\frac{1 \times 2}{11}}$$

$$= \frac{-4}{38} \times \frac{11}{2}$$

$$= \frac{-44}{76} = -0.578947$$

(c part)

If the market is made up of 100 individuals with demand curve identical to Mr Smith's then, the point and arc elasticity for the conditions specified in part "a" and "b" will be the same

60000
130000

Qno6

$P_1 = \$70$

$Q_1 = 4,000$

$\varepsilon_{PT} = -2.5$

$P_2 = \$63$

$Q_2 = ?$

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$-2.5 = \text{Slope} \times \frac{70}{4,000}$$

$$-2.5 = \text{Slope} \times 0.0175$$

$$\frac{-2.5}{0.0175} = \text{Slope}$$

$$\text{Slope} = -142.85$$

Now,

$$\varepsilon_{PT} = \text{Slope} \times \frac{\text{Price}}{\text{Quantity}}$$

$$-2.5 = -142.85 \times \frac{63}{\text{Quantity}}$$

$$-2.5 = \frac{-9000}{\text{Quantity}}$$

$$\text{Quantity} = \frac{9000}{+2.5}$$

$$\boxed{\text{Quantity} = 3600}$$

when $P = \$70$ $Q = 4,000$

Total Revenue = Price × Quantity

$TR = 70 \times 4,000$

$TR = 280000$

when $P = 63$ $Q = 3600$

$TR = 63 \times 3600$

$= 226800$

The total Revenue decreases because Quantity is directly proportional to Price.

Qno7

$Q_1 = 3,000$

$P_1 = \$25$

$Q_2 = ?$

$P_2 = \$28$

(a part)

$P_2 = \$22$

$E_{arc} = -3$

$$\varepsilon_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$\varepsilon_{arc} = -3 = \frac{\frac{Q_2 - 3,000}{\frac{Q_2 + 3,000}{2}}}{\frac{22 - 25}{\frac{22 + 25}{2}}}$$

$$-3 = \frac{Q_2 - 3000 \times \frac{2}{Q_2 + 3,000}}{\frac{-3 \times 2}{47}}$$

$$-3 = \frac{2(Q_2 - 3000)}{Q_2 + 31000} \times \frac{47}{-6}$$

$$-3 = \frac{94(Q_2 - 3,000)}{-6(Q_2 + 3,000)}$$

$$18(Q_2 + 3,000) = 94Q_2 - 282000$$

$$18Q_2 + 54000 = 94Q_2 - 282000$$

$$54000 + 282000 = 94Q_2 - 18Q_2$$

$$336000 = 76Q_2$$

$$Q_2 = \frac{336000}{76} = 4421.05$$

b - part

$P_1 = \$28$

$P_2 = \$24$

$Q_1 = 3,000$

$\varepsilon_{cross} = -0.3$

$$\varepsilon_{cross} = \frac{\frac{Q_2 - Q_1}{Q_2 + Q_1/2}}{\frac{P_2 - P_1}{\frac{P_2 + 1}{2}}}$$

$$-0.3 = \frac{\frac{Q_2 - 3000}{\frac{Q_2 + 3000}{2}}}{\frac{24 - 28}{\frac{24 + 28}{2}}}$$

$$-0.3 = \frac{(Q_2 - 3,000) \times \frac{2}{Q_2 + 3,000}}{-4 \times \frac{2}{52}}$$

$$-0.3 = \frac{2(Q_2 - 3,000)}{\frac{Q_2 + 3,000}{\frac{-8}{52}}}$$

$$-0.3 = \frac{2Q_2 - 6000}{Q_2 + 3,000} \times \frac{52}{-8}$$

$$-0.3 = \frac{104Q_2 - 312000}{-8Q_2 - 24000}$$

$$-0.3(-8Q_2 - 24000) = 104Q_2 - 312000$$

$$2.4Q_2 + 7200 = 104Q_2 - 312000$$

$$7200 + 312000 = 104Q_2 - 2.4Q_2$$

$$319200 = 101.6Q_2$$

$$Q_2 = \frac{319200}{101.6}$$

$$\boxed{Q_2 = 3141.73}$$

Qno8

$Q_1 = 50000$

$P_1 = \$30$

$\varepsilon_{arc} = -4$

$P_2 = ?$

$Q_2 = 80,000$

(a) Part

$$\varepsilon_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$-4 = \frac{\frac{80,000 - 50,000}{\frac{80,000 + 50,000}{2}}}{\frac{P_2 - 30}{\frac{P_2 + 30}{2}}}$$

$$-4 = \frac{\frac{30000}{\frac{130000}{2}}}{\frac{P_2 - 30}{\frac{P_2 + 30}{2}}} \Rightarrow \frac{30000 \times 2}{\frac{130000}{P_2 - 30 \times 2}{P_2 + 30}}$$

$$-4 = \frac{60000}{130000} \times \frac{P_2 + 30}{2P_2 - 60}$$

$$-4 = \frac{60000P_2 + 1800000}{260000P_2 - 7800000}$$

$$-4(260000P_2 - 7800000) = 60000P_2 + 1800000$$

$$= -1040000P_2 + 31200000 = 60000P_2 + 1800000$$

$$= 31200000 - 1800000 = 60000P_2 + 1040000P_2$$

$$= 29400000 = 1100000P_2$$

$$P_2 = \frac{29400000}{1100000}$$

$$P_2 = 26.7272$$

(b part)

$P_1 = \$30$

$Q_1 = 50000$

$P_2 = \$27$

$Q_2 = 60{,}000$

$E_{arc} = ?$

$$E_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$E_{arc} = \frac{\frac{60{,}000 - 50{,}000}{\frac{60{,}000 + 50{,}000}{2}}}{\frac{27 - 30}{\frac{27 + 30}{2}}}$$

$$= \frac{\frac{10{,}000}{\frac{110000}{2}}}{\frac{-3}{\frac{57}{2}}} \Rightarrow \frac{\frac{10{,}000 \times 2}{110000}}{\frac{-3 \times 2}{57}}$$

$$= \frac{\frac{20000}{110000}}{\frac{-6}{57}} \Rightarrow -\frac{20000}{110000} \times \frac{57}{-6}$$

$$= -\frac{1140000}{660000}$$

$$\varepsilon_{arc} = -1.727273$$

Q no 9

$$\varepsilon_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$Q_1 = 100 \quad Q_2 = 120$

$P_1 = \$400 \quad P_2 = \$350$

$$\varepsilon_{arc} = \frac{\frac{120 - 100}{\frac{120 + 100}{2}}}{\frac{350 - 400}{\frac{350 + 400}{2}}}$$

$$= \frac{\frac{20}{220}}{\frac{-50}{750}} \Rightarrow \frac{20 \times 2}{220} \quad -50 \times \frac{2}{750}$$

$$e_{arc} = \frac{40}{220} \times \frac{750}{-100}$$

$$= \frac{30000}{-22000}$$

$$\boxed{e_{arc} = -1.363636}$$

$$e_{cross} = \frac{\frac{Q_{2B} - Q_{1B}}{\frac{Q_{2B} + Q_{1B}}{2}}}{\frac{P_{2A} - P_{1A}}{\frac{P_{2A} + P_{1A}}{2}}}$$

$$Q_{1B} = 50 \quad Q_{2B} = 56$$

$$P_{1A} = 400 \quad P_{2A} = 350$$

$$e_{cross} = \frac{\frac{56 - 50}{\frac{56 + 50}{2}}}{\frac{350 - 400}{\frac{350 + 400}{2}}} \Rightarrow \frac{\frac{6}{\frac{106}{2}}}{\frac{-50}{\frac{750}{2}}}$$

$$= \frac{6 \times \frac{2}{106}}{-50 \times \frac{2}{750}}$$

$$= \frac{\frac{12}{106}}{\frac{-100}{750}} \Rightarrow \frac{12}{106} \times \frac{750}{-100}$$

$$\boxed{E_{cross} = \frac{9000}{-10600} = -0.849}$$

Conclusion:

The Goods are Complemantary to each other.

Q no 10

Elasticity

P	Q	Point	Arc	TR	MR
7.00	100	-14	~~12~~ -9	700	1300-700 = 600
6.500	200	-6.5	~~12.5~~ -5	1300	1800-1300 = 500
6.00	300	-4	-3.2857	1800	2200-1800 = 400
5.500	400	-2.75	-2.3352	2200	2500-2200 = 300
5.00	500	-2	-1.3056	2500	2700-2500 = 200
4.50	600	-1.5	-0.7647	2700	2800-2700 = 100
4.00	700	-1.142	-0.5786	2800	2800-2800 = 0
3.50	800	-0.875		2800	2700-2800 = -100
3.00	900	-0.667		2700	2500-2700 = -200
2.50	1000	-0.5		2500	

Q no 11

Relation:

(a) Substitute products
Cross elasticity positive

(b) Relation:
Substitute products
cross elasticity positive

(c) Relation:
Complemantary products
cross elasticity Negative

(d) Relation: Not Related to each other
cross elasticity zero.

Qno 12
(a part)

$$\varepsilon_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$Q_1 = 70$, $Q_2 = 130$

$P_1 = \$3.50$; $P_2 = \$2.5$ 0.15

$$\varepsilon_{arc} = \frac{\frac{130 - 70}{\frac{130 + 70}{2}}}{\frac{2.5 - 3.5}{\frac{2.5 + 3.5}{2}}}$$

$$= \frac{\frac{60}{\frac{200}{2}}}{\frac{-1}{\frac{6}{2}}}$$

$$= \frac{600 \times \frac{2}{200}}{-1 \times \frac{2}{6}}$$

$$= \frac{\frac{1200}{200}}{\frac{-2}{6}} \Rightarrow \frac{1200}{200} \times \frac{6}{-2}$$

$$\boxed{\varepsilon_{arc} = -1.8}$$

(b - part)

$Q_1 = 40 \quad , \quad Q_2 = 90$

$P_1 = \$3.50 \quad P_2 = \$2.50$

$$\varepsilon_{arc} = \frac{\frac{Q_2 - Q_1}{\frac{Q_2 + Q_1}{2}}}{\frac{P_2 - P_1}{\frac{P_2 + P_1}{2}}}$$

$$e_{arc} = \frac{90 - 40}{\frac{90 + 40}{2}} \Big/ \frac{2.50 - 3.50}{\frac{2.50 + 3.50}{2}}$$

$$= -\frac{0.192308}{0.08333}$$

$$= -2.307696$$

$$e_{cross} = \frac{Q_{2B} - Q_{1B}}{\frac{Q_{2B} + Q_{1B}}{2}} \Big/ \frac{P_{2A} - P_{1A}}{\frac{P_{2A} + P_{1A}}{2}}$$

$$= \frac{90 - 40}{\frac{90 + 40}{2}} \Big/ \frac{2.50 - 3.50}{\frac{2.50 + 3.50}{2}}$$

$$= -2.307$$

Q no 13

$\varepsilon_{PT} = 0.7$

Income $= \varepsilon Y = 0.9$

(a) part

Yes, definitely reduce the price we know this because the elasticity of demand is positive meaning the curve is elastic, or horizontal. A reduction in the price will increase the total revenue (TR) due to the quantity demanding rising

(b) part

In this Situation, people income rises therefore the quantity of shoes purchasing increases as the income increases.

Q no 14

If the cross-price elasticity between the UBS and new Store is 1.5 (so they are Substitutes). If the new Store have the same books and give 20% lower than UBS and UBS does not respond to its Compitition so it is going to loss

20 * 1.5 = 30% loss

Q no 15

a part

~~Price elasticity~~ $= (P_2 - P_1)/P_1$

$$\frac{(3-3.5)}{3.5}$$

$$= -0.142857$$

$$\text{Price elasticity} = \frac{0.2}{0.142}$$

$$= 1.408451$$

b part

They are complementary goods.
The effect is measured by Calculating the cross price elasticity

$$= \frac{\%\Delta Q}{\%\Delta P} = -\frac{0.1}{0.14}$$

$$= -0.7$$

c part

The new pricing policy is beneficial for the supermarket because 14% change in price increases demand by 20%. So the commodity is elastic