**_Answer on Question #81445, Economics / Microeconomics_**

a) $P_0 = 6$; $Q_0 = 550$

$P_1 = 6.5$; $Q_1 = 520$

% change of price is

$$\frac{\Delta P}{P_1} = \frac{0.5}{6.5} \approx 0.08$$

It's 8%.

% change of quantity is

$$\frac{\Delta Q}{Q_0} = \frac{30}{550} \approx 0.05$$

It's 5%.

$$PED = \frac{\%Q_{change}}{\%P_{change}} = \frac{5}{8} = 0.625$$

PED<1 - ***inelastic.***

b) $P_0 = 30$; $Q_0 = 30$

$P_1 = 27{,}25$; $Q_1 - ?$

$$PED = \frac{\%Q_{change}}{\%P_{change}} = \frac{\frac{\Delta Q}{Q_0}}{\frac{\Delta P}{P_1}} = \frac{\Delta Q \cdot P_1}{Q_0 \cdot \Delta P}$$

$PED = -1.85$

$$\frac{\Delta Q \cdot P_1}{Q_0 \cdot \Delta P} = -1.85$$

$$\Delta Q \cdot P_1 = -1.85 \cdot Q_0 \cdot \Delta P$$
$$\Delta Q = \frac{-1.85 \cdot Q_0 \cdot \Delta P}{P_1}$$

$$\Delta Q = \frac{-1.85 \cdot 30 \cdot (-2.75)}{27.25} \approx \frac{152.625}{27.25} \approx 6$$

$\Delta Q = Q_1 - Q_0$

$Q_1 = \Delta Q + Q_0$

$Q_1 = 6 + 30 = 36$

c) *Q = 450 - 2.5P*

First we need to obtain the derivative of the demand function when it's expressed with Q as a function of P. Since quantity (Q) goes down by 2.5 each time price (P) goes up by 1,

$$\frac{\Delta Q}{\Delta P} = -2.5$$

Next we need to find the quantity demanded at each associated price and pair it together with the price: (40; 350*).

(* Q = 450 - 2.5P, P=40 : Q=450-100=350)

Then we plug those values into our point elasticity of demand formula to obtain the following:

$$e = \frac{\Delta Q}{\Delta P} \cdot \left(\frac{P}{Q}\right)$$

$$e = \frac{\Delta Q}{\Delta P} \cdot \left(\frac{P}{Q}\right) = -2.5 \cdot \frac{40}{350} = -0.29.$$