More Elasticity Examples.

Example 2.

$E(2) = 0.8$ Approximate the % change in demand if p increases from \$2 to \$2.25.

Approximate (% change in demand) = $E(2) \times$ (% change in p)

(% change in p) $= 100 \frac{.25}{2}\% = \frac{1}{8} \times 100\% = 12.5\%$

Approx. % change in demand $= 0.8 \times 12.5 = 10\%$
Demand will decrease by about 10%.

Example 3. $E(4) = 1.2$ and p decreases from \$4 to \$3.80.

a) What is the approximate per-cent change in demand?
b) Will revenue increase or decrease?
c) Will demand increase or decrease?

a) (% change in p) $= \frac{.2}{4} \times 100\% = 5\%$ (or -5%)

(% change in demand) $\approx E(4) \times 5\% = 1.2 \times 5\% = \boxed{6\%}$

b) Since $E > 1$ means revenue decreases when p increases, revenue will increase if p decreases from \$4 to \$3.80.

c) Since demand decreases when p increases, demand will increase when p decreases.

Example 4.

$x^2+2p = 1200$ a) Find $f(p)$ and $E(p)$.
$0<p<600$
b) On what interval is demand inelastic?
When is revenue a max? (at what p)

a) $x=f(p)$ so solve $x^2+2p=1200$ for x.

$x^2 = 1200-2p$ $\quad x=\sqrt{1200-2p}$ ($x \geq 0$ in this context).

$$\boxed{f(p)=\sqrt{1200-2p}}$$

$$E(p)=\frac{-p\,f'(p)}{f(p)} = \frac{-p\left[\cancel{\tfrac{1}{2}}(1200-2p)^{-1/2}(\cancel{-2})\right]}{(1200-2p)^{1/2}}$$

$$= \frac{p}{(1200-2p)^{1/2}(1200-2p)^{1/2}} = \boxed{\frac{p}{1200-2p}=E(p)}$$

b) Demand is inelastic where $E(p)<1$

Solve $\frac{p}{1200-2p}<1$. Since $1200-2p>0$ we can multiply without reversing the inequality.

$$p<1200-2p$$
$$3p<1200$$
$$\boxed{0<p<400}$$

Revenue is at a max. if $E(p)=1$ so at $p=400$.