Section 10.7 Solutions

#35] $x = f(p) = 4800 - 4p^2$

$$f'(p) = -8p$$

$$E(P) = -\frac{p\,f'(p)}{f(P)} = -\frac{p(-8p)}{4800-4p^2} = \frac{4(2p^2)}{4(1200-p^2)}$$

$$= \frac{2p^2}{1200-p^2}$$

#47] $x = f(p) = 12{,}000 - 10p^2 = 10(1{,}200 - p^2)$

$$f'(p) = -20p$$

$$E(p) = -\frac{-20p\,p}{10(1200-p^2)} = \frac{2p^2}{1200-p^2}$$

A) $E(10) = \frac{2(100)}{1200-100} = \frac{200}{1100} = \frac{2}{11} < 1$ inelastic

B) $E(20) = \frac{2(400)}{1200-400} = \frac{800}{800} = 1$ Unit elasticity

C) $E(30) = \frac{2(900)}{1200-900} = \frac{1800}{300} = 6 > 1$ elastic

#51] $p + 0.004x = 32$ for $0 \le p \le 32$

$f(p) = x = 250(32-p) = 8000 - 250p$

$f'(p) = -250$

$$E(p) = -\frac{p(-250)}{250(32-p)} = \frac{p}{32-p}$$

Find $E(12) = \frac{12}{32-12} = \frac{12}{20} = \frac{3}{5} < 1$

If p increases 4% then

x decreases $\frac{3}{5}(4\%) \approx 2.4\%$

#55] demand is elastic when

$E(P) > 1$ $\qquad E(p) = 1 = \frac{p}{32-p}$

$32 - p = p$

$32 = 2p$

$p = 16$

so elastic for $p > 16$ but in domain

Elastic Demand for

$16 < p \le 32$