Selected Problems 10.7

19 Relative rate of change

$f(x) = 420 - 5x$ at $x = 55$

$f'(x) = -5$

$$\frac{f'(55)}{f(55)} = \frac{-5}{420-5(55)} = -0.0345$$

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

$f'(p) = -8p$

$$E(p) = -\frac{p f'(p)}{f(p)} = -\frac{-8p^2}{4800-4p^2} = \frac{2p^2}{12-p^2}$$

55 Follows example in notes

$p + .004x = 32$, $0 \le p \le 32$

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

$f'(p) = -250$

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

Demand is elastic when $E(p) > 1$

$$\frac{p}{32-p} > 1$$

$$p > 32 - p$$

$$2p > 32$$

$$32 \ge p > 16$$