## Try it Yourself: Roofer Market Power

Suppose the local roofing company has market power and faces the demand curve Q = 200 - P/10, where Q is the number of roof jobs, and P is in dollars. The marginal cost for the firm is MC = 200 + 16Q.

- 1. What is marginal revenue?
- 2. What is the profit maximizing output?
- 3. Price?
- 4. If the firm's demand changes to Q = 3500/3 P/12, what is the new marginal revenue?

- 5. Profit maximizing output?
- 6. Price?

 marginal revenue MR = ∂PQ/∂Q, or use the MR formula. Either way, we need to know P = f(Q). Re-write the demand curve as the inverse demand curve:

$$Q = 200 - P/10$$
  
 $P/10 = 200 - Q$   
 $P = 2000 - 10Q$ 

Use the formula we derived before MR = a - 2bQ = 2000 - 2(10)Q = 2000 - 20Q. (Or calculus way  $MR = \frac{\partial PQ}{\partial Q} = \frac{\partial 2000Q - 10Q^2}{2} = 2000 - 20Q$ .)

profit maximizing output MR = MC. We know MC = 200 + 16Q. Set MR = MC.

$$2000 - 20Q = 200 + 16Q$$
  
 $1800 = 36Q$   
 $Q^* = 50$ 

- 3. profit maximizing price Plug  $Q^*$  into the demand curve.  $P^* = 2000 10(50) = 2000 500 = 1500$ .
- 4. Firm's demand declines, new MR? Find inverse demand curve:

$$Q = 3500/3 - P/12$$
  
 $P = 14000 - 12Q$ 

MR = 14000 - 24Q

5. Firm's demand declines, new Q\*?

$$MR = MC$$

$$14000 - 24Q = 200 + 16Q$$

$$345 = Q^*$$

6. New profit maximizing price? Plug into new demand curve  $P^* = 14000 - 24(345) = 5720$