

## \*lecture # 3: Quadratic Models.

4] The demand and supply functions for a commodity are given by  $p^2 + 4q = 1600$ , and  $300 - p^2 + 2q = 0$ . At  $p = \$30$ , is there a market shortage, surplus, equilibrium?

$$D: p^2 + 4q = 1600$$

$$S: 300 - p^2 + 2q = 0$$

$$p = \$30$$

$$D: 30^2 + 4q = 1600 \rightarrow \begin{array}{r} 900 + 4q = 1600 \\ -900 \quad -900 \\ \hline 4q = 700 \end{array} \rightarrow \boxed{q = 175}$$

at  $p = 30$ , the quantity demanded is 175 units.

$$S: 300 - 30^2 + 2q = 0$$
$$300 - 900 + 2q = 0 \rightarrow \begin{array}{r} -600 + 2q = 0 \\ +600 \quad +600 \\ \hline 2q = 600 \end{array} \rightarrow q = \frac{600}{2} = 300 \text{ units}$$

at  $p = 30$ , the quantity supplied is 300 units.

$$q_{\text{dem.}} < q_{\text{supp.}}$$

there is a market surplus