

## Properties of Cost Functions

$$C = C(q, r, w)$$

## General Cost Function

$$C = C(q, r, w)$$

## General Cost Function

$$C = C(q, r, w)$$

The higher the value of  $q$ , the greater the total cost of production

## General Cost Function

Ditto for  $r$  and  $w$

$$C = C(q, r, w)$$

The higher the value of  $q$ , the greater the total cost of production

## General Cost Function

$$C = C(q, r, w)$$

I illustrate the problems with seven trick questions

## First Trick Question

- Acme Widgets' costs are now \$100. It doubles output.

## First Trick Question

- Acme Widgets' costs are now \$100. It doubles output.
- Will costs double?

## First Trick Question

- Acme Widgets' costs are now \$100. It doubles output.
- Will costs double?
- They will surely go up but may or may not double.

## First Trick Question

- Acme Widgets' costs are now \$100.
- They will surely go up but may or may not double.

Constant returns to scale ( $C = \$200$ )

Increasing returns to scale ( $\$100 < C < \$200$ )

Decreasing returns to scale ( $C > \$200$ )

## Second Trick Question

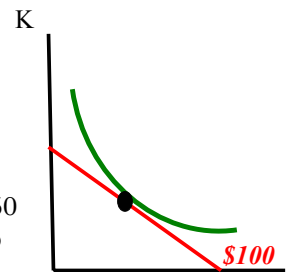
- Acme Widgets' costs are now \$100; \$50 of payments to workers and \$50 of payments to capital.

## Second Trick Question

- Acme Widgets' costs are now \$100.
- If wage rates increase by 100%, will total costs go from \$100 to \$150?

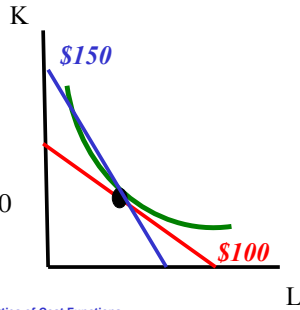
## Second Trick Question

- Acme Widgets' costs are now \$100; \$50 of payments to workers and \$50 of payments to capital.



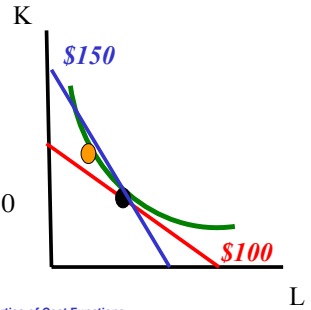
## Second Trick Question

- Acme Widgets' costs are now \$100; \$50 of (factor) payments to workers and \$50 of payments to capital.



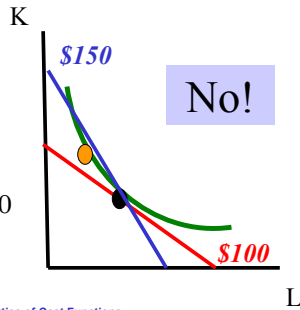
## Second Trick Question

- Acme Widgets' costs are now **Substitute!** (factor) payments to workers and \$50 of payments to capital.



## Second Trick Question

- Acme Widgets' costs are now **If wage rates increase by 100%, will total costs go from \$100 to \$150?**



## Third Trick Question

- Is it possible that higher wage rates will to enough substitution to lower total costs for the given level of output?

## Third Trick Question

- Is it possible that higher wage rates will to enough substitution to lower total costs for the given level of output?
- Assume a new solution of**
  - \$60 of capital payments and \$30 of labor costs

## Third Trick Question

- Is it possible that higher wage rates will to enough substitution to lower total costs for the given level of output?
- Assume a new solution of**
  - \$60 of capital payments and \$30 of labor costs
- At the old wage rate**
  - \$60 of capital payments and \$15 of labor costs

### Third Trick Question

- Is it possible that higher wage rates will to enough substitution to lower total costs for the given level of output?
  - **Assume a new solution of**
- No! This could happen only if Acme were overpaying in the first place.
- total and r costs  
total  
payments and  
\$15 of labor costs

End

©2004 Charles  
W. Upton