



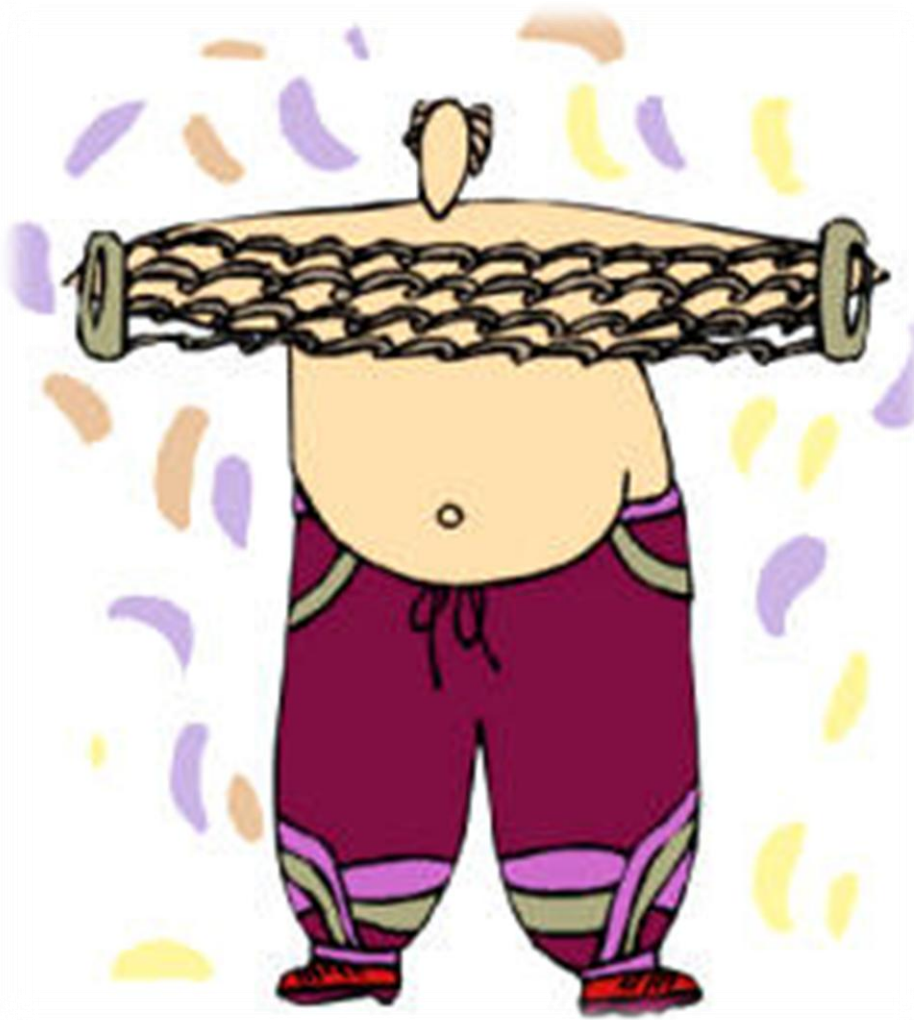
If it is important to you, you will find a way
If not, you will find an excuse.

Frank Banks

Test Yourself: Elasticity



What is elasticity?





Elasticity is the responsiveness or sensitivity to a change in price, the extent to which a change in price will cause quantity demanded to change, *ceteris paribus*.

What is price
elasticity of demand (PED or E_d)?



Elasticity of Demand





Price elasticity of demand is the *ratio* of the percentage change in the quantity demanded of a product to a percentage change in its price.

$$E_d = \frac{\% \Delta Q_d}{\% \Delta P}$$

**Suppose a university's enrollment drops
by 20% because tuition rose by 10%,
what is the price elasticity of demand?**





Tuition increased 10% (P)
Enrollment decreased 20% (Q_d)

$$E_d = \frac{\% \Delta Q_d}{\% \Delta P} \quad E_d = \frac{-20\%}{+10\%} = 2$$

The price elasticity of demand is 2.

**How is the percent increase or decrease
of two numbers calculated?**





Percent change is the difference between the two numbers divided by the *original* number.

$$(\#1 - \#2) \div \#1$$



If there is a decrease from 5 units to 3 units, what is the percent change?



a decrease from 5 units to 3 units

$$(\#1 - \#2) \div \#1$$

$$(5 - 3) \div 5 = .40 = 40\%$$

There is a 40% change.



What is elastic demand?

Elastic Demand

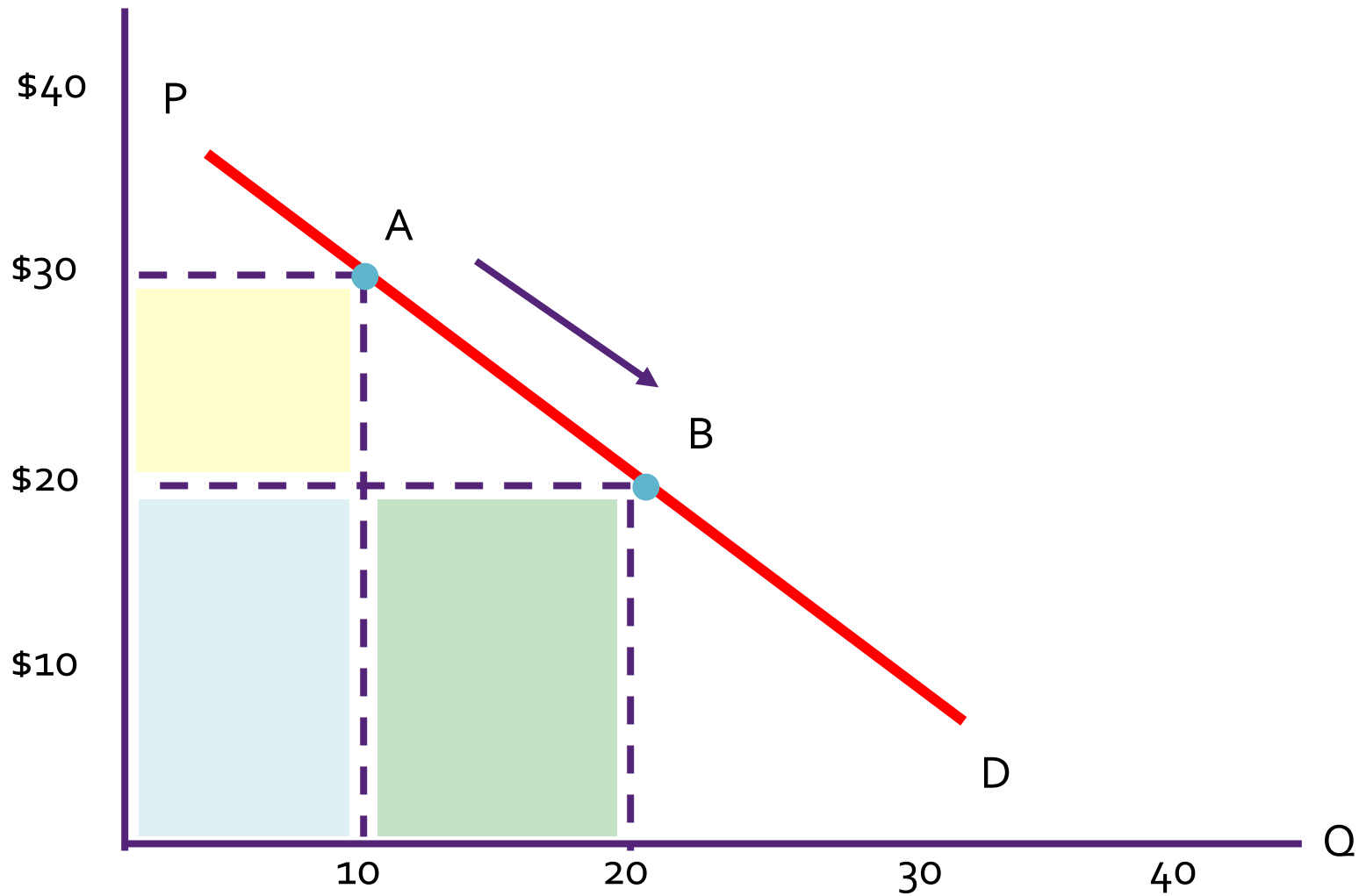




Elastic demand is a condition in which the percent change in quantity demanded is greater than the percentage change in price.

$$\% \Delta Q_d > \% \Delta P$$

How do we know the demand curve shown below is elastic ($E_d > 1$)?





We know the demand curve shown on the previous slide is elastic because the percent change in the quantity demanded is *greater* than the percent change in price.



Calculations for chart on slide 14.

$$\% \Delta Q = \frac{10}{15} = .66 = 66\%$$

$$\% \Delta P = \frac{10}{25} = .40 = 40\%$$

$$E_d = \frac{\% \Delta Q}{\% \Delta P} = \frac{.66}{.40}$$

$$E_d = 1.65$$



What is inelastic demand?

Inelastic Demand

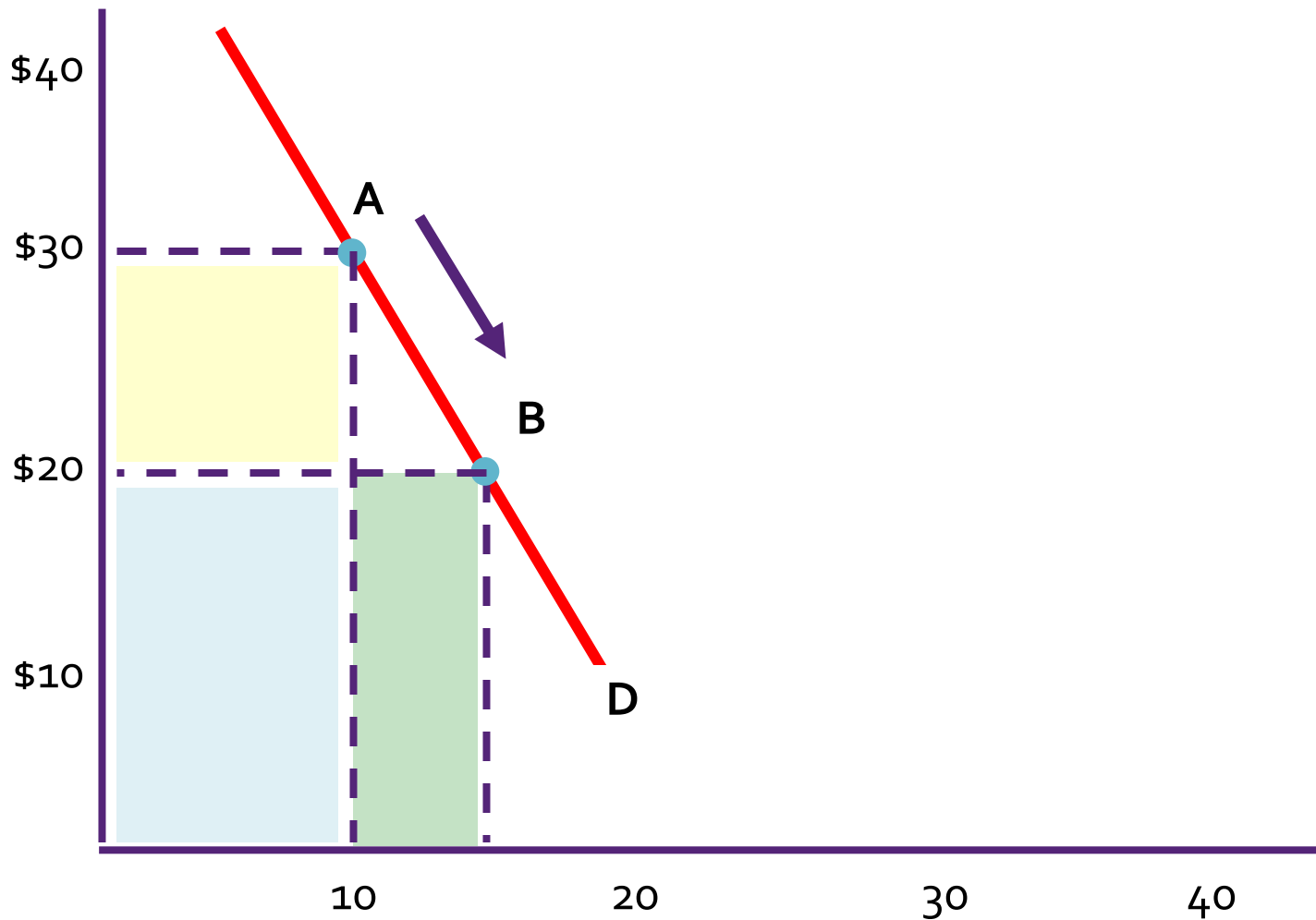




Inelastic demand is a condition in which the percent change in quantity demanded is less than the percentage change in price.

$$\% \Delta Q_d < \% \Delta P$$

How do we know the demand curve shown below is inelastic ($E_d < 1$)?





We know the demand curve shown on the previous slide is inelastic because the percent change in the quantity demanded is *less* than the percent change in price.



Calculations for chart on slide 19.

$$\% \Delta Q = \frac{5}{13} = .38 = 38\%$$

$$\% \Delta P = \frac{10}{25} = .40 = 40\%$$

$$E_d = \frac{\% \Delta Q}{\% \Delta P} = \frac{.38}{.40}$$

$$E_d = 0.95$$

What is a unitary elastic demand curve?

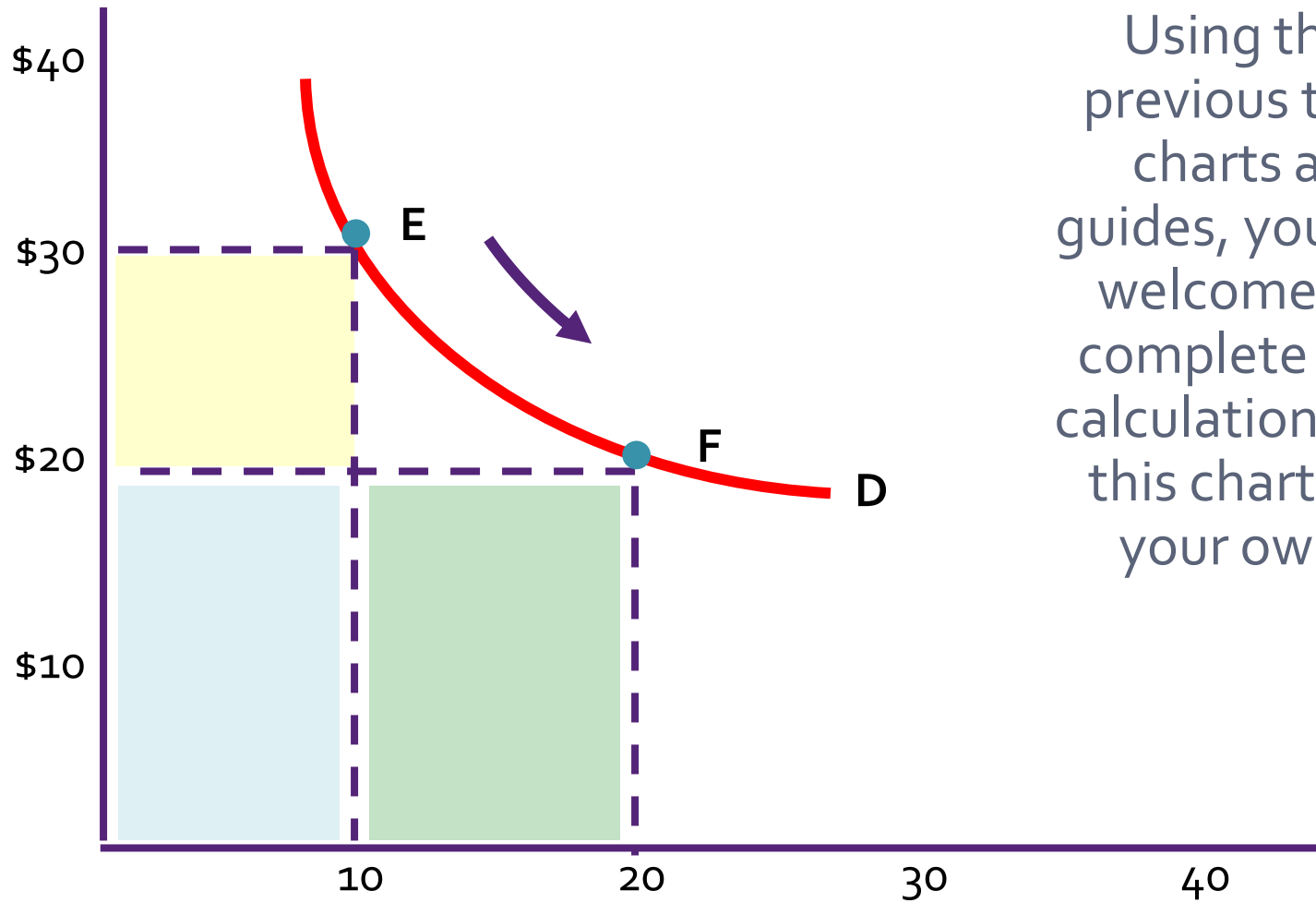




A **unitary elastic demand curve** is one in which the percent change in the quantity demanded is *equal* to the percent change in price.

Chart: Unitary Elastic Demand

$$E_d = 1$$



Using the previous two charts as guides, you are welcome to complete the calculations for this chart on your own.



PED Summary

- If price increases and the revenue gained is *less* than the revenue lost, the demand curve is **price elastic**, > 1 .
- If price increases and the revenue gained is *greater* than the revenue lost, the demand curve is **price inelastic**, < 1 .
- If total revenue does *not change* when price increases, the demand curve is **unitary elastic**, value equals 1.



Table: A Comparison of Elasticities #1

Price Elastic	
↑ An <i>increase</i> in price...	↓ <i>reduces</i> total revenue.
↓ A <i>reduction</i> in price...	↑ <i>Increases</i> total revenue.
Total revenue moves in the direction of the quantity change.	
Price Inelastic	
↑ An <i>increase</i> in price...	↑ <i>Increases</i> total revenue.
↓ A <i>reduction</i> in price...	↓ <i>reduces</i> total revenue.
Total revenue moves in the direction of the price change.	
Unit price Elastic	
↑ An <i>increase</i> in price...	● no change in total revenue.
↓ A <i>reduction</i> in price...	● no change in total revenue.
Total revenue does not change as price changes.	

What is a perfectly elastic demand curve?



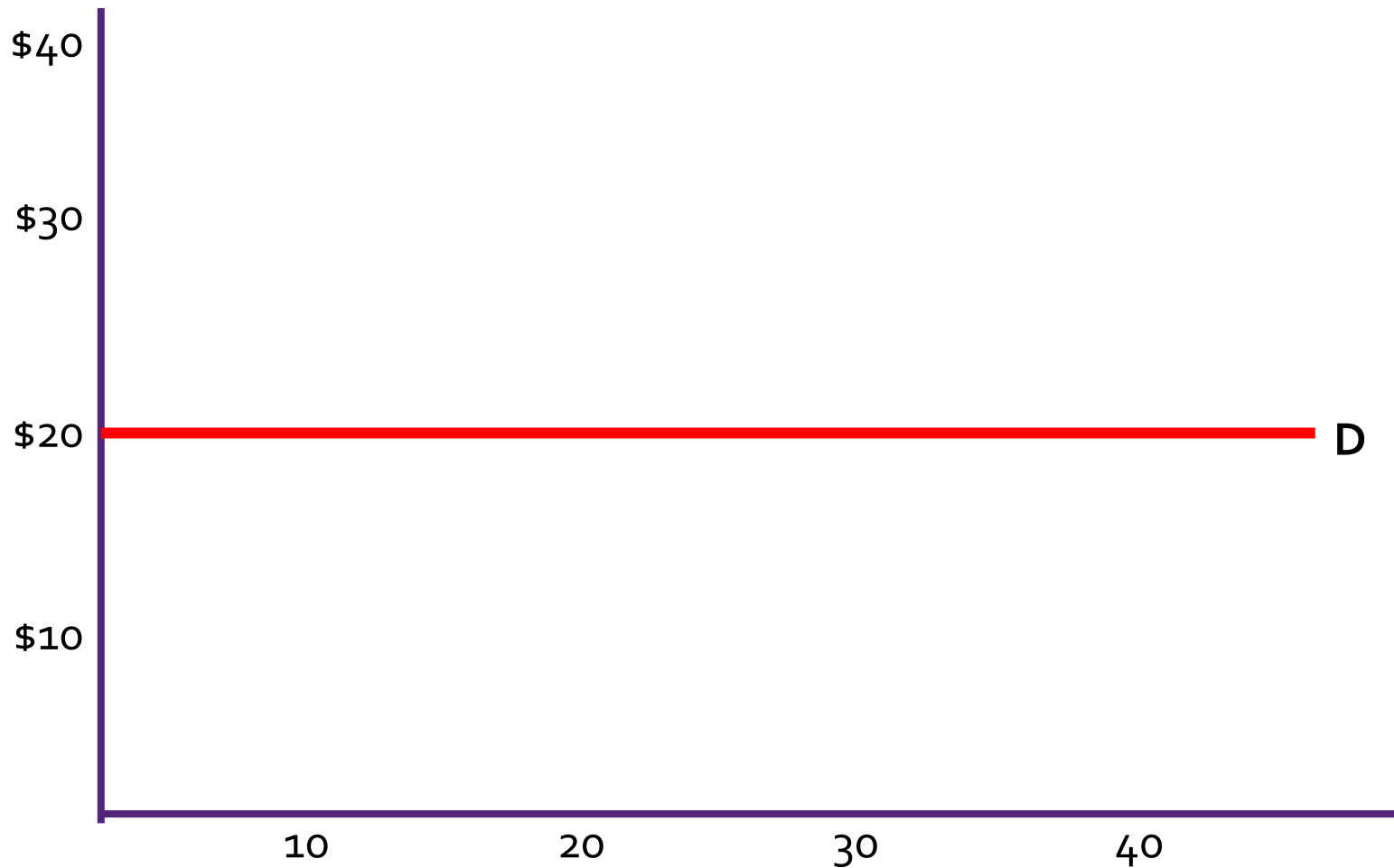


With a **perfectly elastic demand curve**, a small percent change in price brings about an infinite (∞) percent change in the quantity demanded.

Chart: Perfectly Elastic Demand



$$E_d = \infty$$



What is a perfectly inelastic demand curve?





With a **perfectly inelastic demand curve** the quantity demanded does not change as the price changes.

Perfectly Inelastic Demand

$$E_d = 0$$

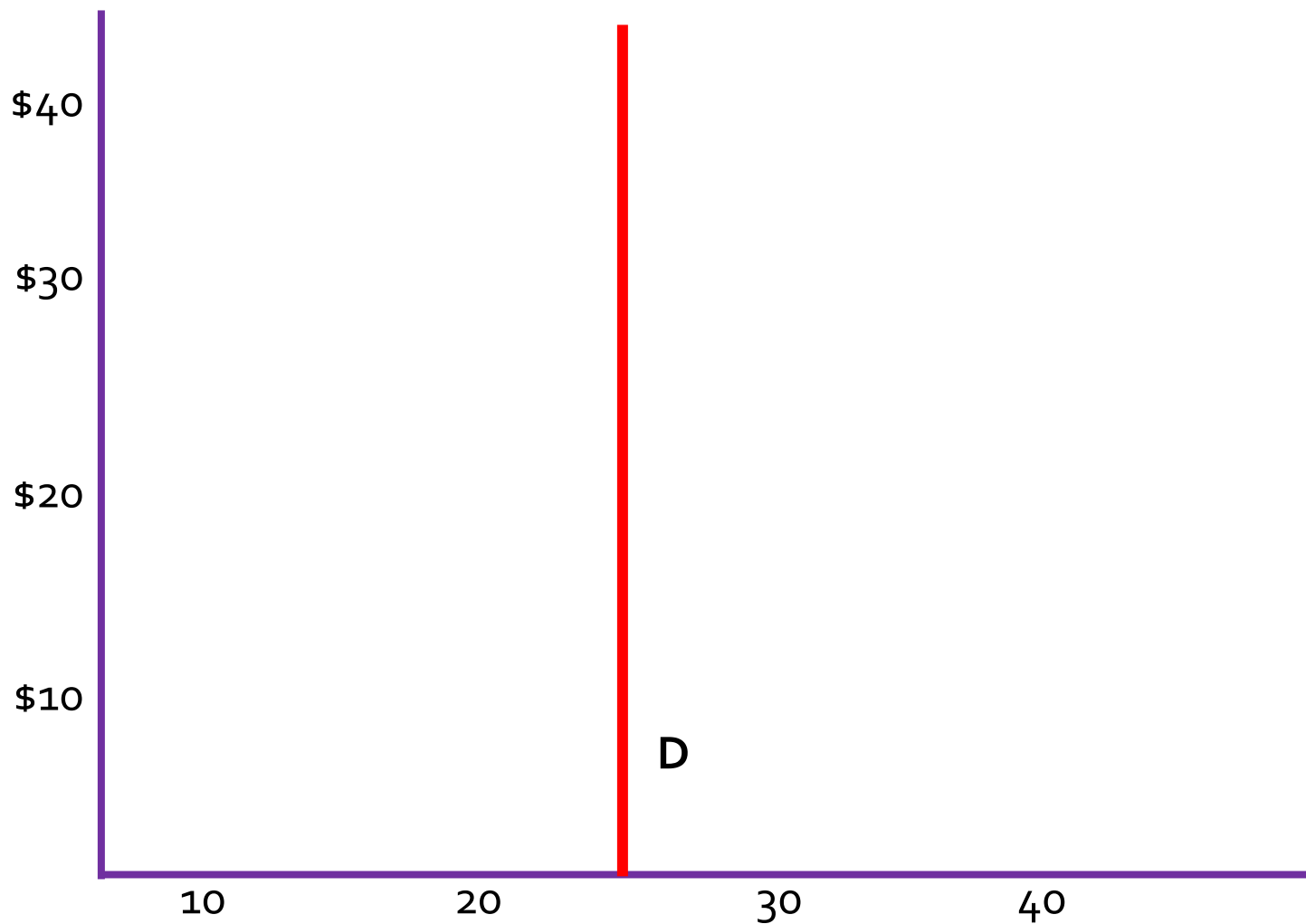




Table: A Comparison of Elasticities #2

Absolute value of elasticity coefficient	Demand is	Description	Impact on a total Revenue of a	
			Price increase	Price decrease
$E_d > 1$	Elastic or relatively elastic	Quantity demanded changes by a larger percentage than does price	Total revenue decreases	Total revenue increases
$E_d = 1$	Unit or Unitary elastic	Quantity demanded changes by the same percentage as does price	Total revenue remains unchanged	Total revenue remains unchanged
$E_d < 1$	Inelastic or relatively inelastic	Quantity demanded changes by a smaller percentage than does price	Total revenue increases	Total revenue decreases

What are the determinants of the elasticity of demand?





The factors that influence demand sensitivity
are:

- availability of substitutes
 - percent of income
 - luxury or necessity
 - time period
 - market definition

**What are some other measures of
elasticity?**





Other elasticity measures:

- **Cross elasticity of demand** – the ratio of the percent change in quantity demanded of a good to a given percent change in the price of another good

$$E_c = \frac{\% \Delta Q \text{ demanded of good A}}{\% \Delta \text{ price of good B}}$$

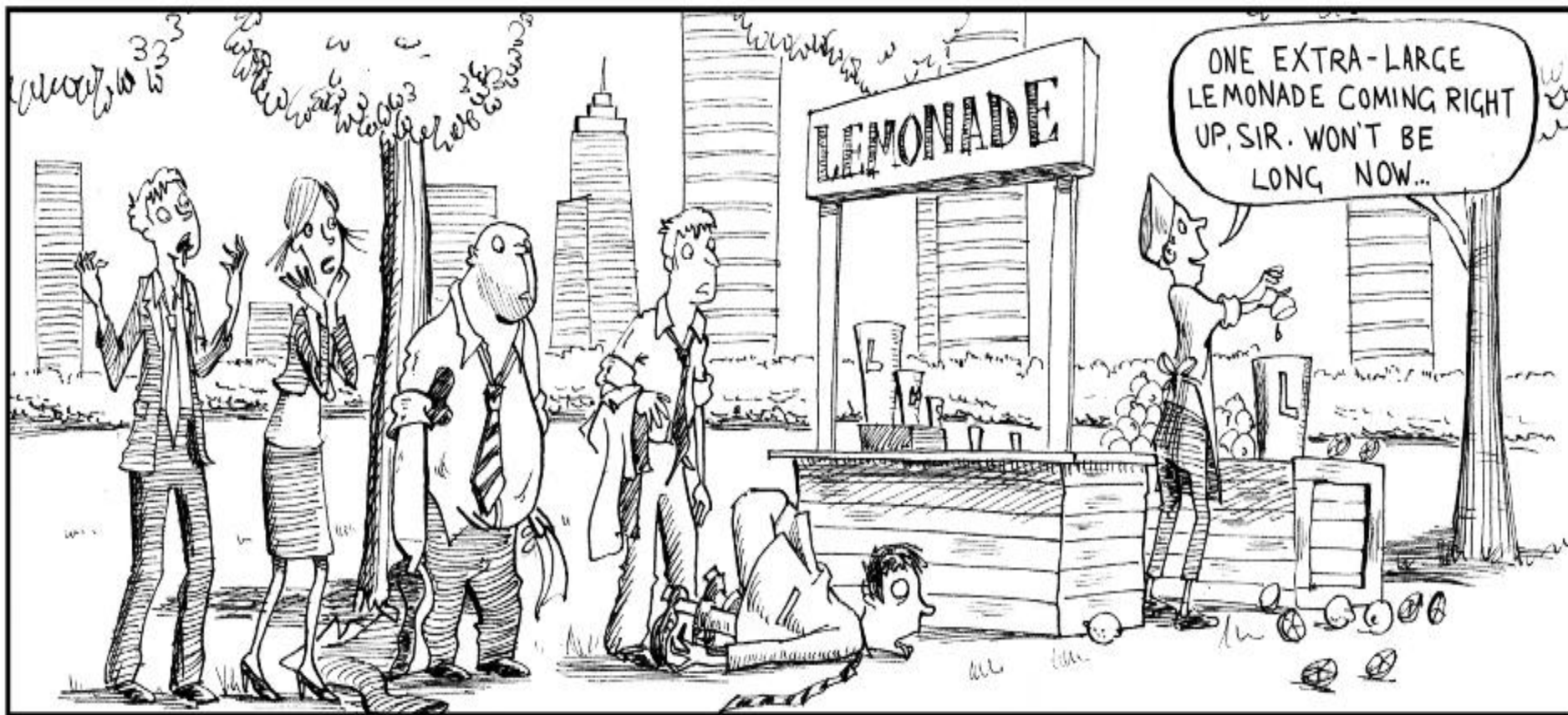


Continued

- **Income elasticity of demand** – the ratio of the percent change in the quantity demanded of a good to a given percent change in income

$$E_d = \frac{\% \Delta Q_d}{\% \Delta \text{income}}$$

What is price elasticity of supply (PES or E_s)?





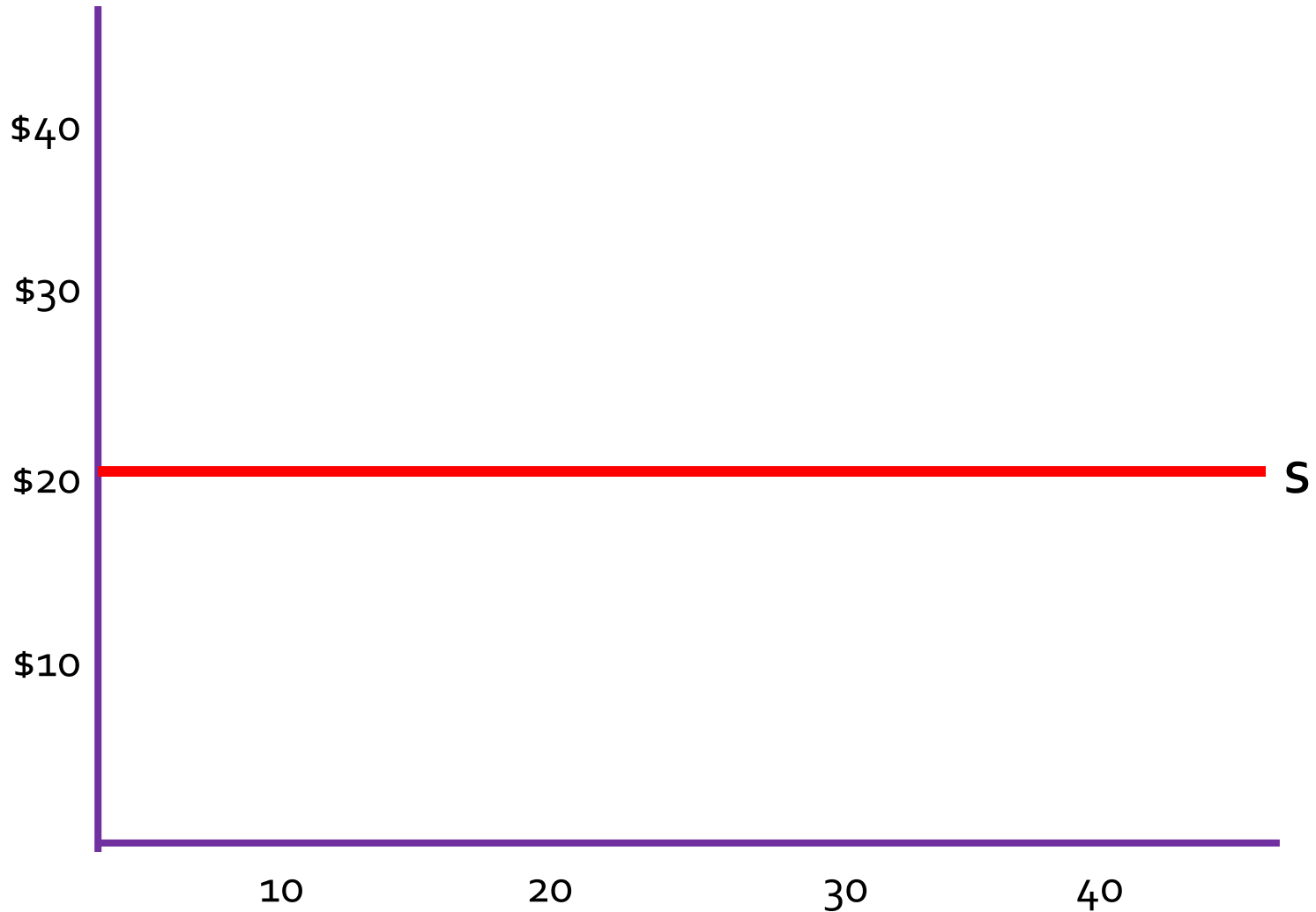
Price elasticity of supply is the ratio of the percent change in the quantity supplied of a product to the percent change in its price.

$$E_s = \frac{\% \Delta \text{ in } Q \text{ supplied}}{\% \Delta \text{ in price}}$$

Perfectly Elastic Supply

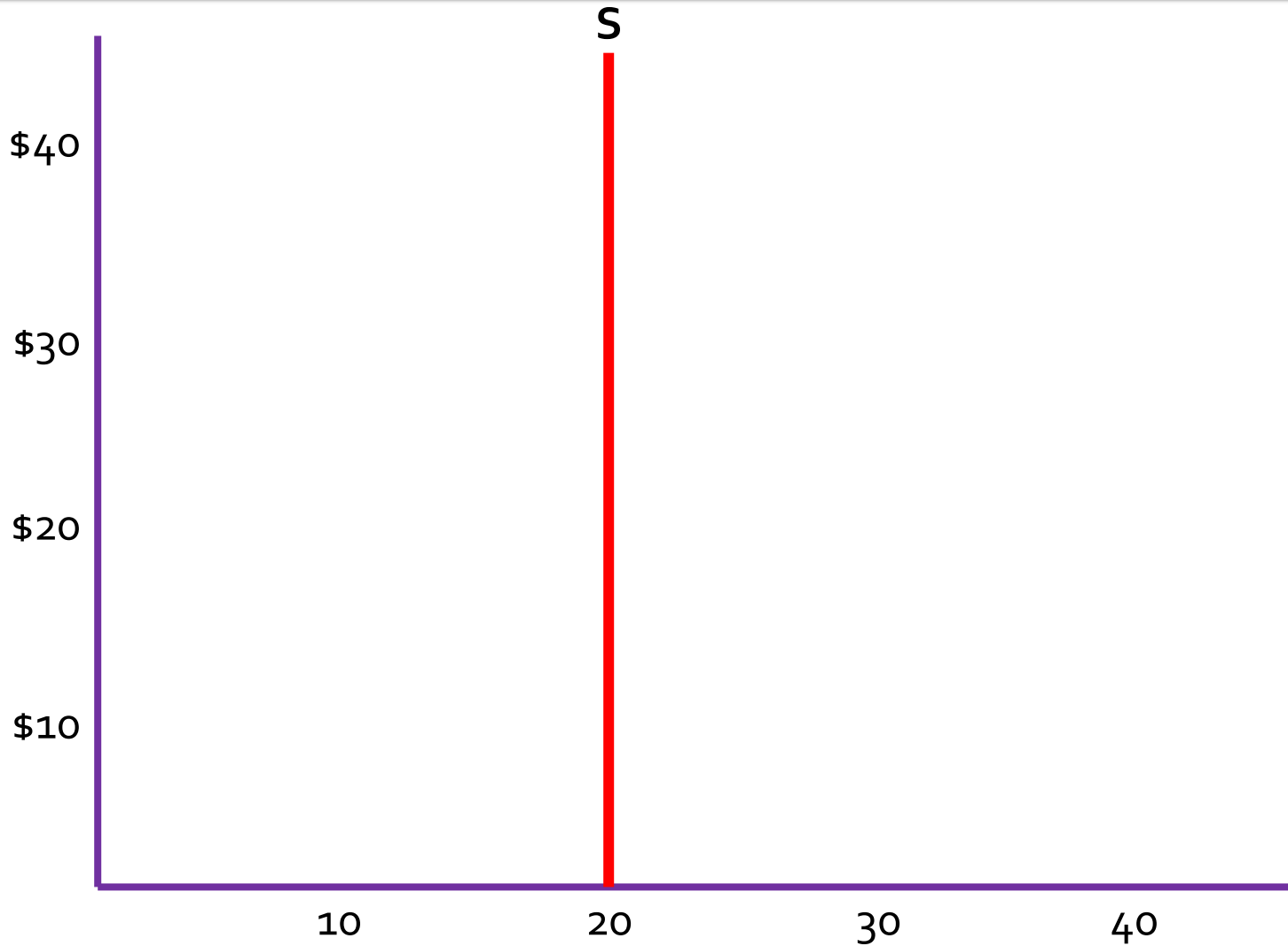


$$E_s = \infty$$



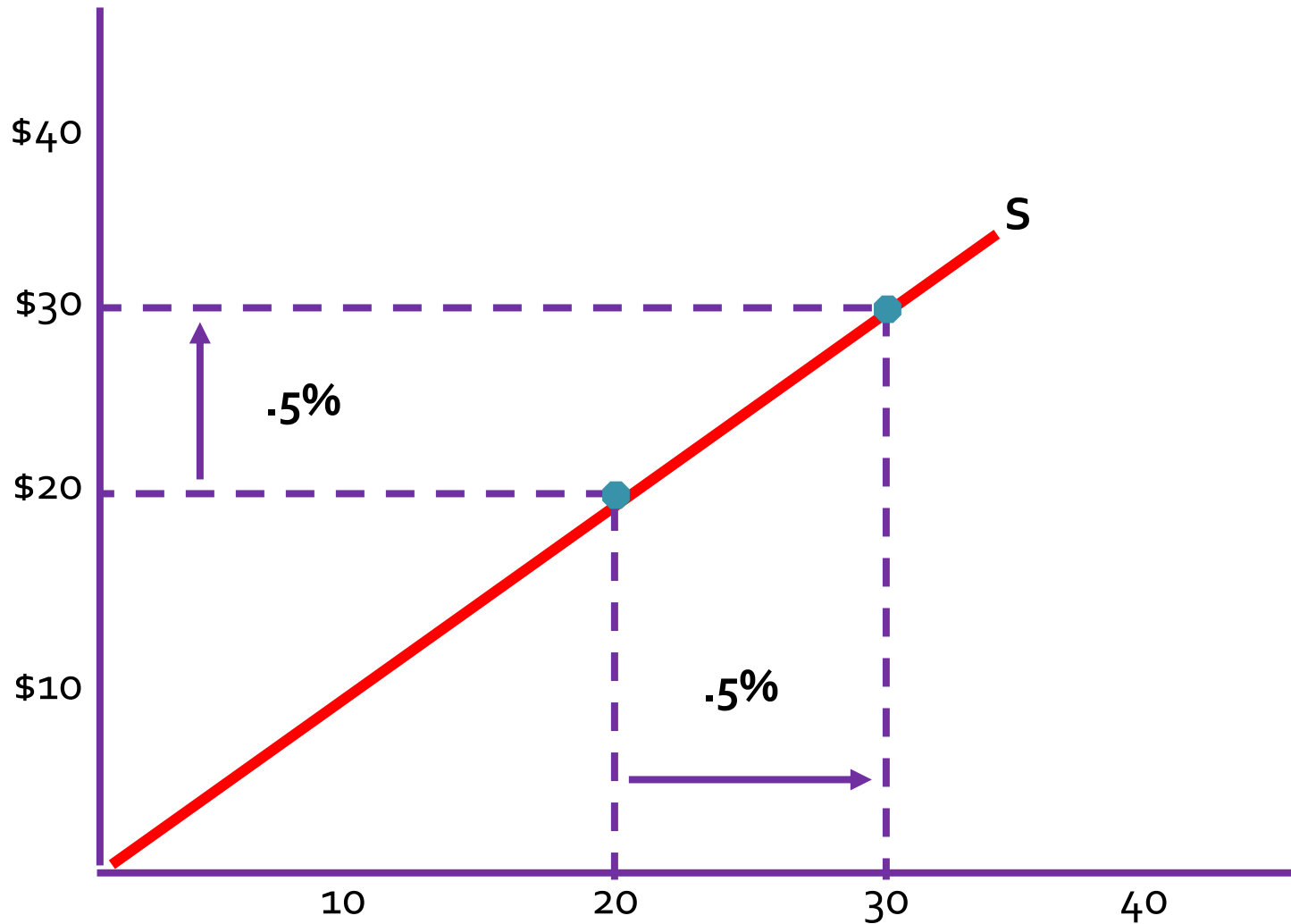
Perfectly Inelastic Supply

$$E_s = 0$$



Unit Elastic Supply

$$E_s = 1$$



What are the determinants of the elasticity of supply?





The factors that influence supply sensitivity are:

- product type
- time period
- production capacity
- input substitution



Summary of Elasticity

ELASTICITY	EQUATION	BENCHMARK
Price Elasticity of Demand	$\frac{\% \Delta QD}{\% \Delta P}$	Inelastic Elastic
Midpoint Formula	$\frac{\Delta Q}{\bar{Q}} \times \frac{\bar{P}}{\Delta P}$	
Cross-Price Elasticity	$\frac{\% \Delta QD_1}{\% \Delta P_2}$	Compliments Substitutes 0
Income Elasticity	$\frac{\% \Delta QD}{\% \Delta I}$	Inferior Normal Luxury 0
Price Elasticity of Supply	$\frac{\% \Delta QS}{\% \Delta P}$	Inelastic Elastic

**Who pays the tax levied on goods such
as gasoline, cigarettes and alcoholic
beverages?**





Who pays the tax levied on sellers of goods such as gasoline, cigarettes and alcoholic beverages depends. Businesses may pay all, some or very little of the tax. The more elastic the demand, the more business pays. The less elastic the demand, the more the consumer pays.

If the demand curve slopes downward and the supply curve upward, sellers can't raise the price by the full amount of the tax or demand will fall.

In the case where demand is perfectly inelastic, sellers can raise the price by the full amount of a tax.

How did you do?! If you didn't do as well as you'd like, review the margin notes and presentations and test yourself again.



"You're fired, Jack. The lab results just came back, and you tested positive for Coke."

CONTINUED IN TEST YOURSELF:
THE BUSINESS FIRM