Experiment 2: Fish Market

Buyers: Same as before.

Sellers: Pay ★40 (★10 each) to rent a boat for the four experiments. A seller can decide to sit out the experiment, but only at the beginning – one the seller has traded, they are in for the duration.

Sellers get a catch, which may be one or two fish, which they can sell in the usual manner.

Twist: Sellers may be selling more than one fish, but buyers can only buy one fish.

Experiment 2: Questions

You are a seller with two fish. You sell one for ★12 and one for ★3. What are your net earnings?

Would the seller be better off withholding the second fish from the market?

You are a buyer with value ★20. There are five buyers left and four sellers, each of whom have two fish. What should you offer?

Experiment 2: Rules

There are four rounds. Do NOT trade coupons except for the current round.

You do not *have* to trade. Sometimes the best action is to wait until you have a better value or cost. But sellers gain nothing from no trade, and lose ★10.

A seller who manages to make a net loss for today will have that loss set to zero.

In each round, buyers may make only one transaction. Sellers can sell their all product coupons.

Each sale requires a separate transaction report.

Sellers have the potential of losing ★s.

Your market manager will take your transaction report and check the information against your sheets.

Buyers: Give the check to the seller but keep your buyer's value coupon.

Sellers: Give the product coupon to the buyer, but keep your cost coupon.

Experiment 2

How does the price affect the supply of fish?

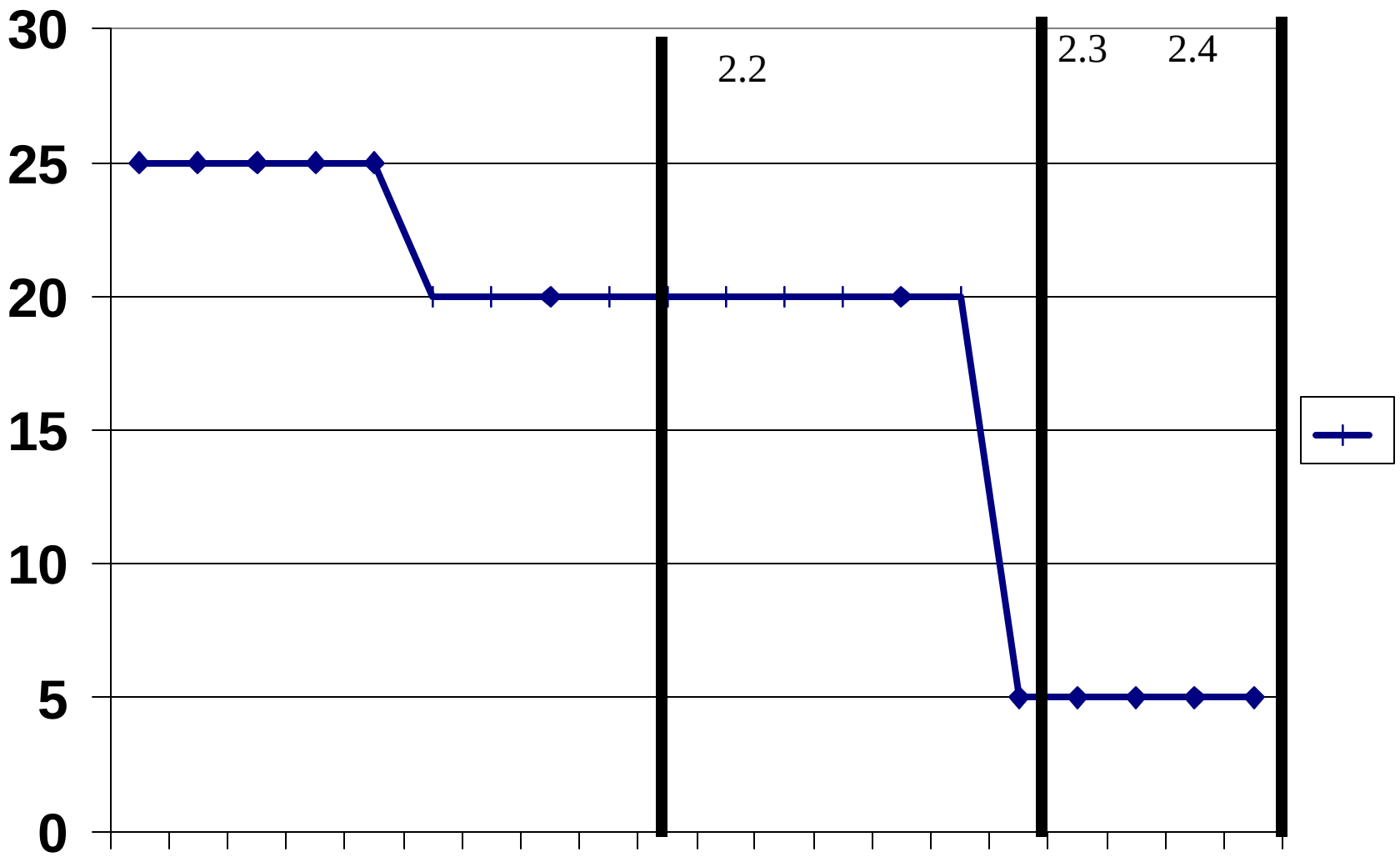
What are other items in fixed supply, at least for a while?

Picasso paintings
Houses
Office space
Beanie babies

Data from Experiment 2

39 buyers with value 5
78 buyers with value 20
39 buyers with value 25

80 sellers, with 80 units (2.1, 2.2), 120 units (2.3) or 160 (2.4)

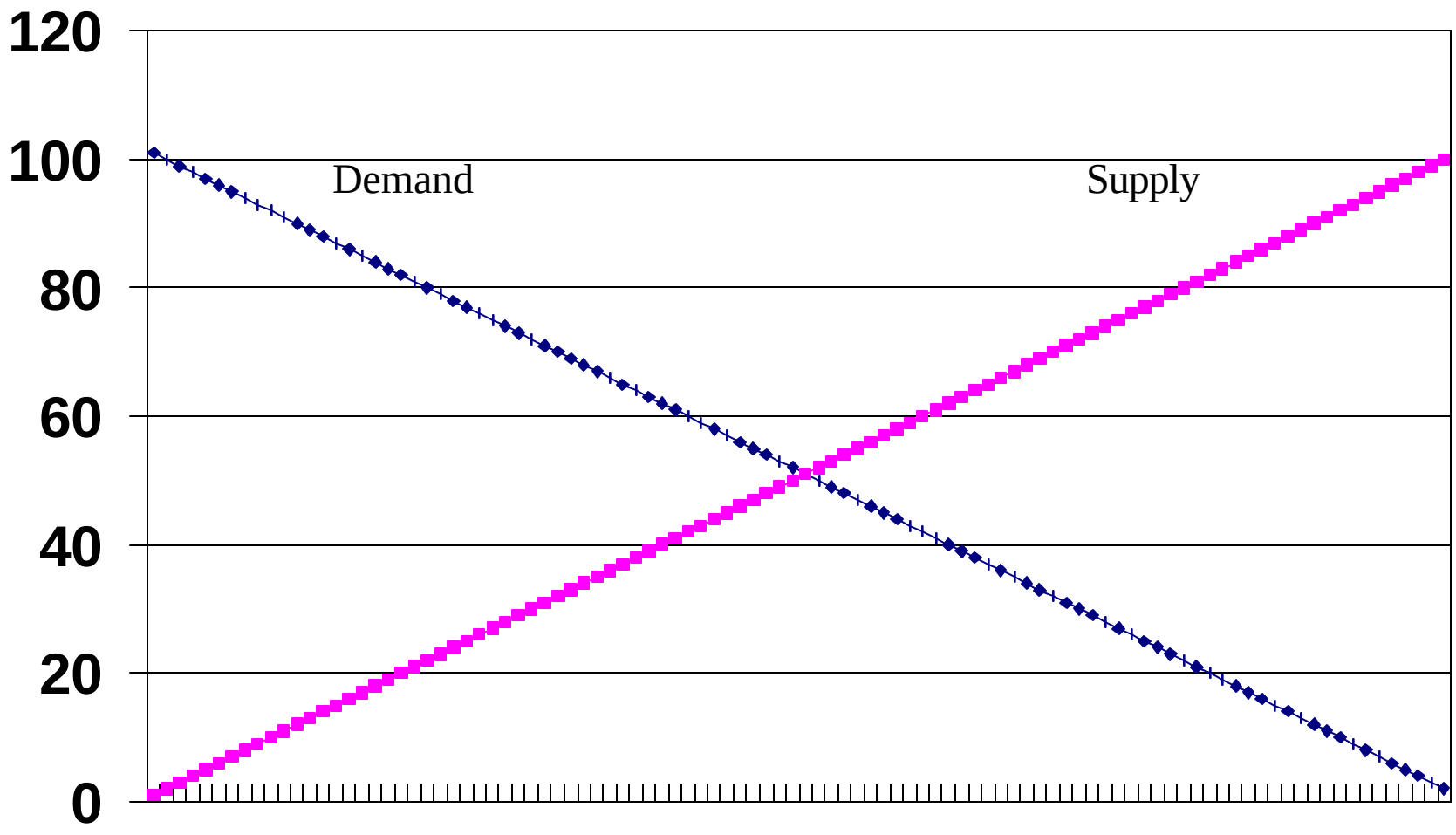


Note that the increase in supply, going from 2.2 to 2.4, does not make sellers better off.

Sellers were earning 20, and after the increase in quantity supplied, are earning at best 5, times 2 units, or 10. Thus their revenue has dropped even as their sales rise.

Continuous Demand Supply Curves

If there are lots of suppliers with distinct values, the demand and supply will look continuous.



Continuous demand and supply make many calculations easier, and eliminate the indifference of some buyers or sellers – only the people with values or costs right at the equilibrium price are indifferent to trading or not.

The Appendix has more information. You are responsible for A1-A4.

A major issue for the study of markets concerns the responsiveness of quantity demanded or supplied to price.

What are consumer goods where quantity doesn't respond to price?

Cigarettes, gasoline, alcohol

What are goods with quantity very responsive to price?

Air travel/tourism, restaurant meals.

The notion of elasticity – think elastic like rubber bands – measures the percentage change in quantity (either demanded or supplied) as a response to a small (1%) change in price.

Shifts in Supply:

What is an increase in supply?

A shift to the right, *not* a shift up!

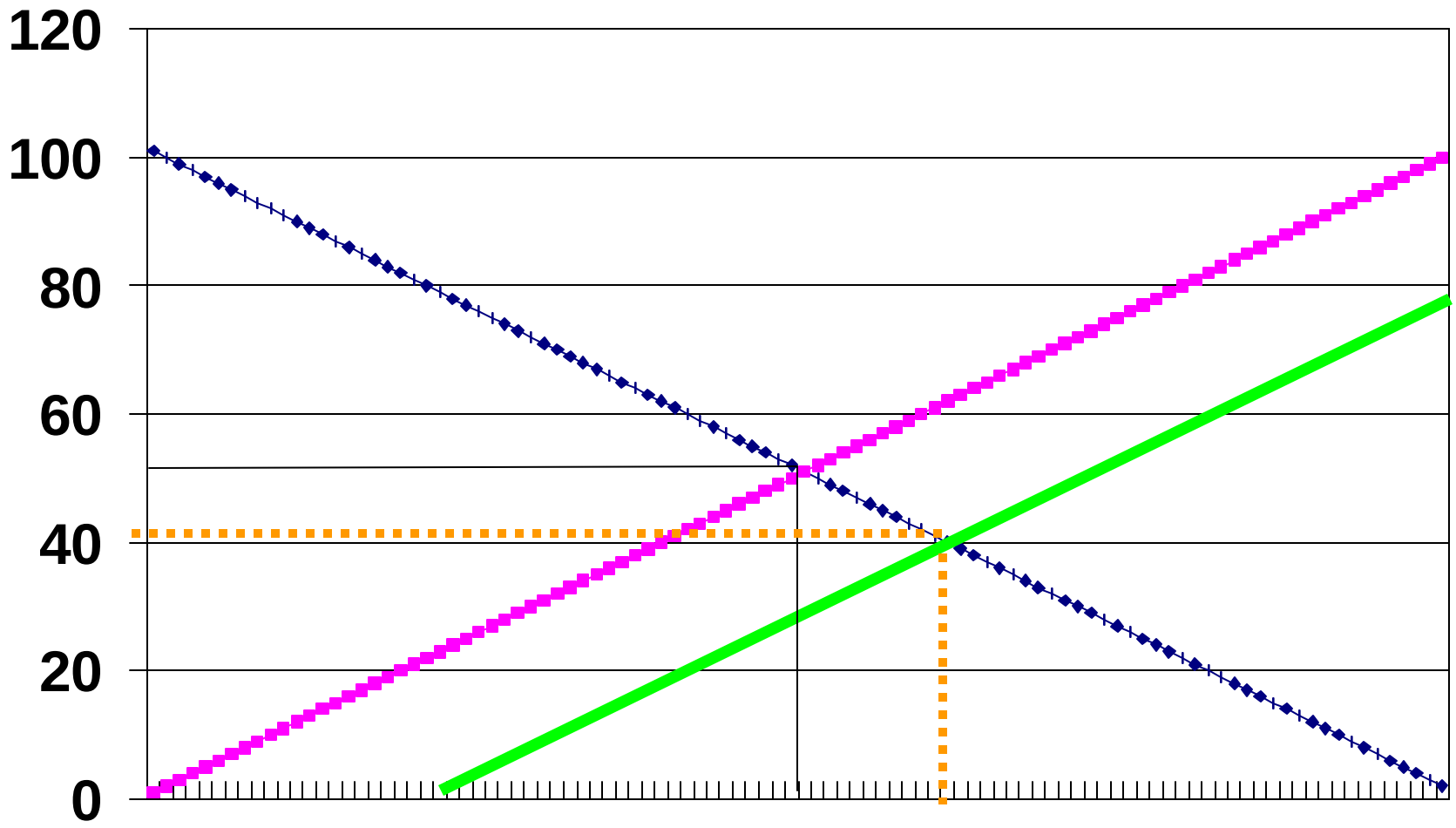
What are the effects?

Price falls. Quantity rises.

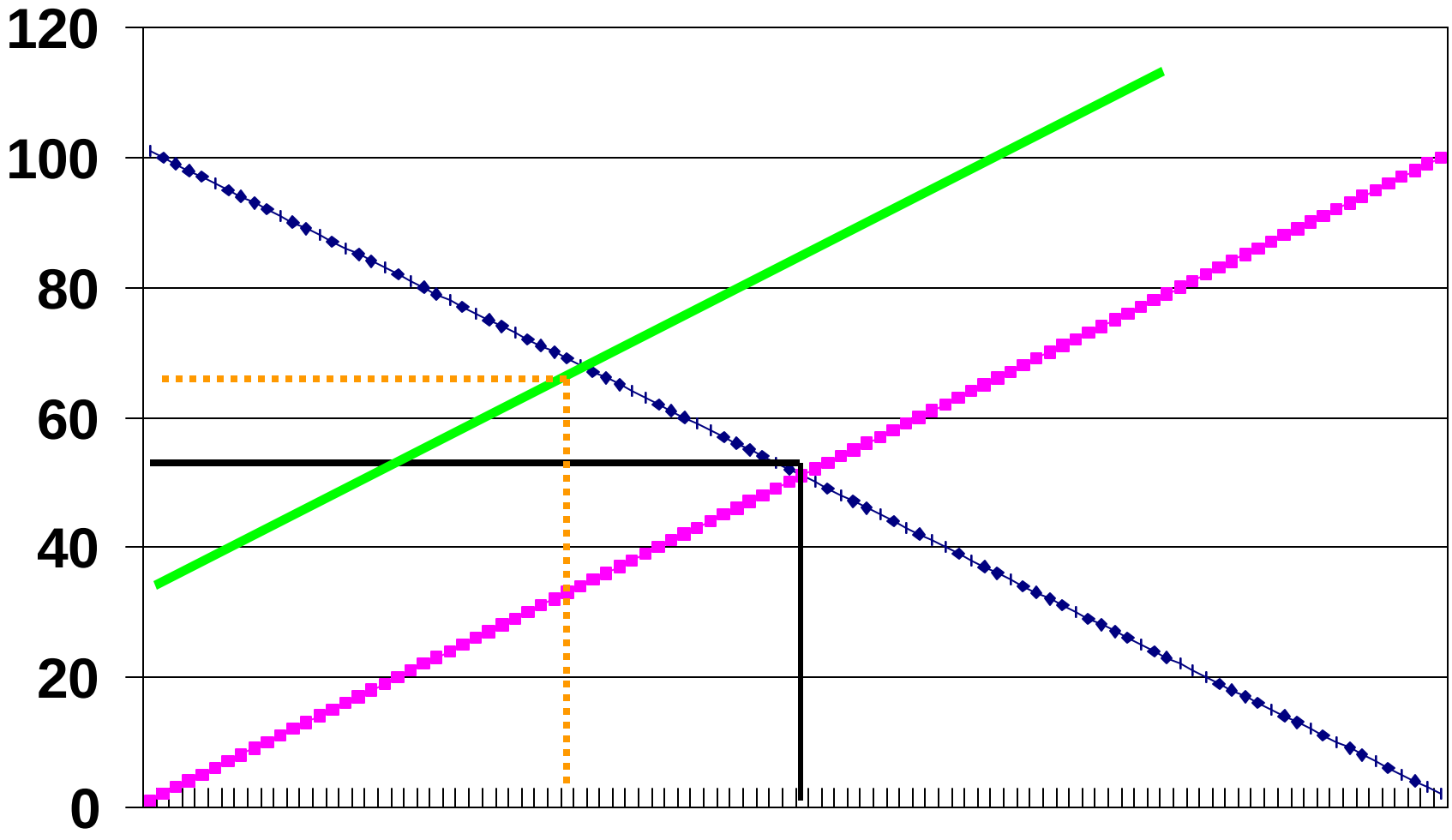
What are some goods that have had increases in supply?

Computers.

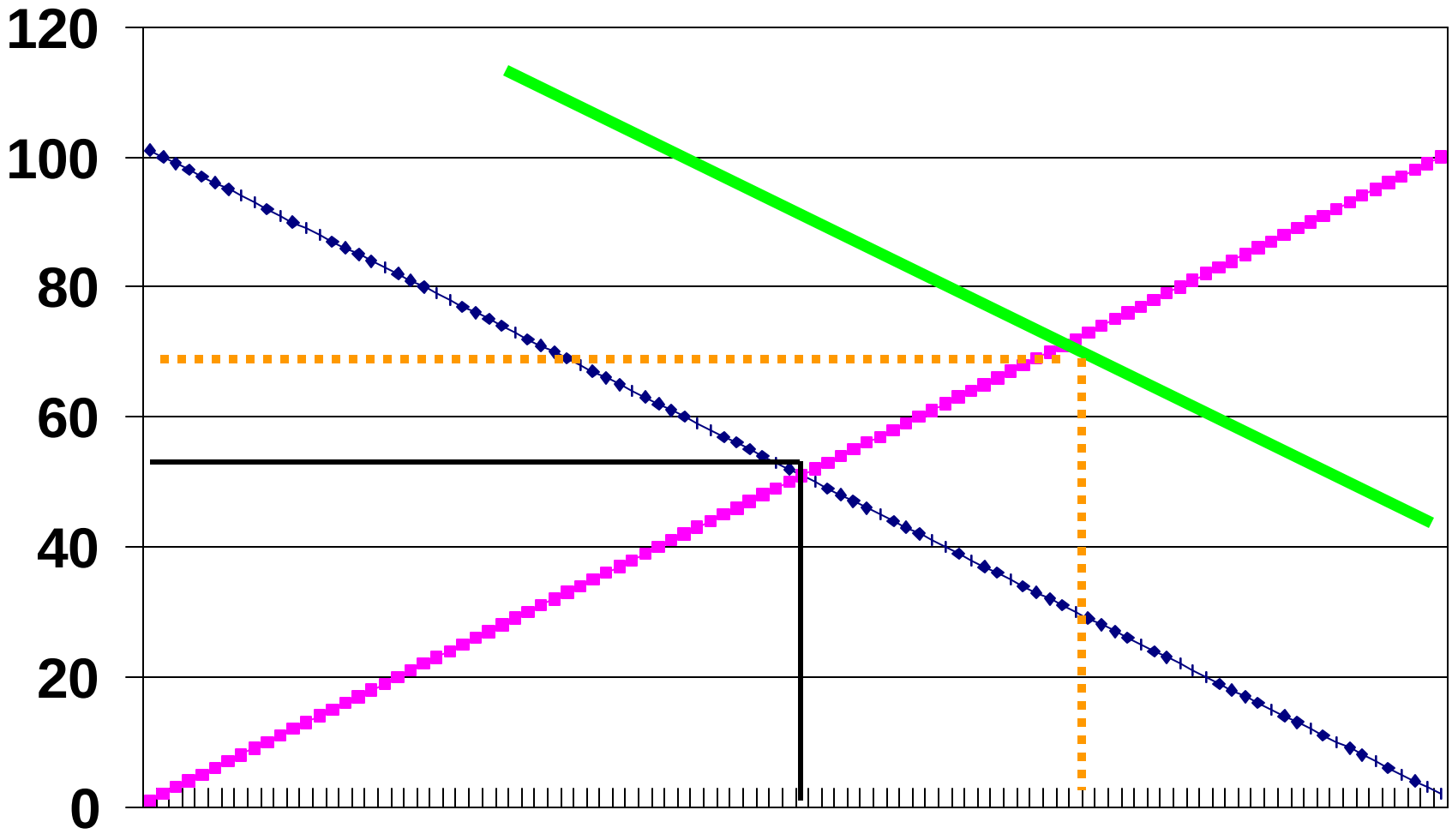
An Increase in Supply: P falls, Q rises



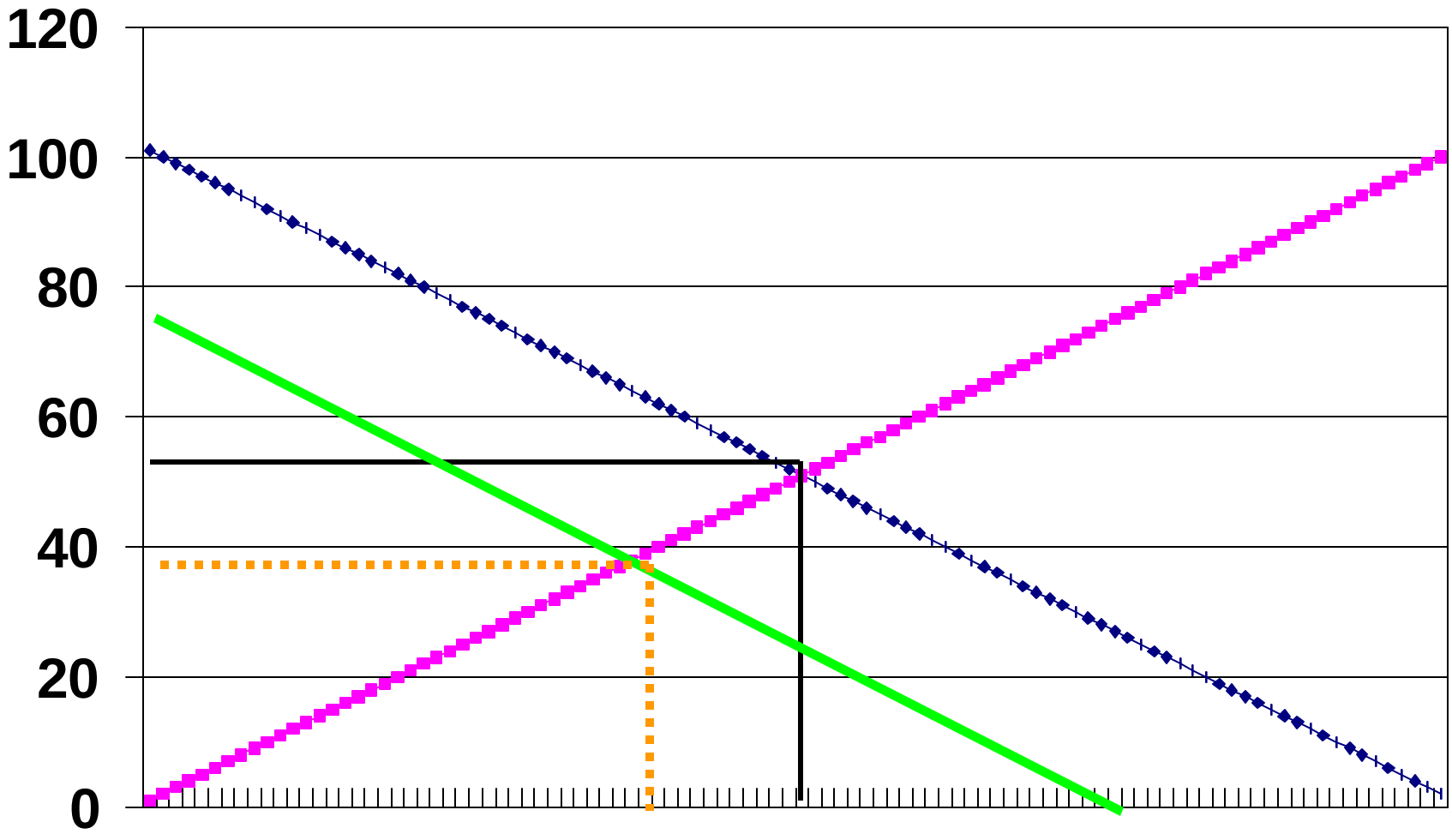
A Decrease in Supply: P rises, Q falls



An Increase In Demand: P rises, Q rises



A Decrease in Demand: P falls, Q falls



Elasticities

The *elasticity of demand* is the percentage change in quantity demanded divided by the percentage change in price, for a small change in price.

We need some notation. Δ means change.

$$\frac{\Delta p}{p} = \frac{change\ in\ price}{price}$$

= percentage change in price/100.

If the price goes from p_1 to p_2, $\Delta p = p_2 - p_1$.

η, the greek letter eta, is the **price** *elasticity of demand*, defined by

$$h = -\frac{\Delta q/q}{\Delta p/p} = \frac{percentage\ decrease\ in\ quantiy}{percentage\ increase\ in\ price}$$

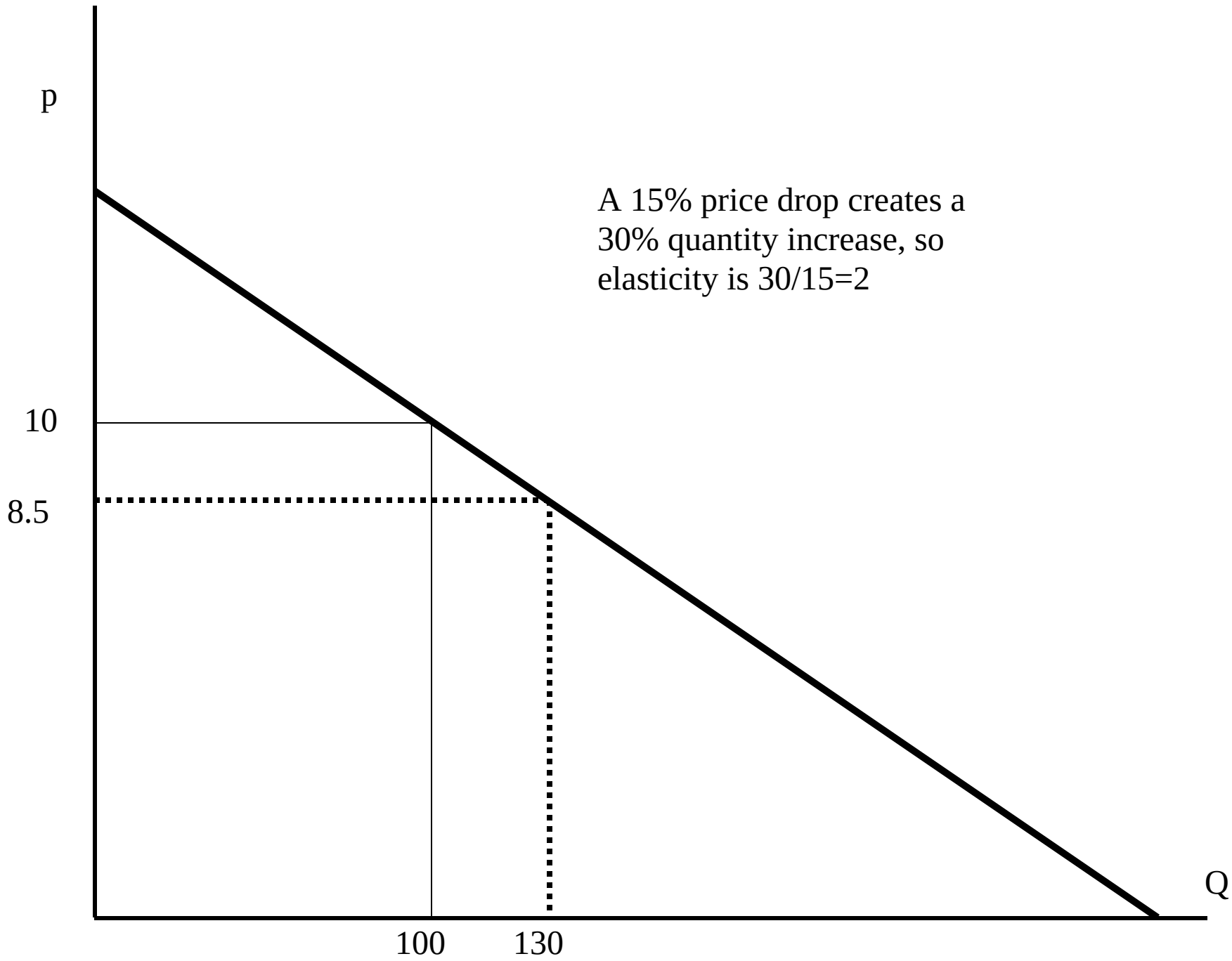
The Demand for Gasoline:

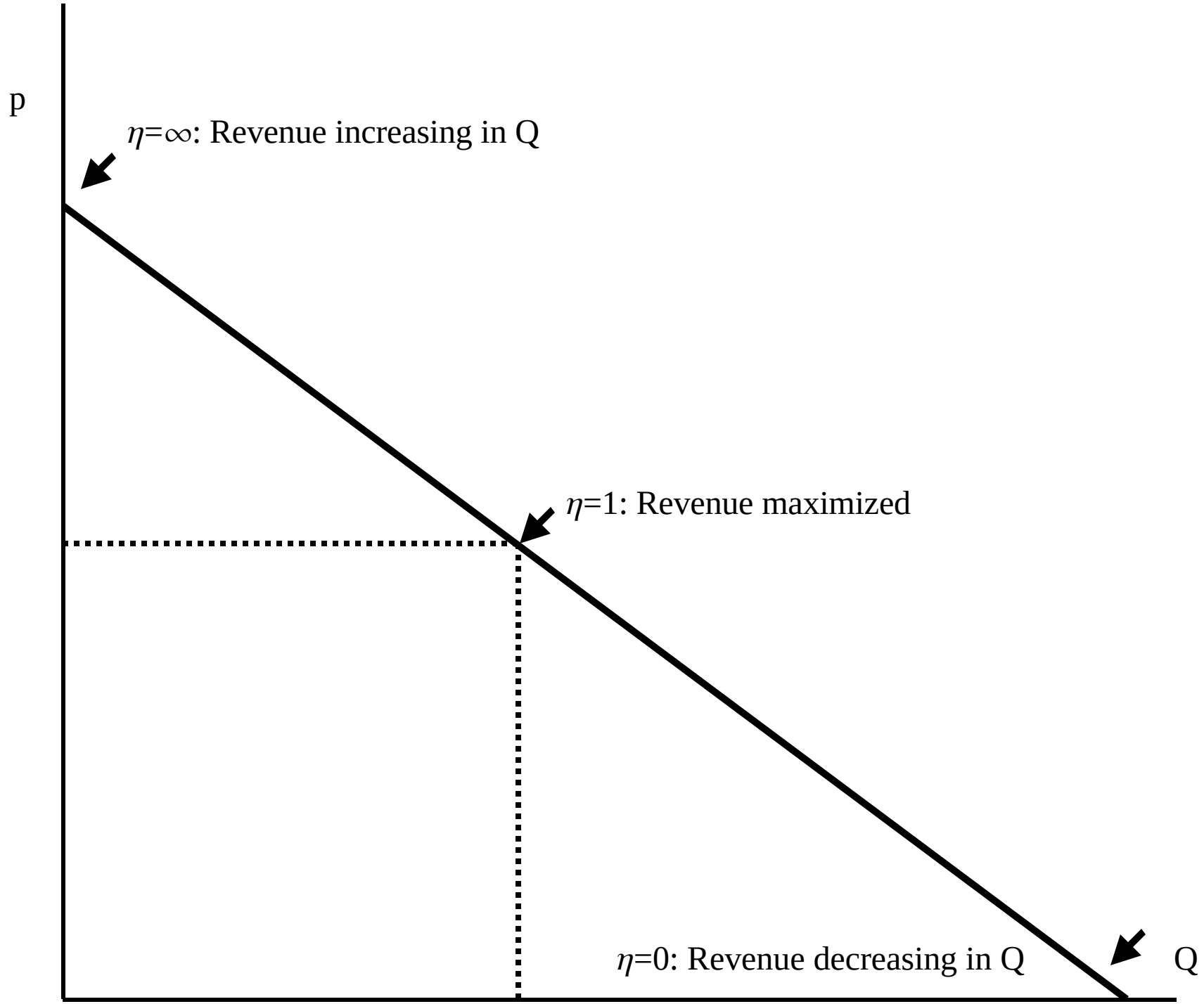
In the summer of 1998, a refinery fire eliminated 6% of California's supply of gasoline. The price went from $1.20 to $1.80 per gallon. What is the elasticity of demand?

A 6% reduction in quantity was associated with a 50% increase in price, yielding an elasticity of 6/50, or 0.12

A tax on cigarettes in Canada increased the price from $2.00 to $5.00. The quantity demanded fell 10%. What is the elasticity of demand?

The price increased 150%, and the quantity fell 10%, so $\eta = 10/150 = 0.06$


p
A 15% price drop creates a
30% quantity increase, so
elasticity is 30/15=2
10
8.5
Q
100
130


p
$\eta=\infty$: Revenue increasing in Q
$\eta=1$: Revenue maximized
$\eta=0$: Revenue decreasing in Q
Q

Consider a 1% increase in price. The percentage change in total expenditure, or *total revenue*, is [η is measured in absolute value - a positive number].

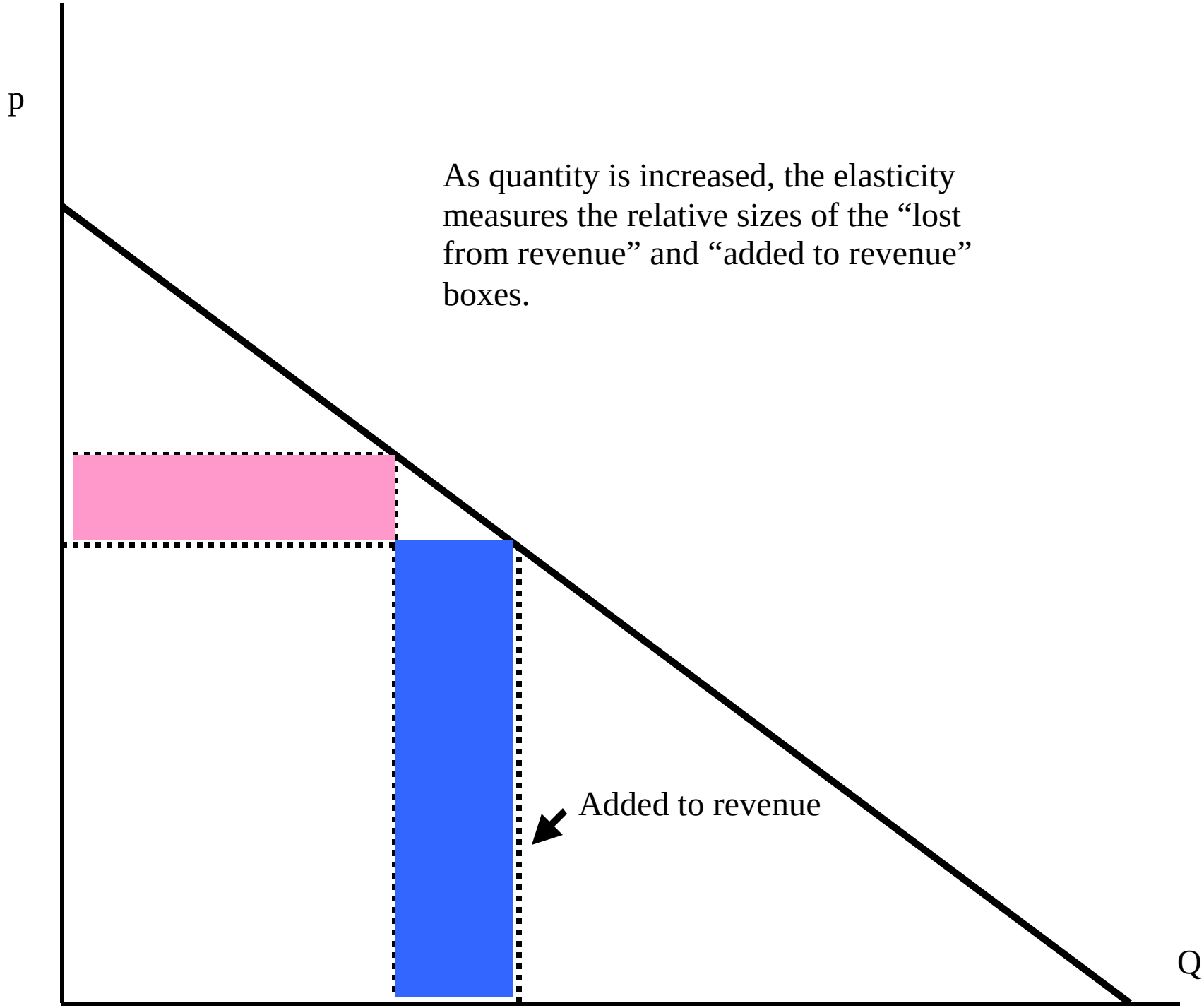
$$\frac{\Delta pq}{pq} = \frac{(\Delta p)q + p(\Delta q)}{pq}$$
$$= \frac{\Delta p}{p} + \frac{\Delta q}{q} = \frac{\Delta p}{p}(1 - \eta)$$

Thus, the total expenditure goes up in response to an increase in price if the elasticity of demand is less than 1, stays constant if $\eta=1$, and decreases if $\eta>1$.

The first case, $\eta<1$, is called *inelastic*, and total expenditure increases if price goes up, and decreases if price goes down. The extreme case, $\eta=0$, is a vertical demand curve and is called *perfectly inelastic demand*.

The second case is called *unitary elasticity*, and total expenditure stays constant in response to a small change in price.

The third case, $\eta>1$, is called *elastic*, and total expenditure falls in response to a small change in price. The extreme case here is $\eta=\infty$, called *perfectly elastic*, and corresponds to a horizontal demand curve.


p
As quantity is increased, the elasticity measures the relative sizes of the “lost from revenue” and “added to revenue” boxes.
Added to revenue
Q

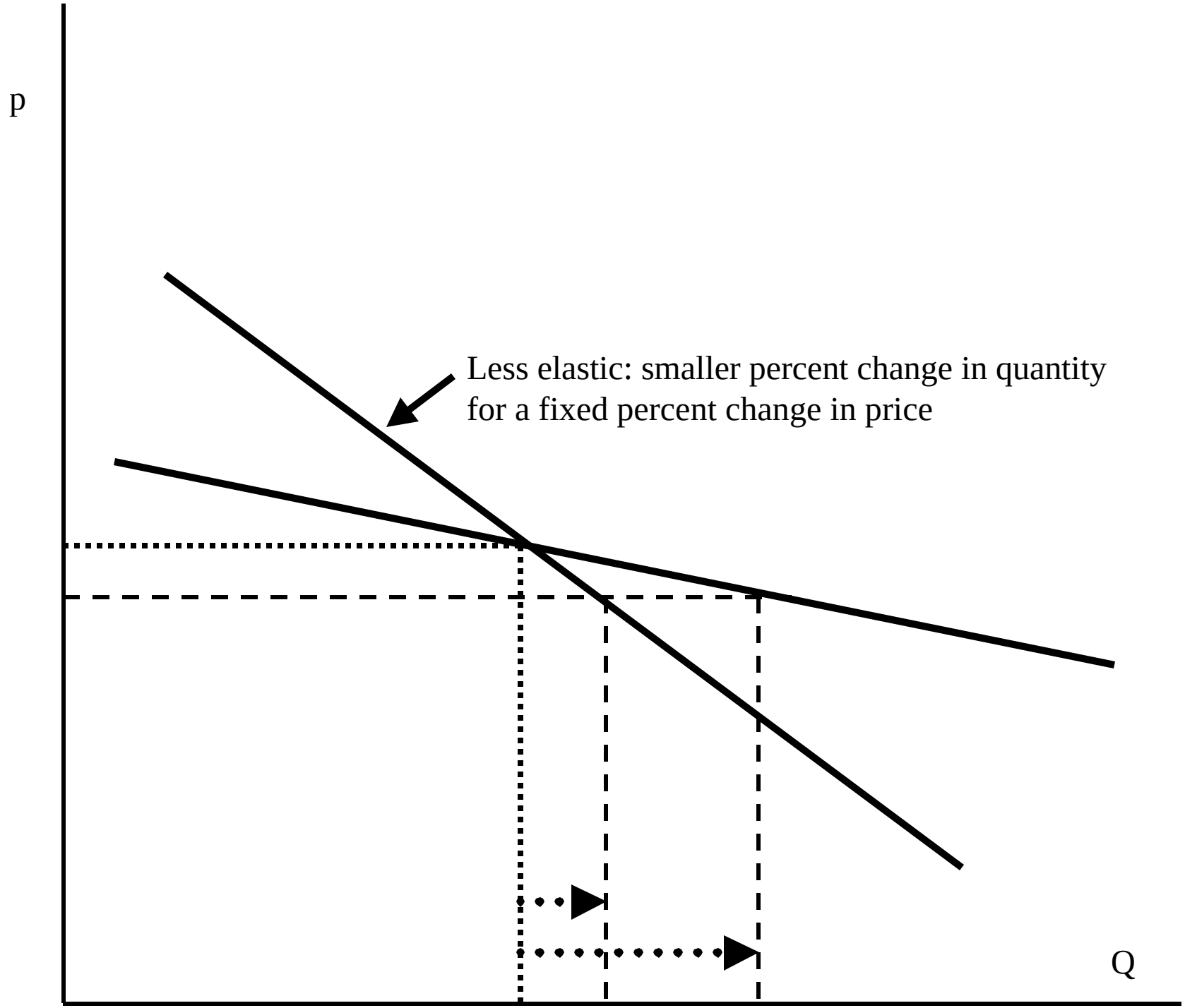
What factors influence the elasticity of demand?
Primarily *substitutes*, the existence of substitutes will tend to make people shift their consumption to the substitute from a good in response to a price increase, making demand *elastic*.

Similarly, complements tend to make the good inelastic.

The third factor is the proportion of the budget spent on the item. If the good represents a small part of the budget, an increase in the price won't drive out the purchase of too many other things.

On the other hand, if the good represents a large fraction of the consumer's budget, an increase in price requires the consumer to cut heavily somewhere, and the good itself is likely to get a lot of the cutting - more elastic.

The long run demand curve is more elastic than the short run demand curve. Both have a point in common - the current consumption.


p
Less elastic: smaller percent change in quantity
for a fixed percent change in price
Q

25. Suppose goods *a* and *b* are substitutes in production, and the demand for *a* falls. Then expenditures on *b* rise if

a. demand for *b* is unitary elastic.
b. demand for *b* is inelastic.
c. demand for *b* is elastic.
d. it can't be determined from the information provided.

45. A 10 percent increase in the quantity of good *a* demanded results from a 20 percent decline in its price. The price elasticity of demand for good *a* is

a. 10.0 b. 20.0 c. 2 d. 0.5.

46. A 20 percent increase in the quantity of good *a* demanded results from a 5 percent decline in its price. The price elasticity of demand for good *a* is

a. 5.0. b. 20.0. c. 4.0. d. 0.25.

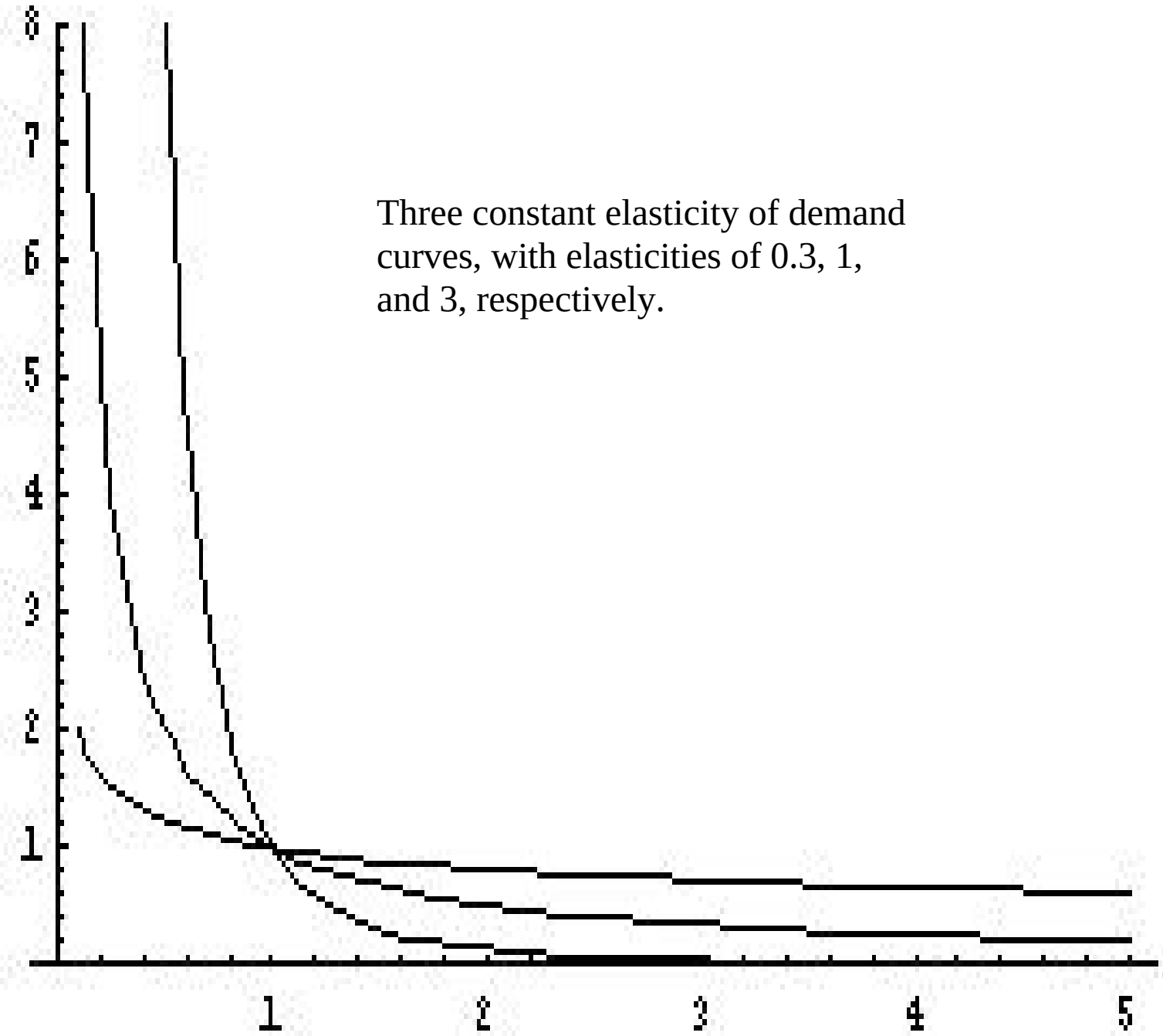
47. Suppose that the quantity of root beer demanded declines from 100,000 gallons per week to 94,000 gallons per week as a consequence of a 10 percent increase in its price. The price elasticity of demand

a. is 0.6.
b. is 1.97.
c. is elastic.
d. cannot be computed unless we know the before and after prices.

48. A fall in the price of a good from $10.00 to $9.00 results in an increase in quantity demanded from 20,000 to 21,000 units. The price elasticity of demand in this part of the demand curve is

a. .5. b. 2.0. c. 1.
b. It cannot be determined from the available data.

x. If we change the units (pounds vs. kilos) that quantity is measured in, does the elasticity change?



Three constant elasticity of demand curves, with elasticities of 0.3, 1, and 3, respectively.

Elasticity of Supply

The elasticity of supply is defined in a similar way to the elasticity of demand.

ε, the greek letter epsilon, is the **price** *elasticity of supply*, defined by

$$e = \frac{\Delta q/q}{\Delta p/p}$$

Note the differences – no minus sign.

Similar to demand, ε>1 is elastic, =1 is unitary elastic, and <1 is inelastic. Vertical is perfectly inelastic, ε=0, and horizontal is perfectly elastic, $\eta_s=\infty$.

If the price increases, does total revenue increase?

The income elasticity of demand, η_y, is defined by

$$\eta_y = \frac{\Delta q / q}{\Delta y / y}$$

where y is income.

Income elasticity measures whether revenue or total expenditure goes up or down as income changes.

$$\frac{\Delta pq}{pq} = \frac{p\Delta q}{pq}$$

$$= \frac{\Delta q}{q} = \eta_y \frac{\Delta y}{y}$$

There are three interesting categories. *Income elastic* goods have an elasticity greater than 1, which means a 10% increase in income produces a greater than 10% increase in expenditure on the good. Examples include air travel, movies and restaurants.

Unitary Income Elasticity, or $\eta_y=1$, appears to occur for dental services. If you get 10% more money, you'll spend 10% more on your teeth. *Income inelastic* goods have the property that if you get 10% more income, you'll increase your expenditure by less than 10%. Shoes, clothes, furniture, alcohol and tobacco are income inelastic.

Finally, *inferior goods* have *negative income elasticity*, increase income and you spend less on the good.