1.3.2 Quiz: Compute and Interpret Elasticity Values

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Here's a recap of what we just learned.

- **Price elasticity of demand** is defined as the percent change in demand divided by the percent change in price.:

$$Price\ elasticity\ of\ demand = \frac{percent\ change\ in\ demand}{percent\ change\ in\ price}$$

- Price elasticity of demand tells us roughly how responsive people are to different changes in price. Why **elasticity**? The language comes from thinking of an elastic rubber band. If a small "pull" in price leads to a big "stretch" of the the rubber band of demand, then we say demand is **elastic** (more sensitive to price changes). We'll make this more precise later in this section.

Question 1

1/1 point (graded)

Suppose that when the price went from $p1$ to $p2$, the quantity demanded went from $q1$ to $q2$. Use the definition:

$$Price\ elasticity\ of\ demand = \frac{percent\ change\ in\ demand}{percent\ change\ in\ price}$$

to find a formula for the price elasticity of demand.

- $\dfrac{p_2 - p_1}{q_2 - q_1}$
- $\dfrac{(p_2 - p_1)}{p_1} \Big/ \dfrac{(q_2 - q_1)}{q_1}$

$$\frac{q_2 - q_1}{p_2 - p_1}$$

$$\frac{(q_2 - q_1)}{q_1} \Big/ \frac{(p_2 - p_1)}{p_1}$$

✔

None of the Above

Explanation

$$Price\ elasticity\ of\ demand = \frac{percent\ change\ in\ demand}{percent\ change\ in\ price} = \frac{(q_2 - q_1)}{q_1} \Big/ \frac{(p_2 - p_1)}{p_1}$$

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Answers are displayed within the problem

Question 2

1/1 point (graded)

Why would we expect price elasticity of demand to be negative? Choose all that apply.

- [x] A. We expect a positive percent change in price to cause a negative percent change in demand. ✔
- [ ] B. We expect a negative percent change in price to cause a negative percent change in demand.
- [ ] C. We expect a positive percent change in price to cause a positive percent change in demand.
- [x] D. We expect a negative percent change in price to cause a positive percent change in demand. ✔

✔

Explanation

We expect price elasticity of demand to be negative because we expect demand to decrease as price increases, and vice-versa. For example, if price increases from p_1 to p_2, we expect demand to decrease, meaning q_2 is less than q_1. Similarly, if price decreases from p_1 to p_2, then we expect demand to increase, meaning q_2 is bigger than q_1. Therefore we expect $p_2 - p_1$ to have the opposite sign of $q_2 - q_1$, and so $\frac{[(q_2-q_1)/q_1]}{[(p_2-p_1)/p_1]}$, will have a negative sign.

Side note for those interested in economics:) A scenario where price elasticity would be positive would be one where demand actually increased when the price increased. This does not necessarily mean that the demand curve represents an increasing function. (An increas- ing demand function is a pretty strange scenario!) More commonly a positive elasticity is measured because something causes the entire demand curve to change. For example, the demand curve might shift up because of some change in the market for that good. If these market changes occur at the same time as an increase in price, we may actually observe an increase in quantity demanded at the same time as an increase in price.

An example of a change in the market that might lead the demand curve to shift up is an increase in price of a substitute good. In the public transportation example, rising gas prices might lead demand for subway rides to rise at every fare price level because people switch from driving cars to riding the subway.

Consider the Boston data, for example. From 1979 to 1980, there was a slight increase of 2 million riders with the price increase of 25 cents, so price elasticity of demand for that period was actually slightly positive. This may have represented a shift upward of the whole demand function because of other factors than those we are considering.

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Answers are displayed within the problem

Question 3

1/1 point (graded)

Suppose that the transit authority for City A estimates the price elasticity of demand for the current subway system to be -0.5. Using the definition of price elasticity of demand

$$Price\ elasticity\ of\ demand = \frac{percent\ change\ in\ demand}{percent\ change\ in\ price}$$

Which of the following situations are consistent with this measurement? Check all that apply.

- [x] a) A 100% increase in price resulted in a ridership decrease by about half. ✔
- [ ] b) A 100% increase in price resulted in ridership decreasing by about half a million riders.
- [ ] c) A 50% decrease in price resulted in ridership increasing about 100%.
- [ ] d) A decrease in price of fifty cents resulted in ridership increasing by about 100%.
- [x] e) A 100% increase in price resulted in ridership decreasing by about 50%. ✔
- [x] f) An decrease in price of 2% resulted in about a 1% increase in ridership. ✔
- [ ] g) A 1% increase in price means ridership will decrease by 2%.

✔

Explanation
Price elasticity of demand is defined as the percentage change in demand divided by the percentage change in price.
Assume a 100% increase in price. Then an elasticity of -0.5 would mean a 50% decrease in ridership, or ridership being cut in half (because -50/100 = -0.5). So choice A and E are consistent with this measurement.
Since 0.5 = 1/2, a 2% decrease in price resulting in a 1% increase in ridership is consistent with the measurement. So choice F is also consistent with a -0.5 price elasticity of demand.

Submit You have used 2 of 4 attempts

Answers are displayed within the problem

Question 4

3/3 points (graded)
Recall that price elasticity of demand tells us roughly how responsive people are to different changes in price. The 'elastic' language comes from thinking of an elastic rubber band. A large absolute value of elasticity means a small "pull" in price leads to a big "stretch" of the the rubber band of demand.

Suppose that the transit authorities for two other cities estimate the price elasticity of demand for the current subway system as shown.

- City A: -0.5
- City B: -0.2
- City C: -1.3

Rank the cities in order of which will have greatest percent decrease in ridership for the same percent change in price (the same "pull").

Greatest Percent Decrease in Ridership		Smallest Percent Decrease in Ridership
City C: -1.3 ✔	City A: -0.5 ✔	City B: -0.2 ✔
Answer: City C: -1.3	**Answer:** City A: -0.5	**Answer:** City B: -0.2

Explanation
City C has riders most sensitive to price since an 1% increase in price will lead to a 1.3% decrease in ridership. The decrease in City C would only be 0.5% and in City B, ridership would decline by about .2%, suggesting that City B riders are least sensitive to price changes.
Notice that the more negative elasticity is the greater percent decrease in ridership for that percent change in price. So we can rank them by ABSOLUTE VALUE of elasticity from greatest to least.

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Answers are displayed within the problem

Question 5

1/1 point (graded)
Here's the data again:

	Boston		**New York**	
Year	Subway Fare *(in dollars)*	Annual Ridership *(in millions, rounded)*	Subway Fare *(in dollars)*	Annual Ridership *(in millions, rounded)*
1979	0.25	156	0.50	1077

1980	0.50	158	0.60	1009
1981	0.75	143	0.75	1011
1981	0.60	144	0.75	989

Compute the price elasticity of demand for Boston for the 50 to 75 cent price change and for New York. Round to the nearest tenth.

-0.2 ✔**Answer:** -0.2

-0.2

Explanation
In Boston ridership dropped by about 9% after a 50% increase in fare. The price elasticity of demand is approximately $\frac{9}{50} \approx -0.2$.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

Question 6

1/1 point (graded)
Compute the price elasticity of demand for New York City for the 50 to 75 cent price change. Round to the nearest tenth.

-0.1 ✔**Answer:** -0.1

-0.1

Explanation
In New York City, ridership dropped by about 6% after a 50% increase in fare. The price elasticity of demand is approximately $\frac{-6}{50} \approx -0.1$

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Answers are displayed within the problem

Question 7

1/1 point (graded)

The greater the *absolute value* of elasticity, the more **elastic** the demand (the more sensitive to price changes).

Compare the absolute value of elasticity for the change from 50 to 75 cents.

Is demand in Boston more elastic than demand in New York, the same or less elastic?

- (•) More elastic ✔
- ( ) Less Elastic
- ( ) About the Same

Explanation

More elastic. We calculated that the price elasticity of demand in Boston is roughly twice the elasticity in New York. We interpret this to mean that Boston riders react more dramatically to fare increases than New York riders. The absolute value of the price elasticity of demand is higher in Boston than in New York City.

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Answers are displayed within the problem

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