A graph of a line and a line

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They might test your understanding of:

1. **Elastic vs. Inelastic demand** — how quantity reacts to price changes.
   * Elastic (|E| > 1): buyers react a lot.
   * Inelastic (|E| < 1): buyers react little.
   * Unit elastic (|E| = 1): midpoint — total revenue is maximized.
2. **Total Revenue (TR = P × Q)** — and how it changes:
   * In the **elastic zone**, ↓ price → ↑ TR.
   * In the **inelastic zone**, ↓ price → ↓ TR.
   * **Peak TR** happens at unit elasticity.
3. **Reading the graphs**:
   * Left graph (red): linear demand line, showing elasticity zones.
   * Right graph (blue): total revenue curve, showing TR behavior across Q.

**QUIZ PRACTICE GUIDE (BEGINNER VERSION)**

**🥤 1️⃣ Supply & Demand**

**Q1.**

A drought makes oranges more expensive.  
👉 What happens to the *price* and *quantity* of orange juice (OJ)?

**Beginner Explanation:**  
When oranges (the main ingredient) cost more, it becomes expensive to make OJ. So producers make less of it.

**Answer:**  
Supply of OJ decreases (curve shifts left).  
→ Price of OJ goes **up**, and quantity sold goes **down**.

**Q2.**

Apple juice is a substitute for orange juice. What happens to apple juice if OJ price increases?

**Beginner Explanation:**  
If OJ becomes pricey, people switch to apple juice instead.

**Answer:**  
Demand for apple juice increases (curve shifts right).  
→ Both price and quantity of apple juice **increase**.

**Q3.**

If Canada bans caffeine in sodas (like Mountain Dew), what happens to *coffee* price and quantity?

**Beginner Explanation:**  
People who love caffeine will turn to coffee instead.

**Answer:**  
Demand for coffee rises (shift right).  
→ Both **price** and **quantity** of coffee **increase**.

**Q4.**

How does the caffeine ban affect coffee producers’ surplus?

**Beginner Explanation:**  
Producers can now sell at higher prices and make more money.

**Answer:**  
**Producer surplus increases**.

**Q5.**

If the price of coffee increases, what happens to the *quantity supplied*?

**Beginner Explanation:**  
When selling price is higher, producers want to sell more.

**Answer:**  
Quantity supplied **increases** (movement along the same supply curve).

**Q6.**

If the price of coffee increases, what happens to the *supply* of coffee?

**Beginner Explanation:**  
Price changes do **not** move the entire supply curve, only the point on it.

**Answer:**  
**No effect** on supply — only **quantity supplied changes**.  
*(Trick question!)*.

**Q7.**

A gasoline tax of $0.05/litre is added. What happens to price?

**Options:**  
A. Price rises by $0.05  
B. Price rises by *less* than $0.05  
C. Price rises by *more* than $0.05  
D. Prices rise more when demand is inelastic  
E. None of the above  
F. More than one of the above

**Beginner Explanation:**  
When the government adds a tax, part is paid by producers and part by consumers.  
How much prices rise depends on elasticity.

**Answer:**  
✅ **B and D are true**, so the correct choice is **F (More than one of the above)**.

**💰 2️⃣ Elasticity**

**Q8.**

Elasticity of demand for cigarettes = –0.3.  
If price goes up 15%, how much will consumption change?

**Beginner Explanation:**  
Elasticity tells how much demand changes when price changes.  
Here, –0.3 means demand is inelastic — small change in quantity.

**Answer:**  
Quantity demanded ↓ by (0.3 × 15%) = **4.5% decrease**.

**Q9.**

Demand equation:  
[  
Q = 100 - 20P  
]  
If the firm produces 40 units, what is elasticity?

**Step 1:** Find P when Q = 40 → P = 3  
**Step 2:** Choose another point (say Q = 50 → P = 2.5)

**Beginner Explanation:**  
We check how much quantity and price change, then use elasticity formula:  
[  
E = \frac{%\Delta Q}{%\Delta P}  
]

**Answer:**  
Elasticity = –1.5 (elastic).

**Q10.**

If price falls slightly in that example, what happens to revenue?

**Beginner Explanation:**  
When demand is elastic, lowering price increases total revenue.

**Answer:**  
Revenue **rises** when price falls slightly.

**Q11.**

Same demand: (Q = 100 - 20P)  
If price = 2, find elasticity.

**Step 1:** Q = 60  
**Step 2:** Compare with another point, say P = 3 → Q = 40

**Beginner Explanation:**  
We check again how sensitive demand is to price.

**Answer:**  
Elasticity = –0.67 (inelastic).

**Q12.**

In that case, if price rises a bit, what happens to revenue?

**Beginner Explanation:**  
In inelastic demand, people buy even if price rises.

**Answer:**  
Revenue **increases** when price rises slightly.

**Q13.**

Elasticity = –0.5, price = 10, quantity = 1000.  
What price is needed to sell 1100 units?

**Beginner Explanation:**  
Elasticity tells how much price must drop to boost sales.  
A 10% rise in Q requires price to fall by 20%.

**Answer:**  
New price = 10 × (1 – 0.20) = **$8**.

**💡 Summary Table**

| **Concept** | **Change** | **Effect** |
| --- | --- | --- |
| Drought ↑ orange prices | Supply ↓ | OJ price ↑, quantity ↓ |
| OJ price ↑ → Apple juice | Demand ↑ | Apple juice price ↑, quantity ↑ |
| Soda caffeine ban | Demand ↑ for coffee | Coffee price ↑, quantity ↑ |
| Coffee price ↑ | Quantity supplied ↑ | Supply unchanged |
| Tax $0.05 | Price ↑ less than $0.05 | B & D true |
| Elasticity –0.3 | Inelastic | Cigarette quantity ↓ 4.5% |
| Elasticity –1.5 | Elastic | Revenue ↑ when price ↓ |
| Elasticity –0.67 | Inelastic | Revenue ↑ when price ↑ |
| Elasticity –0.5 | Inelastic | To ↑ Q by 10%, price ↓ 20% |

**🧩 1️⃣ Supply & Demand Graphs**

**🟠 (a) Drought increases price of oranges → affects Orange Juice market**

**Graph:**

* **Supply curve (S)** shifts **left** because OJ production becomes costly.
* **Demand (D)** stays the same.
* New equilibrium = higher price, lower quantity.

A graph of a function

AI-generated content may be incorrect.

🧠 **Meaning:**

* Leftward shift in supply → higher price, lower quantity of orange juice.

**🍏 (b) Apple juice as a substitute for OJ**

**Graph:**

* OJ becomes expensive → people buy apple juice instead.
* **Demand (D)** for apple juice shifts **right** → higher price & quantity.

A computer screen shot of a computer screen

AI-generated content may be incorrect.

🧠 **Meaning:**

* Rightward demand shift → both price and quantity rise.

**☕ (c) Caffeine ban on sodas → coffee demand rises**

**Graph:**

* Soda ban → more people want coffee → **Demand (D)** shifts **right**.

A white background with black text

AI-generated content may be incorrect. 🧠 **Meaning:**

* Coffee demand rises → higher price, more coffee sold.
* **Producer surplus ↑** because producers earn more at a higher price.

**💰 2️⃣ Elasticity & Total Revenue Graphs**

**📉 (a) Linear Demand Curve & Elasticity Zones**

**Graph idea:**

A screen shot of a computer

AI-generated content may be incorrect.

🧠 **Meaning:**

* High price → elastic region (buyers react strongly).
* Midpoint → unit elastic (TR is maximum).
* Low price → inelastic (buyers don’t react much).

**📈 (b) Total Revenue Curve (TR = P × Q)**

A triangle with black text

AI-generated content may be incorrect.

Elastic Inelastic

🧠 **Meaning:**

* **Left side**: Elastic → price drop ↑ TR
* **Peak**: Unit elastic → TR max
* **Right side**: Inelastic → price drop ↓ TR

**🧮 (c) Gasoline tax impact (Supply shift)**

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AI-generated content may be incorrect.

🧠 **Meaning:**

* Supply curve shifts **up** by the tax amount.
* New equilibrium: price ↑ slightly, quantity ↓.
* Consumers pay part of the tax; producers absorb the rest.
* Price rises **less** than the tax if demand is elastic; **more** if inelastic.

**1) Define price elasticity of demand**

**Beginner:** How sensitive buyers are to price changes.  
**Formula:** .  
**Example:** If price ↑ 10% and quantity ↓ 20%, (elastic).  
**Graph idea:** On a straight demand line, top part is elastic, middle is unit elastic, bottom is inelastic.  
**See:** Demand with zones → download

**2) Meanings**

* **Elastic (|E|>1):** Small price change → big quantity change.  
  *Example:* Clothing during sales.
* **Inelastic (|E|<1):** Quantity barely moves when price changes.  
  *Example:* Table salt.
* **Unit elastic (|E|=1):** %ΔQ = %ΔP → TR is maximized.  
  **See:** Same chart → download

**3) TR behavior by region**

* **Elastic:** Price ↓ → TR ↑ (people buy much more).
* **Inelastic:** Price ↓ → TR ↓ (people don’t buy much more).
* **Unit elastic:** TR at peak.  
  **Example (numbers):** With linear demand :
* At **P=40** → → TR = (elastic region).
* At **P=25** → → TR = **1250** (peak).
* At **P=20** → → TR = (inelastic region).  
  **See:** TR hill → download and quick math → summary

**4) If |E|>1, raise or lower price?**

**Answer:** Lower price to increase TR.  
**Why:** The % jump in Q is bigger than the % drop in P.  
**Example:** Cut price 5%, demand rises 10% → TR up.

**5) Why elasticity varies on a linear demand curve**

**Because:** , and while slope () is constant, the ratio changes as you move along the curve.  
**High P/low Q → big → elastic**; **Low P/high Q → small → inelastic**.  
**See:** Zones labeled → download

**6) Which portion of a linear demand curve is elastic? Why?**

**Top half.** At high prices and low quantities, is large → |E|>1.  
**Graph:** download

**7) When is TR at maximum?**

At **unit elasticity (|E|=1)** — the midpoint of the linear demand curve.  
**Example (our demand):** Midpoint → TR=1250 (peak).  
**Graph:** TR peak pin → download

**8) If TR falls when price falls, where are we?**

**Inelastic region.** Price cuts don’t boost Q enough, so TR drops.  
**Example:** P from 20→19 barely moves Q; TR falls.

**9) High price + low quantity → \_\_\_\_\_\_\_**

**Elastic.**

**10) Low price + high quantity → \_\_\_\_\_\_\_**

**Inelastic.**  
*(Having said that: the midpoint is unit elastic — that’s the “ridge line.”)*

**11) Label elastic/unit/inelastic on the demand graph**

**Top:** Elastic | **Middle:** Unit elastic | **Bottom:** Inelastic.  
**Graph (ready to paste):** download

**12) TR graph: where increasing/constant/decreasing?**

* **Increasing:** Left side (elastic).
* **Constant:** At the peak (unit elastic).
* **Decreasing:** Right side (inelastic).  
  **Graph:** download

**13) Why is the TR curve a hill?**

Because TR = . Along a linear demand:

* As Q rises from 0, P falls slowly at first → TR rises.
* At midpoint: P×Q hits max.
* After midpoint: P becomes too low, Q gains don’t offset P drops → TR falls.  
  **Graph:** download

**14) If price falls from $100 to $80 and quantity rises from 0 to 10, what happens to TR?**

**Compute:**

* Initial TR =
* New TR = → **TR increases** → we’re in the **elastic** region.

**15) Why does TR peak at the demand midpoint?**

At midpoint of a straight-line demand: .  
Mathematically, for :

* TR = .
* .
* That’s the midpoint; elasticity there is –1 → TR max.  
  **Graphs:** demand zones + TR peak → demand, TR

**Supply–Demand Shift Questions (with graphs)**

**A) Drought raises orange prices → OJ market**

* **Effect:** Supply of OJ shifts **left** (higher input cost).
* **Outcome:** **Higher price, lower quantity**.  
  **Graph:** OJ supply shift

**B) OJ gets expensive → Apple juice (a substitute)**

* **Effect:** Demand for apple juice shifts **right**.
* **Outcome:** **Higher price & higher quantity** for apple juice.  
  **Graph:** Apple demand shift

**C) Soda caffeine ban → Coffee**

* **Effect:** Demand for coffee shifts **right**.
* **Outcome:** **Higher price & higher quantity**; producer surplus rises.  
  **Graph:** Coffee demand shift

**D) Gasoline tax (paid by producers)**

* **Effect:** Supply shifts **up** by the tax.
* **Outcome:** Price to consumers rises **less** than the full tax (unless demand perfectly inelastic); quantity falls.  
  **Graph (with equilibria):** Gas tax

**Worked Math (Numerical Elasticity)**

We’ll use the standard linear demand used in class:

* **At P = 40:** , (elastic), TR
* **At P = 25:** , (unit elastic), TR **(max)**
* **At P = 20:** , (inelastic), TR   
  **Quick file:** numbers summary

**Downloads (paste into notes/slides)**

* Demand: Elastic vs Unit vs Inelastic → PNG
* Total Revenue (hill) → PNG
* OJ supply shift (drought) → PNG
* Apple juice demand shift → PNG
* Coffee demand shift (soda ban) → PNG
* Gas tax supply shift → PNG

