How much should you bid?

Sealed-bid auction = each bidder writes a bid nobody else sees · the highest bid wins. The rule for the **price** changes the best bid: **first price** → shade below your value · **second price** → bid exactly your value. When the prize is worth the same to all but nobody knows how much → **winner's curse**.

1 First price

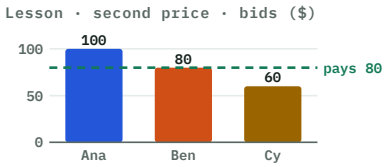
pay your own bid

- **Your move**: painting worth $100 to you, bid $70, $85 or $100? (never graded or stored)
- **First-price auction**: "the highest bid wins and pays its own bid"
- **Gain** = value − price paid · lose → $0
- Bid = value → win, gain `100 − 100 = $0` ⇒ **shade** (= bid less than your value) · how far? must guess the others → too low = lose the prize
- Practice: ticket worth $90, first price, bid $90 → gain **$0**

2 Second price

the Vickrey auction

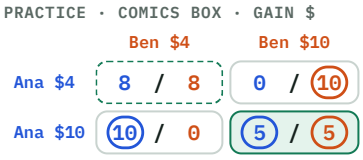
- **Second-price auction**: "the highest bid wins and pays the second-highest bid"
- Values Ana 100 · Ben 80 · Cy 60, all bid their value → Ana wins, pays **$80**, gains `100 − 80 = $20`
- Own bid → decides whether you win · never the price (= next bid down)
- **William Vickrey**: Canadian-American economist (1914–1996) · 1961 paper on this rule · Nobel economics **1996**
- Practice: Ana 90 · Ben 70 · Cy 50 · Dee 40 → Ana pays **$70**, +$20 · Dee at 95 → Dee pays **$90**, +$5



3 Bid the truth

a dominant strategy

- **Dominant strategy**: "a move that is a best reply (the move that pays you most) to every move the others can make" (Lesson 1) · second price → **bid your true value**
- Ana (value 100) vs Ben 80: bid 90 → same win, same $80 · bid < 80 → loses a +$20 win · rival 120, Ana bids 130 → wins, pays 120 → **−$20**
- Practice · value 60, rival 45, 55 or 65 → gains: bid 50: 15 / 0 / 0 · **bid 60: 15 / 5 / 0** · bid 70: 15 / 5 / **−5** ⇒ only 60 best in every case
- Practice · first price, box worth $20 to each, bid $4 or $10, tie = coin (half the gain on average) → $10 **dominant** (10 > 8, 5 > 0) → **5 / 5** though 8 / 8 better for both (Lesson 1's trap) · seller gets $10 · secret deal to bid low = **bid rigging** (against the law in many countries), shaky like Lesson 5's cartels



4 In the world

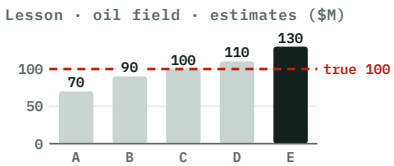
eBay · online ads

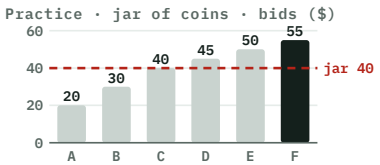
- **eBay** (auction website): type your maximum → eBay bids for you, just above the next bidder = second price in disguise · max $50 vs rival max $40 → pay **a little over $40**
- **Google** search ads: auction from **Feb 2002**, winner pays about the next bid (second-price style) · its marketplace for ads on other websites → **first price** in **2019**
- Both rules in use today · each has its trade-offs · no verdict

5 Winner's curse

one unknown value

- **Private value**: each bidder knows the prize's worth to them (ticket, bike to ride, cake) · **common value**: about the same for all, unknown (oil field, storage unit (rented room of old things) to resell, gold rights, phone license = right to a radio band)
- **Winner's curse**: common value → the winner = the one who **overestimated most** · named by **Capen, Clapp and Campbell**, three oil engineers, **1971** (rights to drill for oil under the sea)
- Oil field worth $100M · estimates 70, 90, 100, 110, 130 (average 100) → 130 wins → `100 − 130 = −$30M`
- Practice · jar holds $40 · bids 20, 30, 40, 45, 50, 55 → first price −$15 · second price (pays 50) still **−$10**
- **Cure**: bid as if you have already won (= all others guessed lower) → shade below your estimate · more bidders → shade **more** · Vickrey's rule ≠ cure (it is about private values)
- Chain: many guess one value → some too high → highest wins → winner overpays → next time shade





Watch out: second price ≠ "pay less by bidding less": your bid never sets your price · bid above your value → can win at a loss · the winner's curse is not bad luck: the highest guess wins, so it is **too high on average** · second price does **not** cure the curse