
Chapter 12: Answers to Questions and Problems

1.
 - a. The expected value of option 1 is
$$\frac{1}{16}(100) + \frac{4}{16}(200) + \frac{6}{16}(500) + \frac{4}{16}(200) + \frac{1}{16}(100) = 300.$$
The expected value of option 2 is
$$\frac{1}{5}(80) + \frac{1}{5}(170) + \frac{1}{5}(1,000) + \frac{1}{5}(170) + \frac{1}{5}(80) = 300.$$
 - b. The variance of option 1 is
$$\frac{1}{16}(100 - 300)^2 + \frac{4}{16}(200 - 300)^2 + \frac{6}{16}(500 - 300)^2 + \frac{4}{16}(200 - 300)^2 + \frac{1}{16}(100 - 300)^2 = 25,000.$$
Similarly, the variance of option 2 is 124,120. The standard deviation of option 1 is 158.11. The standard deviation of option 2 is 352.31.
 - c. Option 2 is the most risky.
2.
 - a. Risk loving.
 - b. Risk averse.
 - c. Risk neutral.
3.
 - a. \$5.
 - b. She will purchase, since your price is less than her reservation price.
 - c. \$6.
 - d. She will continue to search, since the price exceeds her reservation price.
4.
 - a. $Ep = .6(\$100) + .4(\$200) = \$140.$
 - b. Set $Ep = MC$ to get $140 = 1 + 4Q$. Solve for Q to find your profit-maximizing output, $Q = 34.75$ units.
 - c. Your expected profits are $(Ep)Q - C(Q) = \$140(34.75) - (34.75 + 2(34.75)^2) = \$2,415.13.$
5.
 - a. The expected value, which is \$25.
 - b. The maximum value, which is \$50.

- 6.
- With only two bidders, $n = 2$. The lowest possible valuation is $L = \$1,000$, and your own valuation is $v = \$2,500$. Thus, your optimal sealed bid is

$$b = v - \frac{v - L}{n} = \$2,500 - \frac{\$2,500 - \$1,000}{2} = \$1,750.$$
 - With ten bidders, $n = 10$. The lowest possible valuation is $L = \$1,000$, and your own valuation is $v = \$2,500$. Thus, your optimal sealed bid is

$$b = v - \frac{v - L}{n} = \$2,500 - \frac{\$2,500 - \$1,000}{10} = \$2,350.$$
 - With one hundred bidders, $n = 100$. The lowest possible valuation is $L = \$1,000$, and your own valuation is $v = \$2,500$. Thus, your optimal sealed bid is

$$b = v - \frac{v - L}{n} = \$2,500 - \frac{\$2,500 - \$1,000}{100} = \$2,485.$$
- 7.
- With 5 bidders, $n = 5$. The lowest possible valuation is $L = \$50,000$, and your own valuation is $v = \$75,000$. Thus, your optimal sealed bid is

$$b = v - \frac{v - L}{n} = \$75,000 - \frac{\$75,000 - \$50,000}{5} = \$70,000.$$
 - A Dutch auction is strategically equivalent to a first-price sealed bid auction (see part (a)). Thus, you should let the auctioneer continue to lower the price until it reaches \$70,000, and then yell “Mine!”
 - \$75,000, since it is a dominant strategy to bid your true valuation in a second-price, sealed-bid auction.
 - Remain active until the price exceeds \$75,000; then drop out.
- 8.
- Hidden actions lead to moral hazard; hidden characteristics lead to adverse selection.
 - Incentive contracts can solve moral hazard problems; screening and sorting can solve adverse selection problems.
9. Since this is a common value auction, bidders will not bid their own private estimates because doing so would lead to the winner’s curse. Thus, there will be an additional incentive for bidders to shade their bids below their estimated valuations. The English auction format provides bidders the most information (therefore allowing them to pool information to some extent), mitigating this problem. For this reason, the English auction would generate the highest expected revenues in this case.
10. Your expected inverse demand is $E(P) = .5(200,000 - 250Q) + .5(400,000 - 250Q) = 300,000 - 250Q$. Therefore, your expected marginal revenue is $E(MR) = 300,000 - 500Q$. Your marginal cost is $MC = \$200,000$. Setting $E(MR) = MC$ yields $300,000 - 500Q = 200,000$. Solving, $Q = 200$. The price you expect is thus $E(P) = 300,000 - 250(200) = \$250,000$. Your profits are thus $(\$250,000 - \$200,000)(200) - \$110,000 = \$9,890,000$.

11. One would expect higher premiums on credit life, thanks to adverse selection. People who cannot pass physicals will select toward this type of insurance, resulting in higher premiums. Furthermore, people who are healthy and can pass a physical will be unwilling to pay the higher premiums, thus exacerbating this effect.
12. The expected benefit from an additional search are $0.05(\$110,000 - \$60,000) = \$2,500$, while the cost of another search is \$5,000. Therefore, make her an offer.
13. In the absence of "guaranteed issue," an insurance company could choose to insure only those employees with a very low risk structure. In this case they offer lower rates because they experience fewer claims. But this leaves those workers with greater risk factors without insurance. By requiring insurers to offer coverage to all employees, the insurance company must take on employees that are less healthy and a greater risk. Why the controversy? By insuring those with greater health risks, the expected number of claims rises, thus increasing the cost of coverage. The workers with existing health problems benefit at the expense of healthy workers, who pay higher prices with "guaranteed issue." If the price rises high enough and healthy workers are free to drop coverage, this can result in adverse selection: The only people willing to pay the higher premiums are those in poor health.
14. Brownstown Steel has better information about its financial situation than does its lenders, and is attempting to use this information advantage to enhance its bargaining position. If lenders gained full information about the financial situation of Brownstown Steel Corp., they would be in a position to squeeze the maximum amount from Brownstown Steel without fear of pushing it into bankruptcy. Absent the information, lenders will be more generous, since taking too much would increase the risk that Brownstown Steel goes bankrupt.
15. The 30-day warranty and 10-point inspection. This not only reduces buyer risk from being duped by a used car dealer, but provides a costly signal about the quality of the used cars sold. An unscrupulous dealer would find it costly to mimic this strategy. Recognizing both of these facts, rational buyers will be more willing to purchase cars from the dealer.
16. Offer two plans for customers with more than \$1 million in assets. One plan (perhaps called the "Free Trade" Account) has an annual maintenance fee of \$10,000 good for up to 400 "free" transactions (computed as $\$10,000/\25) per year (each additional transaction is priced at \$25 each). The other plan (perhaps called the "Free Service" Account) has no annual maintenance fee but charges \$100 per transaction. Given these two options, investors will sort themselves into the plans based on their individual characteristics.
17. With 5 other bidders, $n = 6$. The lowest possible valuation is $L = \$5,000$, and your own valuation is $v = \$12,000$. Thus, your optimal first-price, sealed-bid is

$$b = v - \frac{v - L}{n} = \$12,000 - \frac{\$12,000 - \$5,000}{6} = \$10,833.33$$

18. A risk-neutral Oracle's bid of \$7 billion is low since the expected value of the present value of the stream of profits is \$7.6 billion. The public bidding process described most resembles an independent, private value English auction (each company places a different probability assessment on the value of the company that depends on potential realized synergies). SAP's expected value of the present value of the stream of profits is \$8.4 billion. Since this is greater than Oracle's expected value, SAP will win the "auction" and acquire PeopleSoft. SAP will pay just over \$7.6 billion for PeopleSoft.
19. The expected value of aggregate ten-year profits of a McDonald's franchise is $.25(\$10) + .50(\$5) + .25(-\$1) = \4.75 million. Similarly, the expected value of a Penn Station East Coast Subs' franchise is $.025(\$30) + .95(\$5) + .025(-\$30) = \4.75 million. The variance and standard deviation of owning a McDonald's franchise is $\sigma_{McDonald's}^2 = .25(10 - 4.75)^2 + .50(5 - 4.75)^2 + .25(-1 - 4.75)^2 = 15.1875$ and $\sigma_{McDonald's} = \sqrt{\sigma_{McDonald's}^2} = \sqrt{15.1875} = 3.8971$, respectively. Similarly, the variance and standard deviation for Penn Station East Coast Subs' is $\sigma_{Penn}^2 = .025(30 - 4.75)^2 + .95(5 - 4.75)^2 + .025(-30 - 4.75)^2 = 46.1875$ and $\sigma_{Penn} = \sqrt{\sigma_{Penn}^2} = \sqrt{46.1875} = 6.7961$, respectively. Since the expected values are the same we can compare the standard deviations to determine the most risky investment. Since $\sigma_{Penn} > \sigma_{McDonald's}$ there is more risk associated with a Penn Station East Coast Subs' franchise.