Exam #2 (80 Points Total)

- Other than this cheat sheet (which you should tear off), all you are allowed to use for help are the basic functions on a calculator.
- The space provided below each question should be sufficient for your answer, but you can use additional paper if needed.
- *Show your work for partial credit.* It is very difficult to give partial credit if the only thing on your page is "$x = 3$".
- **Expected value** is given by summing likelihood times value over all possible outcomes:

$$\text{Expected Value} \quad = \sum_{\text{Outcomes } i} \text{Probability}(i) \cdot \text{Value}(i).$$

- A **Pareto efficient** (or **Pareto optimal**) allocation or outcome is one in which it is not possible find a different allocation or outcome in which nobody is worse off and at least one person is better off. An allocation or outcome B is a **Pareto improvement over A** if nobody is worse off with B than with A and at least one person is better off.
- A (strictly) **dominant strategy** for player X is a strategy which gives player X a higher payoff than any other strategy *regardless of the other players' strategies.*
- In an **ascending price auction**, the price starts out at a low value and the bidders raise each other's bids until nobody else wants to bid. In a **descending price auction**, the price starts out at a high value and the auctioneer lowers it until somebody calls out, "Mine." In a **first-price sealed-bid auction**, the bidders submit bids in sealed envelopes; the bidder with the highest bid wins, and pays an amount equal to his or her bid (i.e., the highest bid). In a **second-price sealed-bid auction**, the bidders submit bids in sealed envelopes; the bidder with the highest bid wins, but pays an amount equal to the *second-highest* bid.

(5 points) Name:

1. Bruce Babbitt (former governor of Arizona and Secretary of the Interior under President Clinton) spoke on campus Monday night about the possibility of saving endangered salmon by taking out the four dams on the lower portion of the Snake River.

   (a) (5 points) One thing that Babbitt said was that taking out the dams would hurt farmers, some boaters, and certain other constituencies. Translate this claim into econ-speak by using the appropriate Pareto term(s).

   (b) (5 points) Babbitt also said that (1) the Bush administration's "salmon recovery plan" involves spending \$6 billion on measures that will in fact not help the salmon nearly as much as taking out the four dams; and (2) that \$6 billion is more than enough to pay for dam removal *and* provide enough financial compensation to the farmers, boaters, and others so that they'd be no worse off without the dams than they were with the dams. Translate this claim into econ-speak by using the appropriate Pareto term(s), *at least one of which should be different from the Pareto term(s) you used above.*

2. It just so happens that eBay is currently running an auction for a collection of *all five* *NSYNC bobblehead dolls. Imagine that your value for such a collection is \$20, meaning that you are indifferent between having the dolls and having \$20.

   (a) (5 points) In a first-price sealed bid auction, should you bid an amount b that is (less than   equal to   more than) your true value (\$20)? Circle one and explain briefly. It may help to write down an expected value calculation.

(b) (5 points) In a second-price sealed bid auction, explain why it makes sense to bid your true value (i.e., \$20). In other words, explain why bidding your true value is a dominant strategy. *Hint:* Consider the highest bid *excluding* your own bid. If that bid is more than \$20, can you do better than bidding your true value? If that bid is less than \$20, can you do better than bidding your true value?

(c) (5 points) Your friend Ed needs some cash, so he decides to auction off his prized collection of *NSYNC bobblehead dolls. You suggest a second-price sealed bid auction, to which he says, "Second price? Why should I accept the *second-highest* price when I can do a first-price sealed bid auction and get the *first-highest* price?" Write a response. *Hint:* Think about your answers to the first two auction questions above.

3. (Overinvestment as a barrier to entry) Consider the following sequential move games of complete information. The games are between an incumbent monopolist (M) and a potential entrant (PE). You can answer these questions without looking at the stories, but the stories do provide some context and motivation.

   Story #1 (See figure 1): Firm M is an incumbent monopolist. Firm PE is considering spending $30 to build a factory and enter the market. If firm PE stays out, firm M gets the whole market. If firm PE enters the market, firm M can either build another factory and engage in a price war or peacefully share the market with firm PE.

   (a) (5 points) Identify (e.g., by circling) the likely outcome of this game.

   (b) (5 points) Is this outcome Pareto efficient? Yes No (Circle one. If it is not Pareto efficient, identify, e.g., with a star, a Pareto improvement.)

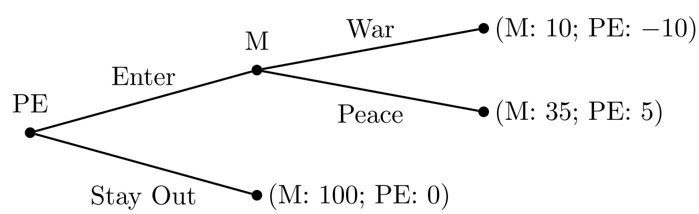

Figure 1: Story #1

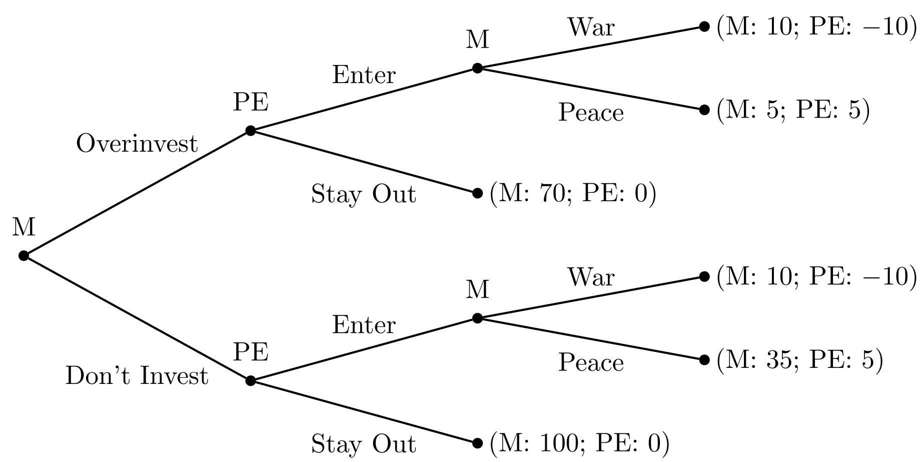

Figure 2: Story #2

Story #2 (See figure 2): The monopolist (firm M) chooses whether or not to overinvest by building a second factory for $30 even though one factory is more than enough. Firm PE (the potential entrant) sees what firm M has done and decides whether to enter or stay out, and if PE enters then M decides whether or not to engage in a price war.

(a) (5 points) Identify (e.g., by circling) the likely outcome of this game.

(b) (5 points) Is this outcome Pareto efficient? Yes No (Circle one. If it is not Pareto efficient, identify, e.g., with a star, a Pareto improvement.)

4. Consider the following 2-period cake-cutting game between Jack and Jill, each of whom has as his or her sole objective the desire for as much cake as possible. In round 1 there are three ounces of cake, and Jack makes a take-it-or-leave-it offer to Jill. If Jill accepts, the game ends and the players divide and eat the cake; if Jill rejects, Mom eats one ounce and the game moves to round 2. In round 2 there are two ounces of cake, and Jill makes a take-it-or-leave-it offer to Jack. If Jack accepts, the game ends and the players divide and eat the cake; if Jack rejects, the game ends and both players get nothing.

   (a) (5 points) Backward induction predicts that Jack will offer two ounces of cake to Jill in round 1, leaving one ounce for himself, and that Jill will accept. Explain the reasoning behind this prediction.

   (b) (5 points) This cake-cutting game has something in common with such real-world phenomena as labor disputes or lawsuits in that delay hurts both sides: the longer the strike or lawsuit drags on, the worse off the various players are. As in the game above, settlement in round 1 is the only way to reach an outcome that is Pareto (circle one: efficient inefficient). What does the Coase theorem have to say about *when* such conflicts are likely to be resolved? Give an example of what the Coase theorem predicts using labor disputes or lawsuits. (Recall the essence of the Coase theorem: "If there is nothing to stop people from trading, nothing will stop people from trading.")

5. Everybody in City X drives to work, so commutes take two hours. Imagine that a really good bus system could get everybody to work in 40 minutes if there were no cars on the road. There are only two hitches: (1) If there are cars on the road, the bus gets stuck in traffic just like every other vehicle, and therefore (2) people can always get to their destination 20 minutes faster by driving instead of taking the bus (the extra 20 minutes comes from walking to the bus stop, waiting for the bus, etc.).

   (a) (5 points) If such a bus system were adopted in City X and each resident of City X cared only about getting to work as quickly as possible, what would you expect the outcome to be?

   (b) (5 points) Is this outcome Pareto efficient? Explain briefly.

   (c) (5 points) "The central difficulty here is that each commuter must decide what to do without knowing what the other commuters are doing. If you knew what the others decided, you would behave differently." Do you agree with this argument? Circle one (Yes No) and briefly explain.

   (d) (5 points) What sort of mechanism do you suggest for reaching the optimal outcome in this game? Hint: Make sure to think about enforcement!