Quiz #4

1. Circle all pure strategy Nash equilibria in the following games:
   a. (Coordination)

		Player 2: Left	Player 2: Right
Player 1	Left	1,1	0,0
	Right	1,2	5,5

   b. ("Chicken")

		Player 2: Straight	Player 2: Swerve
Player 1	Straight	-1,-1	2,1
	Swerve	1,2	0,0

Bonus question In the space below, write a whole number between 0 and 1000, inclusive. Upon collecting all quizzes, I will determine the highest number anyone has written, and then multiply that number by .9. The person closest to this number without going over will receive 15 extra points on this quiz. If more than one person wins, each winner will receive 15 extra points.

2. An incumbent monopoly is currently earning a profit of \$10M. A second firm is considering entering the market; if it does so, both firms will earn profit of \$3M. The incumbent firm is considering urging the government to require all firms in the industry to install pollution control devices, which will lower profit by \$4M.

a. Suppose the incumbent firm chooses between 'pollution controls' and 'no controls' and the entrant chooses between 'enter' and 'don't enter', and that their decisions are made simultaneously. What are the Nash equilibria of this game?

b. Now suppose the incumbent firm moves first, and then, upon observing whether pollution controls are in place or not, the entrant chooses between 'enter' and 'don't enter'. What is the subgame perfect Nash equilibrium of this game?

3. A monopoly sells in two countries, with demand curves

$$\begin{aligned} q_1 &= 100 - p_1 \\ q_2 &= 60 - \frac{1}{2}p_2 \end{aligned} \tag{1}$$

The monopoly has a constant marginal cost of \$30.

a. Suppose resale between the two countries is impossible, so that different prices can be charged in each market. Solve for p_1, p_2, and the monopoly profit.

b. Now suppose that resale becomes much easier, so that the same price must be charged in each country ($p_1 = p_2$). Solve for this price, and the new monopoly profit.

4. A local carnival estimates that each of its customers has a demand function over number of rides given by $p = 20 - q$. The marginal cost of letting a customer on a ride is 0.

a. Solve for the carnival's profit-maximizing price per ride and quantity of rides sold, per customer. What per-customer profit does the monopolist earn?

b. Now suppose the monopolist is able to charge an entrance fee to the park, as well as a per-ride fee. What entrance fee and per-ride price does it set to maximize profits? What per-customer profit does the monopolist earn?