<u>**CONCEPT:**</u> ONE TIME GAMES AND THE PRISONER'S DILEMMA

● *Game Theory* – making decisions when the outcomes depend on the _____ with others

       □ A *one-time game* gets played _____ time

<u>**The Prisoner's Dilemma**</u> **-** Bad Boy Benny and Evil Eddie were recently arrested after some casual B&E. The police do not have enough evidence to make a strong case against them, but can nail them for smaller crimes. After being separated into different cells, the police make each prisoner the same offer. "Right now, we can lock you up for a year. If you confess, we will let you go free and your partner will get 20 years. But if you both confess, you each get an 8-year sentence.

		Bad Boy Benny's Decision	
		Confess	Don't Confess
Evil Eddie's Decision	Confess		
	Don't Confess		

       □ To make the "best decision," consider what you would do in response to each of your opponent's decisions.

              - A *dominant strategy* is your _____ strategy regardless of the other player's choice

                    > Not every game has a dominant strategy!

              - The *Nash equilibrium* occurs where all players make their best choice given their competitor's choices.

                    > Not necessarily the best outcome for all players!

       □ In this game, both players would have been better off if they could cooperate.

              - *Collusion* is an agreement between players (i.e. firms) about their decisions (i.e. quantity/price)

              - A *cartel* is a group of colluding firms

                  - Members of a cartel have the incentive to _____ to increase their profits

              - *Price leadership* - a form of collusion where one firm announces a price change and the industry follows.

● The easiest way to find dominant strategies and the Nash equilibrium is to use the _____ method.

1) Put a ✓ for each of Player One's best strategies

2) Put an ✖ for each of Player Two's best strategies

3) Analyze for your solution:

    a. Any row (or column) with two ✓ or two ✖ will be a ***dominant strategy***.

    b. Any box with both a ✓and an ✖ is a ***Nash equilibrium***.

EXAMPLE:

		Player Two's Decision	
		A	B
Player One's Decision	A	Player One: $300 / Player Two: $500	Player One: $100 / Player Two: $400
	B	Player One: $400 / Player Two: $100	Player One: $200 / Player Two: $200

☐ Player One Dominant Strategy → _____

☐ Player Two Dominant Strategy → _____

☐ Nash Equilibrium   → _____

PRACTICE: Use the payoff matrix to answer the following questions:

		Target	
		Lower Prices	**Keep Prices**
Walmart	**Lower Prices**	Target: $5 million / Walmart: $5 million	Target: $1 million / Walmart: $30 million
	Keep Prices	Target: $30 million / Walmart: $1 million	Target: $20 million / Walmart: $20 million

Based on the information in the payoff matrix, which of the following is true?

a) This situation is not a prisoner's dilemma

b) If Walmart lowers its price, Target should keep its prices high

c) If Target lowers its price and Walmart does not, Target will earn $20 million economic profit

d) Both Walmart and Target would jointly be better off if they could each keep their prices high

The game above has:

a) A Nash equilibrium: both Walmart and Target keep prices high

b) A Nash equilibrium: both Walmart and Target lower prices

c) A Nash equilibrium: Target keeps prices high and Walmart lowers prices

d) No Nash equilibrium

PRACTICE: In a cartel, the incentive to cheat is significant because

a) Each firm has an incentive to decrease its own output

b) Each firm has an incentive to raise its price

c) Each firm has an incentive to expand its output

d) Each firm's marginal cost exceeds the price that the cartel sets