

- 1) Both firms in a Cournot duopoly would enjoy higher profits if
 - A) the firms simultaneously reduced output below the Nash equilibrium level.
 - B) each firm simultaneously increased output above the Nash equilibrium level.
 - C) one firm reduced output below the Cournot Nash equilibrium level, while the other firm continued to produce its Cournot Nash equilibrium output.
 - D) the firms simultaneously reduced output below the Nash equilibrium level and one firm reduced output below the Cournot Nash equilibrium level, while the other firm continued to produce its Cournot Nash equilibrium output.
- 2) In the accompanying game, firms 1 and 2 must independently decide whether to charge high or low prices.

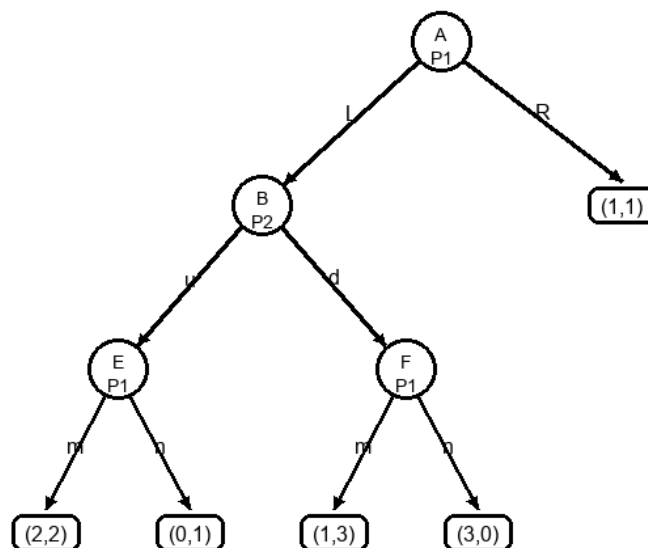
Firm One	Firm Two		
		High Price	Low Price
	High Price	(8, 8)	(-5, 10)
	Low Price	(10, -5)	(2, 2)

Which of the following are Nash equilibrium payoffs in the one-shot game?

- A) (8,8)
 - B) (-5,10)
 - C) (2,2)
 - D) (10,-5)
- 3) Management and a labor union are bargaining over how much of a \$50 surplus to give to the union. The \$50 is divisible up to one cent. The players have one shot to reach an agreement. Management has the ability to announce what it wants first, and then the labor union can accept or reject the offer. Both players get zero if the total amounts asked for exceed \$50. The Labor Union tells the Manager if they don't offer exactly \$25, they will reject the offer. Which of the following is true? The offer of \$25 is
 - A) A Nash Equilibrium
 - B) A Subgame Perfect Nash equilibrium.
 - C) Both A & B
 - D) Neither A or B

- 4) Consider the following information for a simultaneous move game: If you advertise and your rival advertises, you each will earn \$5 million in profits. If neither of you advertises, you will each earn \$10 million in profits. However, if one of you advertises and the other does not, the firm that advertises will earn \$15 million and the non-advertising firm will earn \$1 million. If you and your rival plan to hand your business down to your children (and this "bequest" goes on forever), then a Nash equilibrium when the interest rate is zero is
- A) for each firm to not advertise until the rival does and then to advertise forever.
 - B) for your firm to never advertise.
 - C) for your firm to always advertise when your rival does.
 - D) for each firm to advertise until the rival does not advertise and then not to advertise forever.
- 5) Which of the following is *not* a type of market structure?
- A) monopolistic competition
 - B) perfect competition
 - C) monopolistic oligopoly
 - D) monopoly
- 6) Which of the following is a correct representation of the *profit-maximization condition* for a monopoly?
- A) $P = MR$
 - B) $MC = MR$
 - C) $P = ATC + MR$
 - D) $MR = MC + ATC$
- 7) Suppose that initially the price is \$50 in a perfectly competitive market. Firms are making zero economic profits. Then the market demand shrinks permanently, some firms leave the industry, and the industry returns to a long-run equilibrium. What will be the new equilibrium price, assuming cost conditions in the industry remain constant?
- A) \$50
 - B) \$45
 - C) lower than \$50, but an exact value cannot be known without more information
 - D) higher than \$45, but an exact value cannot be known without more information

- 8) Management and a labor union are bargaining over how much of a \$50 surplus to give to the union. The \$50 is divisible up to one cent. The players have one shot to reach an agreement. Management has the ability to announce what it wants first, and then the labor union can accept or reject the offer. Both players get zero if the total amounts asked for exceed \$50. If you were the labor union, which type of "rules of play" would you prefer to divide the \$50 surplus?
- A) one-shot, simultaneous-move game
 - B) one-shot, sequential-move game with management as the first mover
 - C) one-shot, sequential-move game with labor union as the first mover
 - D) one-shot, simultaneous-move game and one-shot, sequential-move game with management as the first mover
- 9) How many subgames in the following game?



- A) 5
- B) 2
- C) 3
- D) 4

- 10) There is a market supply curve in a
- A) perfectly competitive market.
 - B) monopolistically competitive market.
 - C) monopolistic market.
 - D) perfectly competitive market and monopolistically competitive market.
- 11) The Cournot theory of oligopoly assumes rivals will
- A) keep their output constant.
 - B) increase their output whenever a firm increases its output.
 - C) decrease output whenever a firm increases its output.
 - D) follow the learning curve.
- 12) You are the manager of a firm that sells its product in a competitive market at a price of \$48. Your firm's cost function is $C = 60 + 2Q^2$. Your firm's maximum profits are
- A) \$192.
 - B) \$228.
 - C) \$348.
 - D) \$576.

- 13) Refer to the normal-form game of price competition in the accompanying payoff matrix.

Firm A	Firm B		
		Low Price	High Price
	Low Price	(0, 0)	(50, -10)
	High Price	(-10, 50)	(20, 20)

What is the maximum interest rate that can sustain collusion?

- A) 30 percent
 - B) 15 percent
 - C) 66.7 percent
 - D) 20 percent
- 14) With linear demand and constant marginal cost, a Stackelberg leader's profits are _____ the follower.
- A) less than
 - B) equal to
 - C) greater than
 - D) either less than or greater than

- 15) Game theory is especially useful for analysis in which of the following markets?
- A) perfect competition
 - B) monopolistic competition
 - C) oligopoly
 - D) monopoly
- 16) "An oligopoly is an oligopoly. Firms behave the same no matter what type of oligopoly it is." This statement is true of
- A) Bertrand and Cournot oligopolies.
 - B) Cournot and Stackelberg oligopolies.
 - C) Bertrand and Stackelberg oligopolies.
 - D) neither Bertrand, Cournot, nor Stackelberg oligopolies.
- 17) Ed just finished an empirical study of oligopoly. He found the following result: "In the examined industry, a firm's demand curve is such that other firms match price increases but do not match price reductions." What kind of oligopoly is the examined industry?
- A) Sweezy model
 - B) Cournot model
 - C) Stackelberg model
 - D) none of the provided answers

- 18) Refer to the accompanying normal-form game of advertising depicted here.

	Firm B		
		Advertise	Do Not Advertise
	Advertise	(\$0, \$0)	(\$175, -\$100)
	Do Not Advertise	(-\$100, \$175)	(\$125, \$125)

Firms A and B know the game will be played for exactly five periods. What is a Nash equilibrium to this game?

- A) {advertise, do not advertise}
- B) {advertise, advertise}
- C) {do not advertise, do not advertise}
- D) {do not advertise, advertise}

19) Consider The Following Game:

Player 1	Player 2		
		Left	Right
	Up	$(-2, 2)$	$(2, -2)$
	Down	$(2, -2)$	$(-2, 2)$

In the Mixed NE, what is the probability Player 1 plays Up with $pr=p$ and Player 2 plays left with $pr=q$?

- A) $p=0.5$; $q=0.5$
- B) $p=0.25$; $q=0.75$
- C) $p=0.75$; $q=0.25$
- D) $p=0.5$; $q=0.25$

20) It is easier to sustain tacit collusion in an infinitely repeated game if

- A) the present value of cheating is lower than collusion.
- B) there are many players.
- C) the interest rate is higher.
- D) the present value of cheating is lower than collusion and the interest rate is higher.

21) Which of the following features is common to both perfectly competitive markets and monopolistically competitive markets?

- A) Firms produce homogeneous goods.
- B) There is free entry.
- C) Long-run profits are zero.
- D) There is free entry and long-run profits are zero.

22) Refer to the normal-form game of price competition in the accompanying payoff matrix.

	Firm B		
Firm A		Low Price	High Price
	Low Price	(0, 0)	(50, -10)
	High Price	(-10, 50)	(20, 20)

Suppose the game is infinitely repeated and the interest rate is 10 percent. Both firms agree to charge a high price, provided no player has charged a low price in the past. If both firms stick to this agreement, then the present value of firm A's payoffs is

- A) 220.
B) 110.
C) 330.
D) 550.

23) Which of the following is true?

- A) A Nash equilibrium is always a subgame perfect equilibrium.
- B) A subgame perfect equilibrium is always a Nash equilibrium.
- C) A Nash equilibrium is always a perfect subgame equilibrium in a multistage game.
- D) Subgame perfect equilibrium and Nash equilibrium are the same concept but with different names.

24) Consider the following information for a simultaneous move game: If you advertise and your rival advertises, you each will earn \$5 million in profits. If neither of you advertises, you will each earn \$10 million in profits. However, if one of you advertises and the other does not, the firm that advertises will earn \$15 million and the non-advertising firm will earn \$1 million. If you and your rival plan to be in business for 10 years, then the Nash equilibrium is

- A) for each firm to advertise every year.
B) for neither firm to advertise in early years but to advertise in later years.
C) for each firm to not advertise in any year.
D) for each firm to advertise in early years but not advertise in later years.

25) The dominant strategy for player 2 in the accompanying game is

	Player 2			
Player 1		t1	t2	t3
	s1	(4,10)	(3,0)	(1,3)
	s2	(0,0)	(2,10)	(10,3)

- A) t1.
- B) t1 and t2.
- C) t3.
- D) neither t1, t1 and t2, nor t3.

26) Refer to the normal-form game of price competition in the accompanying payoff matrix. The figure presents information for a one-shot game.

	Firm B		
Firm A		Low Price	High Price
	Low Price	(0, 0)	(15, -3)
	High Price	(-3, 15)	(10, 10)

Suppose the game is infinitely repeated, and the interest rate is 5 percent. Both firms agree to charge a high price, provided no player has charged a low price in the past. If both firms stick to this agreement, then the present value of firm A's payoffs is

- A) 210.
- B) 315.
- C) 275.
- D) 250.

27) Which of the following market structures would you expect to yield the greatest product variety?

- A) monopoly
- B) monopolistic competition
- C) Bertrand oligopoly
- D) perfect competition

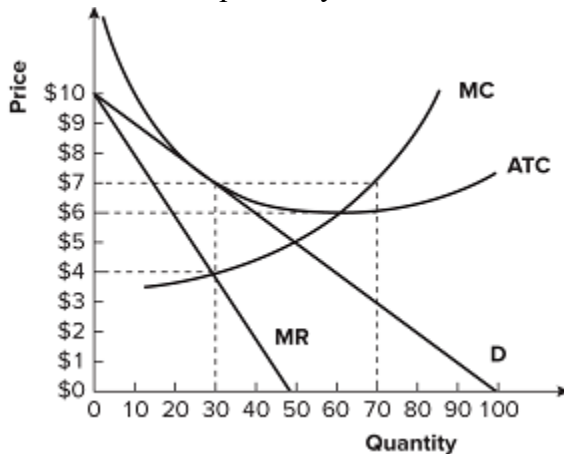
28) Consider The Following Game:

Player 1	Player 2		
		Left	Right
	Up	(11, 10)	(0, 5)
	Down	(3, 0)	(3, 5)

In the Mixed NE, what is the probability Player 1 plays Up with $pr=p$ and Player 2 plays left with $pr=q$?

- A) $p=0.5$; $q=0.27$
- B) $p=0.27$; $q=0.5$
- C) $p=0.73$; $q=0.27$
- D) $p=0.5$; $q=0.5$

29) Suppose University Cereal operates in a monopolistic competition market and its cost and revenue curves are represented in the figure. The profit-maximization price and quantity in this scenario, respectively, are



- A) \$4 and 30 units.
- B) \$7 and 70 units.
- C) \$6 and 50 units.
- D) \$7 and 30 units

30) Refer to the accompanying normal-form game of advertising depicted here.

	Firm B		
Firm A		Advertise	Do Not Advertise
	Advertise	(\$0, \$0)	(\$175, -\$100)
	Do Not Advertise	(\$-100, \$175)	(\$125, \$125)

Suppose there is a 90 percent chance that the advertising game will end in the next period.

The collusive agreement {(not advertise, not advertise)} is

- A) sustainable since $\$175 > \138.89 .
- B) unsustainable since $\$175 > \138.89 .
- C) sustainable since $\$11.11 < \50 .
- D) unsustainable since $\$11.11 < \50 .

31) Which of the following is true?

- A) In an infinitely repeated game, collusion is always a Nash equilibrium.
- B) In a finitely repeated game with a certain end period, collusion is unlikely because effective punishments cannot be used during any time period.
- C) All of the statements associated with this question are correct.
- D) None of the answers is correct.

32) A perfectly competitive firm faces a

- A) perfectly elastic demand function.
- B) perfectly inelastic demand function.
- C) demand function with unitary elasticity.
- D) perfectly inelastic demand curve.

33) Suppose that you are a manager. You are considering whether or not to monitor employees with the payoffs in the normal-form accompanying game.

	Worker		
Manager		Work	Shirk
	Monitor	(-1, 1)	(1, -1)
	Don't Monitor	(1, -1)	(-1, 1)

Which of the following pairs of strategies constitutes a Nash equilibrium?

- A) Manager monitors and worker works.
- B) Manager does not monitor and worker works.
- C) Manager monitors and worker shirks.
- D) None of the answers is correct.

- 34) In the long run, monopolistically competitive firms produce a level of output such that
- A) $P > MC$.
 - B) $P = ATC$.
 - C) $ATC > \text{minimum of average costs}$.
 - D) all of the statements associated with this question are correct.
- 35) Consider the following entry game: Here, firm B is an existing firm in the market, and firm A is a potential entrant. Firm A must decide whether to enter the market (play "enter") or stay out of the market (play "not enter"). If firm A decides to enter the market, firm B must decide whether to engage in a price war (play "hard"), or not (play "soft"). By playing "hard," firm B ensures that firm A makes a loss of \$1 million, but firm B only makes \$1 million in profits. On the other hand, if firm B plays "soft," the new entrant takes half of the market, and each firm earns profits of \$5 million. If firm A stays out, it earns zero while firm B earns \$10 million. Which of the following are perfect equilibrium strategies?
- A) (enter, soft)
 - B) (not enter, soft)
 - C) (enter, hard)
 - D) (not enter, hard)
- 36) Consider the following entry game: Here, firm B is an existing firm in the market, and firm A is a potential entrant. Firm A must decide whether to enter the market (play "enter") or stay out of the market (play "not enter"). If firm A decides to enter the market, firm B must decide whether to engage in a price war (play "hard") or not (play "soft"). By playing "hard," firm B ensures that firm A makes a loss of \$1 million, but firm B only makes \$1 million in profits. On the other hand, if firm B plays "soft," the new entrant takes half of the market, and each firm earns profits of \$5 million. If firm A stays out, it earns zero while firm B earns \$10 million. Which of the following are Nash equilibrium strategies?
- A) (enter, hard) and (not enter, hard)
 - B) (enter, soft) and (not enter, soft)
 - C) (not enter, hard) and (enter, soft)
 - D) (enter, hard) and (not enter, soft)
- 37) Which of the following is a profit-maximizing condition for a Cournot oligopolist?
- A) $MR = MC$.
 - B) $Q_1 = Q_2 = \dots = Q_r$.
 - C) $P = MR$.
 - D) All of the statements associated with this question are correct.

- 38) The spirit of equating marginal cost with marginal revenue is *not* held by
- A) perfectly competitive firms.
 - B) oligopolistic firms.
 - C) perfectly competitive firms and oligopolistic firms.
 - D) any of the provided answers.

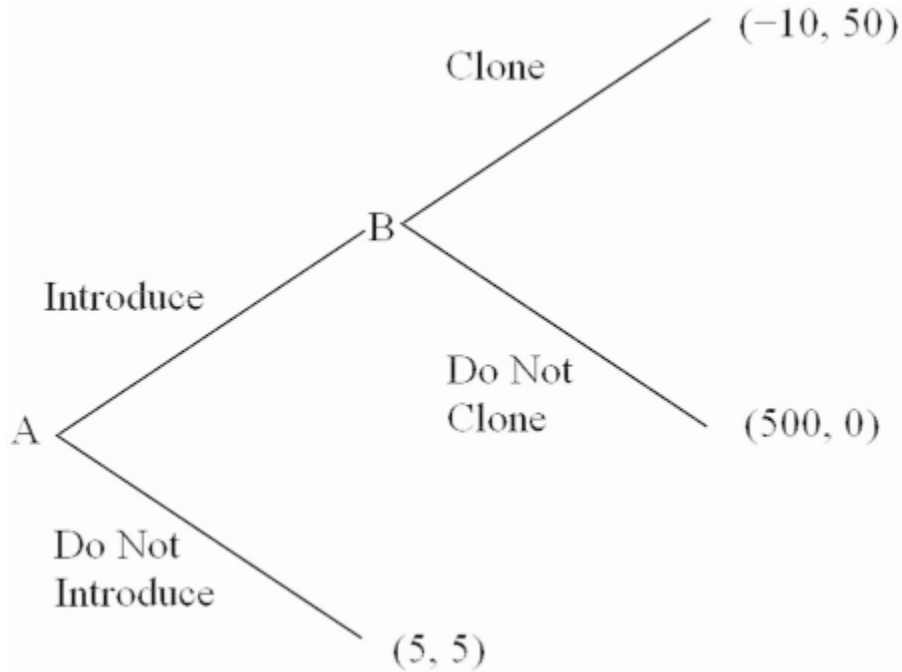
- 39) Refer to the accompanying normal-form game of price competition.

	Firm B		
Firm A		C	D
	A	(50, 50)	(500-x, 200)
	B	(100, 500-x)	(50, 50)

For what values of x is strategy B strictly dominant for firm A?

- A) All $x > 450$
 - B) All $x < 450$
 - C) $x = 450$
 - D) $x < 50$
- 40) A coordination problem arises whenever there
- A) is no Nash equilibrium in a game.
 - B) is a unique Nash equilibrium but it is not very desirable.
 - C) are multiple Nash equilibria.
 - D) are no dominant strategies for both players.

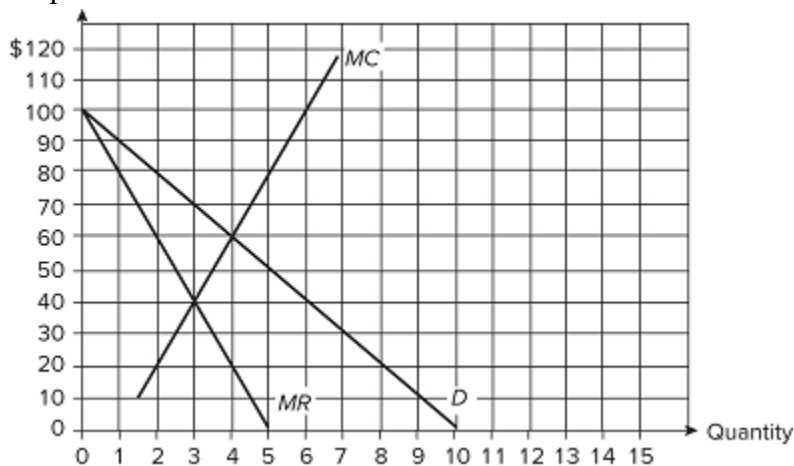
41) Refer to the accompanying extensive-form game diagram.



Firm A must decide whether or not to introduce a new product. If firm A introduces a new product, firm B must decide whether or not to clone the product. The payoff structure of the game is depicted in the diagram. The subgame perfect equilibrium to this game is

- A) Firm A plays "Introduce" and firm B plays "Clone" if firm A plays "Introduce."
- B) Firm A plays "Do Not Introduce."
- C) Firm A plays "Introduce" and firm B plays "Do Not Clone" if firm A plays "Introduce."
- D) There is not a subgame perfect equilibrium in this game.

- 42) The graph shows a monopolist firms cost and revenue curves. What is the profit-maximizing output?



- A) 2
B) 3
C) 4
D) 10
- 43) The accompanying figure provides information for a one-shot game.

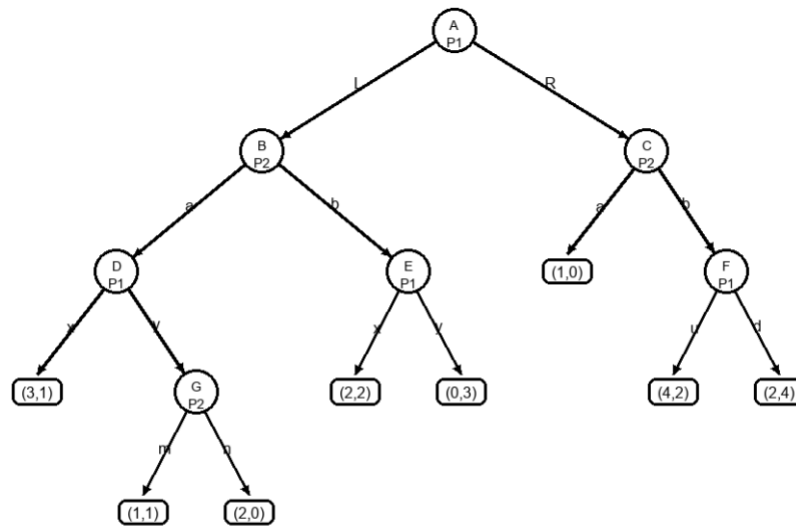
Firm A	Firm B		
		Low Price	High Price
	Low Price	(2, 2)	(10, -8)
	High Price	(-8, 10)	(15, 15)

What are the Nash equilibrium strategies for this game?

- A) (low price, low price)
B) (high price, high price)
C) (low price, low price) and (high price, high price)
D) None of the answers is correct.
- 44) Consider the following innovation game: Firm A must decide whether or not to introduce a new product. Firm B must decide whether or not to clone firm A's product. If firm A introduces and B clones, then firm A earns \$1 and B earns \$10. If A introduces and B does not clone, then A earns \$10 and B earns \$2. If firm A does not introduce, both firms earn profits of 0. Which of the following is true?
- A) The subgame perfect Nash equilibrium profits are (\$10, \$2).
B) It is not in A's interest to introduce.
C) Firm A does not care if B clones.
D) None of the answers is correct.

- 45) The primary difference(s) between monopolistic competition and perfect competition
- A) is the ease of entry and exit into the industry.
 - B) is the number of firms in the market.
 - C) are both the ease of entry and exit into the industry and the number of firms in the market.
 - D) is that products are identical under perfect competition but not under monopolistic competition..

46) How many subgames in the following game?



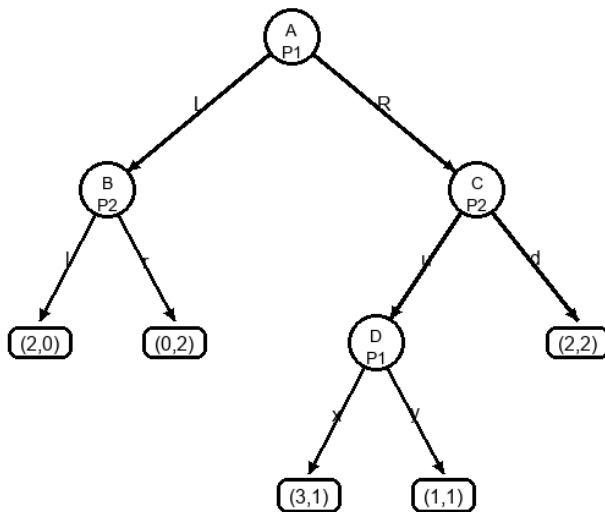
- A) 5
- B) 6
- C) 7
- D) 8

47) The Nash equilibrium of the accompanying game is

Player 1	Player 2			
		A	B	C
	X	(9, 8)	(10, 12)	(3, 15)
	Y	(5, 6)	(12, 20)	(4, 10)
	Z	(10, 9)	(13, 4)	(8, 12)

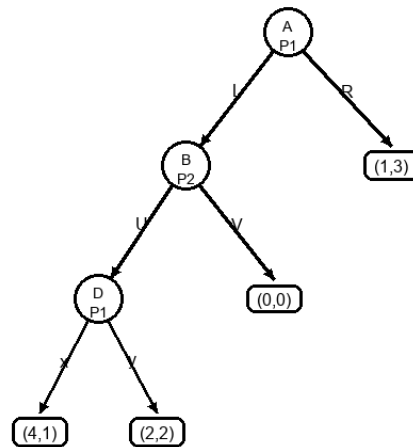
- A) (Y,B).
- B) (X,B).
- C) (Z,C),
- D) none of the provided answers because there is no Nash equilibrium in this game.

48) How many subgames in the following game?



- A) 1
- B) 2
- C) 3
- D) 4

49) How many subgames in the following game?



- A) 1
- B) 2
- C) 3
- D) 4

50) In the long run, monopolistically competitive firms charge prices

- A) equal to marginal cost.
- B) below marginal cost.
- C) equal to the minimum of average total cost.
- D) above the minimum of average total cost.

51) A dominant strategy is a strategy that

- A) results in the highest payoff to a player regardless of the opponent's action.
- B) guarantees the highest payoff given the worst possible scenario.
- C) describes a set of circumstances in which no player can improve her payoff by unilaterally changing her own strategy, given the other players' strategies.
- D) randomizes over two or more available actions in order to keep rivals from being able to predict a player's action.

52) Annie owns a florist shop and operates in a perfectly competitive market. Suppose that price per unit is 15. If at the point where MC and MR curves intersect, ATC = \$18 and AVC = \$15, then Annie will

- A) have losses equal to fixed costs.
- B) exit in the short run.
- C) earn positive profits in the short run.
- D) earn zero profits in the short run.

53) Consider The Following Game:

	Player 2		
Player 1		Left	Right
	Up	(7, 2)	(0, 0)
	Down	(0, 0)	(3, 5)

In the Mixed NE, what is the probability Player 1 plays Up with $pr=p$ and Player 2 plays left with $pr=q$?

- A) $p=0.3$; $q=0.71$
- B) $p=0.5$; $q=0.5$
- C) $p=0.71$; $q=0.3$
- D) $p=0.43$; $q=0.5$