True-False Questions: Fill in Bubble A for True, Bubble B for False.

1. If the production and sale of a good imposes external costs on members of a community, the total profits of community members will be increased if trade in the good is banned.

2. If the production of a good causes a positive externality, a competitive equilibrium in the market for that good may be inefficient.

3. If the cost of producing one more unit is lower than the price at which a monopolist is currently selling its output, then the monopolist will increase its profits by selling one more unit.

4. The sum of demanders’ profits and suppliers’ profits is lower under monopoly than under competition.

5. If Person A has absolute advantage over Person B in the production of Good X, then Person A must also have comparative advantage over Person B in the production of Good X.

6. Consumer’s surplus is the difference between the number of units of a good demanded and the number of units supplied.

7. If the demand curve slopes down and the supply curve slopes up, then when the demand curve shifts, the equilibrium price and quantity move in the same direction.

8. Competitive equilibrium theory predicts that the number of transactions and the amount of profits for buyers and for sellers would be the same if a sales tax of $20 per unit were collected from buyers as they would be if a sales tax of $20 per unit were collected from sellers.

9. A profit-maximizing firm will always want to hire the number of workers that gives it the highest average profit per worker.
10. In a short-run equilibrium, all firms make a positive profit.

Multiple Choice Questions

11. Side Hill Lie Golf Course gets regular play on weekdays (Monday through Friday) from a group of retired senior citizens. They only play on weekdays and never on the weekend (Saturday and Sunday). On the weekend, Side Hill gets play from residents of the community who have full-time jobs during the week. They only play on the Saturday and Sunday and never during the rest of the week. If Side Hill charges $15 a round, 100 golfers will demand to play on an average weekday, and 250 golfers will demand to play on an average Saturday or Sunday. If it charges $20 per round, 80 will demand to play on an average weekday, and 150 on an average Saturday or Sunday. If it charges $25 a round, 70 will demand to play on an average weekday, and 100 on an average Saturday or Sunday. Side Hill incurs a cost of $5 per golfer per day. Suppose Side Hill must charge the same price on the weekend as during the week. If Side Hill wishes to maximize its profits, what price should it charge? (Remember that a week almost always has 5 weekdays, one Saturday, and one Sunday.)
   (a) $15
   (b) $20
   (c) $25

12. Suppose that the demand for and cost of golf at Side Hill Lie Golf Course is exactly as depicted in the previous question. But, now suppose that the golf course can charge a price on the weekend (Saturday and Sunday) that is different that the price it charges during the week (Monday through Friday). If Side Hill wishes to maximize its profits, what prices should it charge?
   (a) $25 on the weekend and $25 during the week.
   (b) $20 on the weekend and $20 during the week.
   (c) $25 on the weekend and $15 during the week.
   (d) $15 on the weekend and $25 during the week.
   (e) $25 on the weekend and $20 during the week.

13. A monopolist is currently selling 10 units of its product at $50 per unit. If it cuts its price to $46, it will be able to sell 11 units. What is the firm’s marginal revenue from selling its 11th unit?
   (a) $50
   (b) $6
   (c) $46
   (d) $4
   (e) $16
14. Clearview, Texas, has 10 plants that generate electricity. Each plant can generate one megawatt. For 3 of the plants, the cost of generating electricity is $10 per hour. For 5 of the plants, that cost is $13 per hour. For 2 of the plants, the cost is $17 per hour. The demand curve for electricity is perfectly elastic at a price of $19 per megawatt hour. While operating, each plant emits one pound per hour of sulfur dioxide into Clearview’s air. In an attempt to reduce this air pollution, Clearview has instituted a system of marketable pollution permits. A permit allows a power plant to emit one pound of sulphur dioxide per hour. Clearview has issued 7 of these permits. Power plants may buy and sell the permits. What is the competitive equilibrium price of a permit?

(a) $9
(b) $11
(c) $6
(d) $7
(e) $2

15. After Clearview’s plan described in the previous question has been implemented and pollution permits have been freely traded, which generating plants will continue to operate in Clearview?

(a) Both of the plants with a $17 cost, 4 of the plants with a $13 cost, and none of the plants with a $10 cost.
(b) All of the plants with a $10 cost, 3 of the plants with a $13 cost, and none of the plants with a $17 cost.
(c) Two of the plants with a $10 cost, 2 of the plants with a $13 cost, and both of the plants with a $17 cost.
(d) All of the plants with a $17 cost and all of the plants with a $13 cost.

16. In producing two goods (one with an external benefit and the other with an external cost), an unregulated competitive market would produce

(a) too much of both goods.
(b) too little of both goods.
(c) too much of the good with the external benefit, and too little of the good with the external cost.
(d) too little of the good with the external benefit, and too much of the good with the external cost.
17. Robinson Crusoe lives alone on a tropical island. He spends 8 hours per day gathering coconuts or catching fish. For every hour that he spends fishing, he catches 1 fish. For every hour that he spends gathering coconuts, he gets 2 coconuts. Where $F$ is the number of fish he catches per day, and $C$ is the number of coconuts he gathers per day, Robinson’s production possibility frontier can be described by

(a) a line with the equation $F + (C/2) = 8$.
(b) a line with the equation $F + 2C = 8$.
(c) two line segments; one extending from the point $(0, 8)$ to the point $(4, 4)$ and one extending from the point $(4, 4)$ to the point $(4, 0)$.
(d) a line segment with the equation $F = 2C + 8$.
(e) a line segment with the equation $C = 2F$.

18. Suppose that Robinson Crusoe of the previous problem is regularly visited by an itinerant trader who is willing to trade fish for coconuts or coconuts for fish. The trader is willing to trade fish for coconuts or coconuts for fish at the rate of 1 fish per coconut. Robinson always insists on consuming one fish for every coconut that he eats and one coconut for every fish that he eats. Thus his payoff from consuming $C$ coconuts and $F$ fish is $\text{Minimum}\{C, F\}$. When Robinson is able to deal with the trader, he will

(a) spend all his time catching fish and trade 4 fish for 4 coconuts.
(b) catch equal numbers of fish and coconuts and not trade with the trader.
(c) catch 2 fish and gather 6 coconuts and trade 2 coconuts for 2 fish.
(d) spend all his time gathering coconuts and trade 8 coconuts for 8 fish.
(e) spend all his time gathering coconuts and trade 4 coconuts for 4 fish.

19. In "Clothes will cost less, but some nations pay," Marshall, Iraitani, and Dickerson report on the effects of the end of international quotas on clothing and textiles. According to the article,

(a) The end of quotas will have little effect because most countries were exporting less than their quotas.
(b) The end of quotas will harm industrialized countries because they produce most of the world’s textiles.
(c) The end of quotas will harm China and India because the quotas protected them from competition from other countries.
(d) The end of quotas will harm small countries like Cambodia because the quotas protected them from competition from China and India.
(e) The end of quotas will harm consumers because the quality of textiles will decline.
20. The state of Calix has two river valleys: Santa Lucia and San Ricardo. In both valleys, ranchers can raise cattle or grow grapes. In Santa Lucia, an acre of land yields 1 ton of beef per year or 2 tons of grapes per year. In San Ricardo, an acre of land yields 3 tons of beef per year or 4 tons of grapes per year. In comparing these two river valleys,

(a) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in beef.

(b) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in grapes.

(c) San Ricardo has an absolute advantage in grapes, Santa Lucia has an absolute advantage in beef, and Santa Lucia has a comparative advantage in grapes.

(d) San Ricardo has both absolute and comparative advantages in both products.

(e) Santa Lucia has an absolute advantage in beef, San Ricardo has an absolute advantage in grapes, and San Ricardo has a comparative advantage in beef.

21. A small tropical island’s banana market has 35 banana growers and 65 banana consumers. Each banana grower can sell at most one sack of bananas. Each consumer can consume either 0 or 1 sack of bananas. There are 25 low-cost banana producers, each of whom can produce bananas at a cost of $25 per sack and 10 high-cost banana producers, each of whom can produce bananas at a cost of $50 per sack. There are 35 consumers who are willing to pay up to $40 a sack and 30 consumers who are willing to pay up to $20 a sack for bananas. What is the competitive equilibrium price of bananas on this island?

(a) $20

(b) $50

(c) $25

(d) $45

(e) $40

22. In competitive equilibrium, the total amount of profit made by banana growers will be:

(a) $735

(b) $325

(c) $475

(d) $375

(e) $425
23. Suppose that an oil cartel succeeded in reducing the supply of crude oil by 10% and suppose that the price elasticity of demand for crude oil is $-0.20$. What will happen to the equilibrium price of crude oil?

(a) It will fall by 10%.
(b) It will rise by 10%.
(c) It will rise by 20%.
(d) It will rise by 50%.
(e) It will rise by 30%.

24. In 2004, Florida harvested 12 million tons of oranges, and the total revenue of orange producers that year was $1,080 million. In the winter of 2005, however, there was hard frost reducing the orange harvest in 2005 to 9 million tons. This caused the price of oranges to rise and the total revenue of Florida orange growers to increase to $1,260 million in 2005. Assuming the demand curve for Florida oranges did not change between 2004 and 2005, from the information above it appears that

(a) the price elasticity of supply of oranges is less than 1.
(b) the price elasticity of demand for oranges is less than $-1$.
(c) the price elasticity of demand for oranges is between $-1$ and 0.
(d) the price elasticity of supply for oranges is greater than 1.
(e) the supply curve for oranges slopes downward.

25. Ten residents of Greenfield are willing to pay someone as much as $8 a week to mow their lawn, and ten residents are willing to pay someone as much as $6 a week to mow their lawn. Thirty teenage boys are willing to mow a lawn each week if they receive at least $5 for the job. Suppose the city of Greenfield imposes a tax of $2 a week on each resident who hires a teenage boy to mow his or her lawn. How will that tax affect the competitive equilibrium price of lawn mowing?

(a) The price would fall by $2.
(b) The price would rise by $2
(c) The price would not change.
(d) The price would fall by $1.
(e) The price would rise by $1.
26. In the previous question about the tax on lawn mowing in Greenfield, what is the excess burden of the tax?
   (a) zero
   (b) $10
   (c) $20
   (d) $30
   (e) $40

27. Ed’s bakery can sell as many loaves of bread as it wishes for a price of $1 per loaf. To keep calculations simple, let us assume that Ed’s only costs are hired labor. If Ed hires 1 worker, he can produce 400 loaves of bread per day. If he hires 2 workers, he can produce 550 loaves of bread per day. If he hires 3 workers, he can produce 650 loaves of bread per day. If he hires 4 workers, he can produce 740 loaves of bread per day. If he hires 5 workers, he can produce 800 loaves of bread per day, and if he hires 6 workers, he can produce 830 loaves of bread per day. If he hires 7 or more workers, he can still produce only 830 loaves of bread per day. If Ed increases his work crew from 4 workers to 5 workers, his daily revenue will increase by:
   (a) $150
   (b) $60
   (c) $90
   (d) $30
   (e) $180

28. If each worker that Ed hires must be paid a daily wage of $65, how many workers should he hire per day to maximize his profits? (Hint: Remember that each loaf of bread is worth $1.)
   (a) 4
   (b) 3
   (c) 5
   (d) 6
   (e) 2
29. Demand for haircuts in the city of San Barberia is given by the function \( P = 71 - (Q/25) \), where \( Q \) is the number of haircuts per day and \( P \) is the price of a haircut. Everyone who opens a barber shop in town has a fixed cost of $400 per day, which must be paid so long as a shop is in business and regardless of the number of haircuts it sells. There is also a variable cost of $3 for each customer served. Each barber shop has a capacity of 50 customers per day. San Barberia currently has 27 barbershops. A barber shop that is open cannot escape its fixed costs immediately, but must give 6 months notice to its landlord of its intention to close. It also takes about 6 months to organize and open a new barber shop. The short run supply curve for haircuts in San Barberia consists of

(a) a vertical segment extending from the origin to the point \((0, 3)\) and an unbounded horizontal line extending to the right of the point \((0, 3)\).

(b) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1350, 3)\), and a vertical segment extending upwards from \((1350, 3)\).

(c) a vertical segment extending from the origin to the point \((0, 11)\), a horizontal segment extending from \((0, 11)\) to \((1350, 11)\), and a vertical segment extending upwards from \((1350, 11)\).

(d) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1450, 3)\) and a vertical segment extending upwards from \((1450, 3)\).

(e) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1200, 3)\), and a vertical segment extending upwards from \((1200, 3)\).

30. In long run equilibrium in San Barberia, the number of barber shops and the price of a haircut is

(a) 30 barbershops and a price of $11.

(b) 32 barbershops and a price of $7.

(c) 27 barbershops and a price of $17.

(d) 28 barbershops and a price of $15.

(e) 31 barbershops and a price of $11.
True-False Questions: Fill in Bubble A for True, Bubble B for False.

1. A profit-maximizing firm will always want to hire the number of workers that gives it the highest average profit per worker.

2. If the production and sale of a good imposes external costs on members of a community, the total profits of community members will be increased if trade in the good is banned.

3. Competitive equilibrium theory predicts that the number of transactions and the amount of profits for buyers and for sellers would be the same if a sales tax of $20 per unit were collected from buyers as they would be if a sales tax of $20 per unit were collected from sellers.

4. In a short-run equilibrium, all firms make a positive profit.

5. If the production of a good causes a positive externality, a competitive equilibrium in the market for that good may be inefficient.

6. If the cost of producing one more unit is lower than the price at which a monopolist is currently selling its output, then the monopolist will increase its profits by selling one more unit.

7. The sum of demanders’ profits and suppliers’ profits is lower under monopoly than under competition.

8. Consumer’s surplus is the difference between the number of units of a good demanded and the number of units supplied.

9. If Person A has absolute advantage over Person B in the production of Good X, then Person A must also have comparative advantage over Person B in the production of Good X.
10. If the demand curve slopes down and the supply curve slopes up, then when the demand curve shifts, the equilibrium price and quantity move in the same direction.

Multiple Choice Questions

11. Side Hill Lie Golf Course gets regular play on weekdays (Monday through Friday) from a group of retired senior citizens. They only play on weekdays and never on the weekend (Saturday and Sunday). On the weekend, Side Hill gets play from residents of the community who have full-time jobs during the week. They only play on the Saturday and Sunday and never during the rest of the week. If Side Hill charges $15 a round, 100 golfers will demand to play on an average weekday, and 250 golfers will demand to play on an average Saturday or Sunday. If it charges $20 per round, 80 will demand to play on an average weekday, and 150 on an average Saturday or Sunday. If it charges $25 a round, 70 will demand to play on an average weekday, and 100 on an average Saturday or Sunday. Side Hill incurs a cost of $5 per golfer per day. Suppose Side Hill must charge the same price on the weekend as during the week. If Side Hill wishes to maximize its profits, what price should it charge? (Remember that a week almost always has 5 weekdays, one Saturday, and one Sunday.)
   (a) $25
   (b) $20
   (c) $15

12. Suppose that the demand for and cost of golf at Side Hill Lie Golf Course is exactly as depicted in the previous question. But, now suppose that the golf course can charge a price on the weekend (Saturday and Sunday) that is different that the price it charges during the week (Monday through Friday). If Side Hill wishes to maximize its profits, what prices should it charge?
   (a) $15 on the weekend and $25 during the week.
   (b) $25 on the weekend and $25 during the week.
   (c) $20 on the weekend and $20 during the week.
   (d) $25 on the weekend and $15 during the week.
   (e) $25 on the weekend and $20 during the week.

13. A monopolist is currently selling 10 units of its product at $50 per unit. If it cuts its price to $46, it will be able to sell 11 units. What is the firm’s marginal revenue from selling its 11th unit?
   (a) $46
   (b) $4
   (c) $50
   (d) $6
   (e) $16
14. Clearview, Texas, has 10 plants that generate electricity. Each plant can generate one megawatt. For 3 of the plants, the cost of generating electricity is $10 per hour. For 5 of the plants, that cost is $13 per hour. For 2 of the plants, the cost is $17 per hour. The demand curve for electricity is perfectly elastic at a price of $19 per megawatt hour. While operating, each plant emits one pound per hour of sulfur dioxide into Clearview’s air. In an attempt to reduce this air pollution, Clearview has instituted a system of marketable pollution permits. A permit allows a power plant to emit one pound of sulfur dioxide per hour. Clearview has issued 7 of these permits. Power plants may buy and sell the permits. What is the competitive equilibrium price of a permit?

(a) $7  
(b) $6  
(c) $9  
(d) $11  
(e) $2

15. After Clearview’s plan described in the previous question has been implemented and pollution permits have been freely traded, which generating plants will continue to operate in Clearview?

(a) All of the plants with a $17 cost and all of the plants with a $13 cost.  
(b) Both of the plants with a $17 cost, 4 of the plants with a $13 cost, and none of the plants with a $10 cost.  
(c) All of the plants with a $10 cost, 3 of the plants with a $13 cost, and none of the plants with a $17 cost.  
(d) Two of the plants with a $10 cost, 2 of the plants with a $13 cost, and both of the plants with a $17 cost.

16. In producing two goods (one with an external benefit and the other with an external cost), an unregulated competitive market would produce

(a) too much of the good with the external benefit, and too little of the good with the external cost.  
(b) too little of both goods.  
(c) too much of both goods.  
(d) too little of the good with the external benefit, and too much of the good with the external cost.
17. Robinson Crusoe lives alone on a tropical island. He spends 8 hours per day gathering coconuts or catching fish. For every hour that he spends fishing, he catches 1 fish. For every hour that he spends gathering coconuts, he gets 2 coconuts. Where $F$ is the number of fish he catches per day, and $C$ is the number of coconuts he gathers per day, Robinson’s production possibility frontier can be described by

(a) a line with the equation $F + (C/2) = 8$.
(b) two line segments; one extending from the point $(0, 8)$ to the point $(4, 4)$ and one extending from the point $(4, 4)$ to the point $(4, 0)$.
(c) a line with the equation $F + 2C = 8$.
(d) a line segment with the equation $F = 2C + 8$.
(e) a line segment with the equation $C = 2F$.

18. Suppose that Robinson Crusoe of the previous problem is regularly visited by an itinerant trader who is willing to trade fish for coconuts or coconuts for fish. The trader is willing to trade fish for coconuts or coconuts for fish at the rate of 1 fish per coconut. Robinson always insists on consuming one fish for every coconut that he eats and one coconut for every fish that he eats. Thus his payoff from consuming $C$ coconuts and $F$ fish is $\min\{C, F\}$. When Robinson is able to deal with the trader, he will

(a) spend all his time gathering coconuts and trade 8 coconuts for 8 fish.
(b) catch 2 fish and gather 6 coconuts and trade 2 coconuts for 2 fish.
(c) catch equal numbers of fish and coconuts and not trade with the trader.
(d) spend all his time catching fish and trade 4 fish for 4 coconuts.
(e) spend all his time gathering coconuts and trade 4 coconuts for 4 fish.

19. In "Clothes will cost less, but some nations pay," Marshall, Iraitani, and Dickerson report on the effects of the end of international quotas on clothing and textiles. According to the article,

(a) The end of quotas will harm China and India because the quotas protected them from competition from other countries.
(b) The end of quotas will harm industrialized countries because they produce most of the world’s textiles.
(c) The end of quotas will harm small countries like Cambodia because the quotas protected them from competition from China and India.
(d) The end of quotas will have little effect because most countries were exporting less than their quotas.
(e) The end of quotas will harm consumers because the quality of textiles will decline.
20. The state of Calix has two river valleys: Santa Lucia and San Ricardo. In both valleys, ranchers can raise cattle or grow grapes. In Santa Lucia, an acre of land yields 1 ton of beef per year or 2 tons of grapes per year. In San Ricardo, an acre of land yields 3 tons of beef per year or 4 tons of grapes per year. In comparing these two river valleys,

(a) San Ricardo has both absolute and comparative advantages in both products.
(b) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in grapes.
(c) San Ricardo has an absolute advantage in grapes, Santa Lucia has an absolute advantage in beef, and Santa Lucia has a comparative advantage in grapes.
(d) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in beef.
(e) Santa Lucia has an absolute advantage in beef, San Ricardo has an absolute advantage in grapes, and San Ricardo has a comparative advantage in beef.

21. A small tropical island’s banana market has 35 banana growers and 65 banana consumers. Each banana grower can sell at most one sack of bananas. Each consumer can consume either 0 or 1 sack of bananas. There are 25 low-cost banana producers, each of whom can produce bananas at a cost of $25 per sack and 10 high-cost banana producers, each of whom can produce bananas at a cost of $50 per sack. There are 35 consumers who are willing to pay up to $40 a sack and 30 consumers who are willing to pay up to $20 a sack for bananas. What is the competitive equilibrium price of bananas on this island?

(a) $20
(b) $25
(c) $45
(d) $50
(e) $40

22. In competitive equilibrium, the total amount of profit made by banana growers will be:

(a) $325
(b) $375
(c) $735
(d) $475
(e) $425
23. Suppose that an oil cartel succeeded in reducing the supply of crude oil by 10% and suppose that the price elasticity of demand for crude oil is −0.20. What will happen to the equilibrium price of crude oil?
   (a) It will rise by 10%.
   (b) It will rise by 20%.
   (c) It will fall by 10%.
   (d) It will rise by 50%.
   (e) It will rise by 30%.

24. In 2004, Florida harvested 12 million tons of oranges, and the total revenue of orange producers that year was $1,080 million. In the winter of 2005, however, there was hard frost reducing the orange harvest in 2005 to 9 million tons. This caused the price of oranges to rise and the total revenue of Florida orange growers to increase to $1,260 million in 2005. Assuming the demand curve for Florida oranges did not change between 2004 and 2005, from the information above it appears that
   (a) the price elasticity of demand for oranges is between −1 and 0.
   (b) the price elasticity of supply for oranges is greater than 1.
   (c) the price elasticity of demand for oranges is less than −1.
   (d) the price elasticity of supply of oranges is less than 1.
   (e) the supply curve for oranges slopes downward.

25. Ten residents of Greenfield are willing to pay someone as much as $8 a week to mow their lawn, and ten residents are willing to pay someone as much as $6 a week to mow their lawn. Thirty teenage boys are willing to mow a lawn each week if they receive at least $5 for the job. Suppose the city of Greenfield imposes a tax of $2 a week on each resident who hires a teenage boy to mow his or her lawn. How will that tax affect the competitive equilibrium price of lawn mowing?
   (a) The price would rise by $2
   (b) The price would not change.
   (c) The price would fall by $2.
   (d) The price would fall by $1.
   (e) The price would rise by $1.
26. In the previous question about the tax on lawn mowing in Greenfield, what is the excess burden of the tax?
   (a) $10
   (b) $20
   (c) $30
   (d) zero
   (e) $40

27. Ed’s bakery can sell as many loaves of bread as it wishes for a price of $1 per loaf. To keep calculations simple, let us assume that Ed’s only costs are hired labor. If Ed hires 1 worker, he can produce 400 loaves of bread per day. If he hires 2 workers, he can produce 550 loaves of bread per day. If he hires 3 workers, he can produce 650 loaves of bread per day. If he hires 4 workers, he can produce 740 loaves of bread per day. If he hires 5 workers, he can produce 800 loaves of bread per day, and if he hires 6 workers, he can produce 830 loaves of bread per day. If he hires 7 or more workers, he can still produce only 830 loaves of bread per day. If Ed increases his work crew from 4 workers to 5 workers, his daily revenue will increase by:

   (a) $30
   (b) $150
   (c) $60
   (d) $90
   (e) $180

28. If each worker that Ed hires must be paid a daily wage of $65, how many workers should he hire per day to maximize his profits? (Hint: Remember that each loaf of bread is worth $1.)

   (a) 5
   (b) 6
   (c) 4
   (d) 3
   (e) 2
29. Demand for haircuts in the city of San Barberia is given by the function \( P = 71 - (Q/25) \), where \( Q \) is the number of haircuts per day and \( P \) is the price of a haircut. Everyone who opens a barber shop in town has a fixed cost of $400 per day, which must be paid so long as a shop is in business and regardless of the number of haircuts it sells. There is also a variable cost of $3 for each customer served. Each barber shop has a capacity of 50 customers per day. San Barberia currently has 27 barbershops. A barber shop that is open cannot escape its fixed costs immediately, but must give 6 months notice to its landlord of its intention to close. It also takes about 6 months to organize and open a new barber shop. The short run supply curve for haircuts in San Barberia consists of

(a) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1450, 3)\) and a vertical segment extending upwards from \((1450, 3)\).

(b) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1350, 3)\), and a vertical segment extending upwards from \((1350, 3)\).

(c) a vertical segment extending from the origin to the point \((0, 11)\), a horizontal segment extending from \((0, 11)\) to \((1350, 11)\), and a vertical segment extending upwards from \((1350, 11)\).

(d) a vertical segment extending from the origin to the point \((0, 3)\) and an unbounded horizontal line extending to the right of the point \((0, 3)\).

(e) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1200, 3)\), and a vertical segment extending upwards from \((1200, 3)\).

30. In long run equilibrium in San Barberia, the number of barber shops and the price of a haircut is

(a) 30 barbershops and a price of $11.

(b) 28 barbershops and a price of $15.

(c) 27 barbershops and a price of $17.

(d) 32 barbershops and a price of $7.

(e) 31 barbershops and a price of $11.
True-False Questions: Fill in Bubble A for True, Bubble B for False.

1. The sum of demanders’ profits and suppliers’ profits is lower under monopoly than under competition.

2. In a short-run equilibrium, all firms make a positive profit.

3. If the demand curve slopes down and the supply curve slopes up, then when the demand curve shifts, the equilibrium price and quantity move in the same direction.

4. If the cost of producing one more unit is lower than the price at which a monopolist is currently selling its output, then the monopolist will increase its profits by selling one more unit.

5. Competitive equilibrium theory predicts that the number of transactions and the amount of profits for buyers and for sellers would be the same if a sales tax of $20 per unit were collected from buyers as they would be if a sales tax of $20 per unit were collected from sellers.

6. A profit-maximizing firm will always want to hire the number of workers that gives it the highest average profit per worker.

7. If the production and sale of a good imposes external costs on members of a community, the total profits of community members will be increased if trade in the good is banned.

8. Consumer’s surplus is the difference between the number of units of a good demanded and the number of units supplied.

9. If the production of a good causes a positive externality, a competitive equilibrium in the market for that good may be inefficient.
10. If Person A has absolute advantage over Person B in the production of Good X, then Person A must also have comparative advantage over Person B in the production of Good X.

Multiple Choice Questions

11. Side Hill Lie Golf Course gets regular play on weekdays (Monday through Friday) from a group of retired senior citizens. They only play on weekdays and never on the weekend (Saturday and Sunday). On the weekend, Side Hill gets play from residents of the community who have full-time jobs during the week. They only play on the Saturday and Sunday and never during the rest of the week. If Side Hill charges $15 a round, 100 golfers will demand to play on an average weekday, and 250 golfers will demand to play on an average Saturday or Sunday. If it charges $20 per round, 80 will demand to play on an average weekday, and 150 on an average Saturday or Sunday. If it charges $25 a round, 70 will demand to play on an average weekday, and 100 on an average Saturday or Sunday. Side Hill incurs a cost of $5 per golfer per day. Suppose Side Hill must charge the same price on the weekend as during the week. If Side Hill wishes to maximize its profits, what price should it charge? (Remember that a week almost always has 5 weekdays, one Saturday, and one Sunday.)
   (a) $20
   (b) $15
   (c) $25

12. Suppose that the demand for and cost of golf at Side Hill Lie Golf Course is exactly as depicted in the previous question. But, now suppose that the golf course can charge a price on the weekend (Saturday and Sunday) that is different that the price it charges during the week (Monday through Friday). If Side Hill wishes to maximize its profits, what prices should it charge?
   (a) $25 on the weekend and $15 during the week.
   (b) $25 on the weekend and $25 during the week.
   (c) $20 on the weekend and $20 during the week.
   (d) $15 on the weekend and $25 during the week.
   (e) $25 on the weekend and $20 during the week.

13. A monopolist is currently selling 10 units of its product at $50 per unit. If it cuts its price to $46, it will be able to sell 11 units. What is the firm's marginal revenue from selling its 11th unit?
   (a) $6
   (b) $46
   (c) $50
   (d) $4
   (e) $16
14. Clearview, Texas, has 10 plants that generate electricity. Each plant can generate one megawatt. For 3 of the plants, the cost of generating electricity is $10 per hour. For 5 of the plants, that cost is $13 per hour. For 2 of the plants, the cost is $17 per hour. The demand curve for electricity is perfectly elastic at a price of $19 per megawatt hour. While operating, each plant emits one pound per hour of sulfur dioxide into Clearview’s air. In an attempt to reduce this air pollution, Clearview has instituted a system of marketable pollution permits. A permit allows a power plant to emit one pound of sulphur dioxide per hour. Clearview has issued 7 of these permits. Power plants may buy and sell the permits. What is the competitive equilibrium price of a permit?

(a) $11
(b) $7
(c) $6
(d) $9
(e) $2

15. After Clearview’s plan described in the previous question has been implemented and pollution permits have been freely traded, which generating plants will continue to operate in Clearview?

(a) All of the plants with a $17 cost and all of the plants with a $13 cost.
(b) All of the plants with a $10 cost, 3 of the plants with a $13 cost, and none of the plants with a $17 cost.
(c) Two of the plants with a $10 cost, 2 of the plants with a $13 cost, and both of the plants with a $17 cost.
(d) Both of the plants with a $17 cost, 4 of the plants with a $13 cost, and none of the plants with a $10 cost.

16. In producing two goods (one with an external benefit and the other with an external cost), an unregulated competitive market would produce

(a) too little of both goods.
(b) too little of the good with the external benefit, and too much of the good with the external cost.
(c) too much of both goods.
(d) too much of the good with the external benefit, and too little of the good with the external cost.
17. Robinson Crusoe lives alone on a tropical island. He spends 8 hours per day gathering coconuts or catching fish. For every hour that he spends fishing, he catches 1 fish. For every hour that he spends gathering coconuts, he gets 2 coconuts. Where \( F \) is the number of fish he catches per day, and \( C \) is the number of coconuts he gathers per day, Robinson’s production possibility frontier can be described by

(a) a line with the equation \( F + 2C = 8 \).
(b) two line segments; one extending from the point \((0, 8)\) to the point \((4, 4)\) and one extending from the point \((4, 4)\) to the point \((4, 0)\).
(c) a line with the equation \( F + \left(\frac{C}{2}\right) = 8 \).
(d) a line segment with the equation \( F = 2C + 8 \).
(e) a line segment with the equation \( C = 2F \).

18. Suppose that Robinson Crusoe of the previous problem is regularly visited by an itinerant trader who is willing to trade fish for coconuts or coconuts for fish. The trader is willing to trade fish for coconuts or coconuts for fish at the rate of 1 fish per coconut. Robinson always insists on consuming one fish for every coconut that he eats and one coconut for every fish that he eats. Thus his payoff from consuming \( C \) coconuts and \( F \) fish is \( \text{Minimum}\{C, F\} \). When Robinson is able to deal with the trader, he will

(a) catch 2 fish and gather 6 coconuts and trade 2 coconuts for 2 fish.
(b) spend all his time gathering coconuts and trade 8 coconuts for 8 fish.
(c) spend all his time catching fish and trade 4 fish for 4 coconuts.
(d) catch equal numbers of fish and coconuts and not trade with the trader.
(e) spend all his time gathering coconuts and trade 4 coconuts for 4 fish.

19. In "Clothes will cost less, but some nations pay," Marshall, Iraitani, and Dickerson report on the effects of the end of international quotas on clothing and textiles. According to the article,

(a) The end of quotas will harm small countries like Cambodia because the quotas protected them from competition from China and India.
(b) The end of quotas will harm industrialized countries because they produce most of the world’s textiles.
(c) The end of quotas will harm China and India because the quotas protected them from competition from other countries.
(d) The end of quotas will have little effect because most countries were exporting less than their quotas.
(e) The end of quotas will harm consumers because the quality of textiles will decline.
20. The state of Calix has two river valleys: Santa Lucia and San Ricardo. In both valleys, ranchers can raise cattle or grow grapes. In Santa Lucia, an acre of land yields 1 ton of beef per year or 2 tons of grapes per year. In San Ricardo, an acre of land yields 3 tons of beef per year or 4 tons of grapes per year. In comparing these two river valleys,

(a) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in beef.

(b) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in grapes.

(c) San Ricardo has both absolute and comparative advantages in both products.

(d) San Ricardo has an absolute advantage in grapes, Santa Lucia has an absolute advantage in beef, and Santa Lucia has a comparative advantage in grapes.

(e) Santa Lucia has an absolute advantage in beef, San Ricardo has an absolute advantage in grapes, and San Ricardo has a comparative advantage in beef.

21. A small tropical island’s banana market has 35 banana growers and 65 banana consumers. Each banana grower can sell at most one sack of bananas. Each consumer can consume either 0 or 1 sack of bananas. There are 25 low-cost banana producers, each of whom can produce bananas at a cost of $25 per sack and 10 high-cost banana producers, each of whom can produce bananas at a cost of $50 per sack. There are 35 consumers who are willing to pay up to $40 a sack and 30 consumers who are willing to pay up to $20 a sack for bananas. What is the competitive equilibrium price of bananas on this island?

(a) $25
(b) $45
(c) $50
(d) $20
(e) $40

22. In competitive equilibrium, the total amount of profit made by banana growers will be:

(a) $735
(b) $325
(c) $375
(d) $475
(e) $425
23. Suppose that an oil cartel succeeded in reducing the supply of crude oil by 10% and suppose that the price elasticity of demand for crude oil is $-0.20$. What will happen to the equilibrium price of crude oil?

(a) It will rise by 50%.
(b) It will rise by 20%.
(c) It will fall by 10%.
(d) It will rise by 10%.
(e) It will rise by 30%.

24. In 2004, Florida harvested 12 million tons of oranges, and the total revenue of orange producers that year was $1,080 million. In the winter of 2005, however, there was hard frost reducing the orange harvest in 2005 to 9 million tons. This caused the price of oranges to rise and the total revenue of Florida orange growers to increase to $1,260 million in 2005. Assuming the demand curve for Florida oranges did not change between 2004 and 2005, from the information above it appears that

(a) the price elasticity of demand for oranges is less than $-1$.
(b) the price elasticity of supply for oranges is greater than 1.
(c) the price elasticity of demand for oranges is between $-1$ and 0.
(d) the price elasticity of supply of oranges is less than 1.
(e) the supply curve for oranges slopes downward.

25. Ten residents of Greenfield are willing to pay someone as much as $8 a week to mow their lawn, and ten residents are willing to pay someone as much as $6 a week to mow their lawn. Thirty teenage boys are willing to mow a lawn each week if they receive at least $5 for the job. Suppose the city of Greenfield imposes a tax of $2 a week on each resident who hires a teenage boy to mow his or her lawn. How will that tax affect the competitive equilibrium price of lawn mowing?

(a) The price would not change.
(b) The price would fall by $2.
(c) The price would rise by $2.
(d) The price would fall by $1.
(e) The price would rise by $1.
26. In the previous question about the tax on lawn mowing in Greenfield, what is the excess burden of the tax?
   (a) $30
   (b) $20
   (c) zero
   (d) $10
   (e) $40

27. Ed’s bakery can sell as many loaves of bread as it wishes for a price of $1 per loaf. To keep calculations simple, let us assume that Ed’s only costs are hired labor. If Ed hires 1 worker, he can produce 400 loaves of bread per day. If he hires 2 workers, he can produce 550 loaves of bread per day. If he hires 3 workers, he can produce 650 loaves of bread per day. If he hires 4 workers, he can produce 740 loaves of bread per day. If he hires 5 workers, he can produce 800 loaves of bread per day, and if he hires 6 workers, he can produce 830 loaves of bread per day. If he hires 7 or more workers, he can still produce only 830 loaves of bread per day. If Ed increases his work crew from 4 workers to 5 workers, his daily revenue will increase by:
   (a) $60
   (b) $90
   (c) $30
   (d) $150
   (e) $180

28. If each worker that Ed hires must be paid a daily wage of $65, how many workers should he hire per day to maximize his profits? (Hint: Remember that each loaf of bread is worth $1.)
   (a) 4
   (b) 5
   (c) 6
   (d) 3
   (e) 2
29. Demand for haircuts in the city of San Barberia is given by the function \( P = 71 - (Q/25) \), where \( Q \) is the number of haircuts per day and \( P \) is the price of a haircut. Everyone who opens a barber shop in town has a fixed cost of $400 per day, which must be paid so long as a shop is in business and regardless of the number of haircuts it sells. There is also a variable cost of $3 for each customer served. Each barber shop has a capacity of 50 customers per day. San Barberia currently has 27 barbershops. A barber shop that is open cannot escape its fixed costs immediately, but must give 6 months notice to its landlord of its intention to close. It also takes about 6 months to organize and open a new barber shop. The short run supply curve for haircuts in San Barberia consists of:

(a) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1350, 3)\), and a vertical segment extending upwards from \((1350, 3)\).

(b) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1450, 3)\) and a vertical segment extending upwards from \((1450, 3)\).

(c) a vertical segment extending from the origin to the point \((0, 11)\), a horizontal segment extending from \((0, 11)\) to \((1350, 11)\), and a vertical segment extending upwards from \((1350, 11)\).

(d) a vertical segment extending from the origin to the point \((0, 3)\) and an unbounded horizontal line extending to the right of the point \((0, 3)\).

(e) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1200, 3)\), and a vertical segment extending upwards from \((1200, 3)\).

30. In long run equilibrium in San Barberia, the number of barber shops and the price of a haircut is:

(a) 30 barbershops and a price of $11.

(b) 28 barbershops and a price of $15.

(c) 32 barbershops and a price of $7.

(d) 27 barbershops and a price of $17.

(e) 31 barbershops and a price of $11.
True-False Questions: Fill in Bubble A for True, Bubble B for False.

1. If the demand curve slopes down and the supply curve slopes up, then when the demand curve shifts, the equilibrium price and quantity move in the same direction.

2. If Person A has absolute advantage over Person B in the production of Good X, then Person A must also have comparative advantage over Person B in the production of Good X.

3. If the production and sale of a good imposes external costs on members of a community, the total profits of community members will be increased if trade in the good is banned.

4. If the cost of producing one more unit is lower than the price at which a monopolist is currently selling its output, then the monopolist will increase its profits by selling one more unit.

5. If the production of a good causes a positive externality, a competitive equilibrium in the market for that good may be inefficient.

6. Consumer’s surplus is the difference between the number of units of a good demanded and the number of units supplied.

7. Competitive equilibrium theory predicts that the number of transactions and the amount of profits for buyers and for sellers would be the same if a sales tax of $20 per unit were collected from buyers as they would be if a sales tax of $20 per unit were collected from sellers.

8. In a short-run equilibrium, all firms make a positive profit.

9. The sum of demanders’ profits and suppliers’ profits is lower under monopoly than under competition.
10. A profit-maximizing firm will always want to hire the number of workers that gives it the highest average profit per worker.

Multiple Choice Questions

11. Side Hill Lie Golf Course gets regular play on weekdays (Monday through Friday) from a group of retired senior citizens. They only play on weekdays and never on the weekend (Saturday and Sunday). On the weekend, Side Hill gets play from residents of the community who have full-time jobs during the week. They only play on the Saturday and Sunday and never during the rest of the week. If Side Hill charges $15 a round, 100 golfers will demand to play on an average weekday, and 250 golfers will demand to play on an average Saturday or Sunday. If it charges $20 per round, 80 will demand to play on an average weekday, and 150 on an average Saturday or Sunday. If it charges $25 a round, 70 will demand to play on an average weekday, and 100 on an average Saturday or Sunday. Side Hill incurs a cost of $5 per golfer per day. Suppose Side Hill must charge the same price on the weekend as during the week. If Side Hill wishes to maximize its profits, what price should it charge? (Remember that a week almost always has 5 weekdays, one Saturday, and one Sunday.)
   (a) $25
   (b) $20
   (c) $15

12. Suppose that the demand for and cost of golf at Side Hill Lie Golf Course is exactly as depicted in the previous question. But, now suppose that the golf course can charge a price on the weekend (Saturday and Sunday) that is different that the price it charges during the week (Monday through Friday). If Side Hill wishes to maximize its profits, what prices should it charge?
   (a) $25 on the weekend and $15 during the week.
   (b) $20 on the weekend and $20 during the week.
   (c) $15 on the weekend and $20 during the week.
   (d) $25 on the weekend and $25 during the week.
   (e) $25 on the weekend and $20 during the week.

13. A monopolist is currently selling 10 units of its product at $50 per unit. If it cuts its price to $46, it will be able to sell 11 units. What is the firm’s marginal revenue from selling its 11th unit?
   (a) $46
   (b) $50
   (c) $4
   (d) $6
   (e) $16
14. Clearview, Texas, has 10 plants that generate electricity. Each plant can generate one megawatt. For 3 of the plants, the cost of generating electricity is $10 per hour. For 5 of the plants, that cost is $13 per hour. For 2 of the plants, the cost is $17 per hour. The demand curve for electricity is perfectly elastic at a price of $19 per megawatt hour. While operating, each plant emits one pound per hour of sulfur dioxide into Clearview’s air. In an attempt to reduce this air pollution, Clearview has instituted a system of marketable pollution permits. A permit allows a power plant to emit one pound of sulfur dioxide per hour. Clearview has issued 7 of these permits. Power plants may buy and sell the permits. What is the competitive equilibrium price of a permit?

(a) $6  
(b) $9  
(c) $11  
(d) $7  
(e) $2

15. After Clearview’s plan described in the previous question has been implemented and pollution permits have been freely traded, which generating plants will continue to operate in Clearview?

(a) All of the plants with a $10 cost, 3 of the plants with a $13 cost, and none of the plants with a $17 cost.  
(b) Both of the plants with a $17 cost, 4 of the plants with a $13 cost, and none of the plants with a $10 cost.  
(c) All of the plants with a $17 cost and all of the plants with a $13 cost.  
(d) Two of the plants with a $10 cost, 2 of the plants with a $13 cost, and both of the plants with a $17 cost.

16. In producing two goods (one with an external benefit and the other with an external cost), an unregulated competitive market would produce

(a) too much of the good with the external benefit, and too little of the good with the external cost.  
(b) too much of both goods.  
(c) too little of the good with the external benefit, and too much of the good with the external cost.  
(d) too little of both goods.
17. Robinson Crusoe lives alone on a tropical island. He spends 8 hours per day gathering coconuts or catching fish. For every hour that he spends fishing, he catches 1 fish. For every hour that he spends gathering coconuts, he gets 2 coconuts. Where $F$ is the number of fish he catches per day, and $C$ is the number of coconuts he gathers per day, Robinson’s production possibility frontier can be described by

(a) a line with the equation $F + (C/2) = 8$.
(b) a line with the equation $F + 2C = 8$.
(c) two line segments; one extending from the point $(0,8)$ to the point $(4,4)$ and one extending from the point $(4,4)$ to the point $(4,0)$.
(d) a line segment with the equation $F = 2C + 8$.
(e) a line segment with the equation $C = 2F$.

18. Suppose that Robinson Crusoe of the previous problem is regularly visited by an itinerant trader who is willing to trade fish for coconuts or coconuts for fish. The trader is willing to trade fish for coconuts or coconuts for fish at the rate of 1 fish per coconut. Robinson always insists on consuming one fish for every coconut that he eats and one coconut for every fish that he eats. Thus his payoff from consuming $C$ coconuts and $F$ fish is $\min\{C,F\}$. When Robinson is able to deal with the trader, he will

(a) catch 2 fish and gather 6 coconuts and trade 2 coconuts for 2 fish.
(b) catch equal numbers of fish and coconuts and not trade with the trader.
(c) spend all his time catching fish and trade 4 fish for 4 coconuts.
(d) spend all his time gathering coconuts and trade 8 coconuts for 8 fish.
(e) spend all his time gathering coconuts and trade 4 coconuts for 4 fish.

19. In "Clothes will cost less, but some nations pay," Marshall, Iraitani, and Dickerson report on the effects of the end of international quotas on clothing and textiles. According to the article,

(a) The end of quotas will harm industrialized countries because they produce most of the world’s textiles.
(b) The end of quotas will harm China and India because the quotas protected them from competition from other countries.
(c) The end of quotas will have little effect because most countries were exporting less than their quotas.
(d) The end of quotas will harm small countries like Cambodia because the quotas protected them from competition from China and India.
(e) The end of quotas will harm consumers because the quality of textiles will decline.
20. The state of Calix has two river valleys: Santa Lucia and San Ricardo. In both valleys, ranchers can raise cattle or grow grapes. In Santa Lucia, an acre of land yields 1 ton of beef per year or 2 tons of grapes per year. In San Ricardo, an acre of land yields 3 tons of beef per year or 4 tons of grapes per year. In comparing these two river valleys,

(a) San Ricardo has an absolute advantage in grapes, Santa Lucia has an absolute advantage in beef, and Santa Lucia has a comparative advantage in grapes.
(b) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in beef.
(c) San Ricardo has both absolute and comparative advantages in both products.
(d) San Ricardo has an absolute advantage in grapes and beef, and it also has a comparative advantage in grapes.
(e) Santa Lucia has an absolute advantage in beef, San Ricardo has an absolute advantage in grapes, and San Ricardo has a comparative advantage in beef.

21. A small tropical island’s banana market has 35 banana growers and 65 banana consumers. Each banana grower can sell at most one sack of bananas. Each consumer can consume either 0 or 1 sack of bananas. There are 25 low-cost banana producers, each of whom can produce bananas at a cost of $25 per sack and 10 high-cost banana producers, each of whom can produce bananas at a cost of $50 per sack. There are 35 consumers who are willing to pay up to $40 a sack and 30 consumers who are willing to pay up to $20 a sack for bananas. What is the competitive equilibrium price of bananas on this island?

(a) $50
(b) $45
(c) $25
(d) $20
(e) $40

22. In competitive equilibrium, the total amount of profit made by banana growers will be:

(a) $375
(b) $475
(c) $735
(d) $325
(e) $425
23. Suppose that an oil cartel succeeded in reducing the supply of crude oil by 10% and suppose that the price elasticity of demand for crude oil is $-0.20$. What will happen to the equilibrium price of crude oil?

(a) It will rise by 20%.
(b) It will rise by 10%.
(c) It will rise by 50%.
(d) It will fall by 10%.
(e) It will rise by 30%.

24. In 2004, Florida harvested 12 million tons of oranges, and the total revenue of orange producers that year was $1,080 million. In the winter of 2005, however, there was hard frost reducing the orange harvest in 2005 to 9 million tons. This caused the price of oranges to rise and the total revenue of Florida orange growers to increase to $1,260 million in 2005. Assuming the demand curve for Florida oranges did not change between 2004 and 2005, from the information above it appears that

(a) the price elasticity of demand for oranges is between $-1$ and 0.
(b) the price elasticity of supply of oranges is less than 1.
(c) the price elasticity of demand for oranges is less than $-1$.
(d) the price elasticity of supply for oranges is greater than 1.
(e) the supply curve for oranges slopes downward.

25. Ten residents of Greenfield are willing to pay someone as much as $8 a week to mow their lawn, and ten residents are willing to pay someone as much as $6 a week to mow their lawn. Thirty teenage boys are willing to mow a lawn each week if they receive at least $5 for the job. Suppose the city of Greenfield imposes a tax of $2 a week on each resident who hires a teenage boy to mow his or her lawn. How will that tax affect the competitive equilibrium price of lawn mowing?

(a) The price would fall by $1.
(b) The price would rise by $2
(c) The price would not change.
(d) The price would fall by $2.
(e) The price would rise by $1.
26. In the previous question about the tax on lawn mowing in Greenfield, what is the excess burden of the tax?
   
   (a) zero
   
   (b) $30
   
   (c) $10
   
   (d) $20
   
   (e) $40

27. Ed's bakery can sell as many loaves of bread as it wishes for a price of $1 per loaf. To keep calculations simple, let us assume that Ed's only costs are hired labor. If Ed hires 1 worker, he can produce 400 loaves of bread per day. If he hires 2 workers, he can produce 550 loaves of bread per day. If he hires 3 workers, he can produce 650 loaves of bread per day. If he hires 4 workers, he can produce 740 loaves of bread per day. If he hires 5 workers, he can produce 800 loaves of bread per day, and if he hires 6 workers, he can produce 830 loaves of bread per day. If he hires 7 or more workers, he can still produce only 830 loaves of bread per day. If Ed increases his work crew from 4 workers to 5 workers, his daily revenue will increase by:

   (a) $90
   
   (b) $150
   
   (c) $60
   
   (d) $30
   
   (e) $180

28. If each worker that Ed hires must be paid a daily wage of $65, how many workers should he hire per day to maximize his profits? (Hint: Remember that each loaf of bread is worth $1.)

   (a) 6
   
   (b) 3
   
   (c) 5
   
   (d) 4
   
   (e) 2
29. Demand for haircuts in the city of San Barberia is given by the function \( P = 71 - (Q/25) \), where \( Q \) is the number of haircuts per day and \( P \) is the price of a haircut. Everyone who opens a barber shop in town has a fixed cost of $400 per day, which must be paid so long as a shop is in business and regardless of the number of haircuts it sells. There is also a variable cost of $3 for each customer served. Each barber shop has a capacity of 50 customers per day. San Barberia currently has 27 barbershops. A barber shop that is open cannot escape its fixed costs immediately, but must give 6 months notice to its landlord of its intention to close. It also takes about 6 months to organize and open a new barber shop. The short run supply curve for haircuts in San Barberia consists of

(a) a vertical segment extending from the origin to the point \((0, 3)\) and an unbounded horizontal line extending to the right of the point \((0, 3)\).

(b) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1450, 3)\) and a vertical segment extending upwards from \((1450, 3)\).

(c) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1350, 3)\), and a vertical segment extending upwards from \((1350, 3)\).

(d) a vertical segment extending from the origin to the point \((0, 11)\), a horizontal segment extending from \((0, 11)\) to \((1350, 11)\), and a vertical segment extending upwards from \((1350, 11)\).

(e) a vertical segment extending from the origin to the point \((0, 3)\), a horizontal segment extending from \((0, 3)\) to \((1200, 3)\), and a vertical segment extending upwards from \((1200, 3)\).

30. In long run equilibrium in San Barberia, the number of barber shops and the price of a haircut is

(a) 30 barbershops and a price of $11.

(b) 32 barbershops and a price of $7.

(c) 28 barbershops and a price of $15.

(d) 27 barbershops and a price of $17.

(e) 31 barbershops and a price of $11.