Chapter 1

**Monday, June 21**

COURSE OBJECTIVES

1. To become familiar with basic microeconomic theory

2. To prepare for future work in economics

3. To understand economic policy, and policy debates, in the context of economic theory

4. To facilitate critical and creative thinking in economic theory and policy
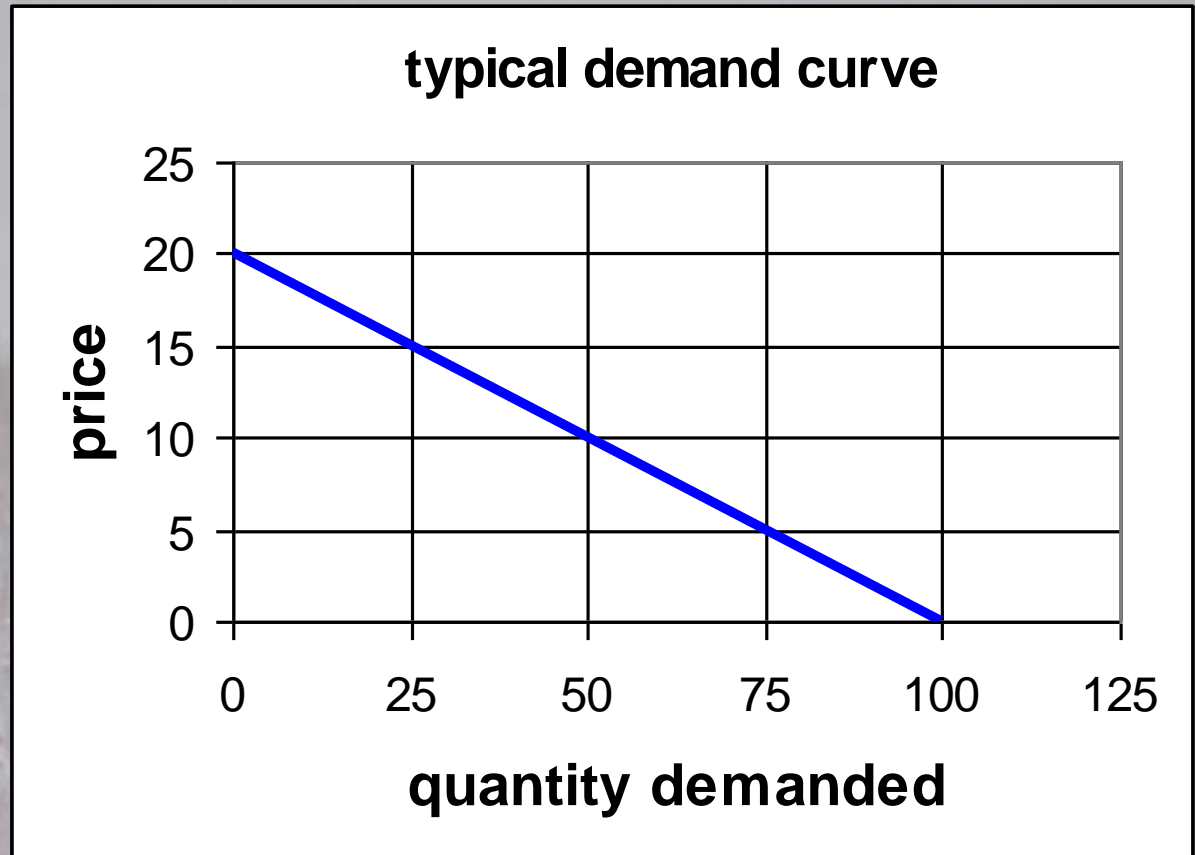
discrete demand schedule

price of coffee	my demand for coffee
1¢-$1.99	5
$2.01-$3.99	4
$4.01 - $5.99	3
$6.01 - $7.99	2
$8.01 - $9.99	1
> $10	0
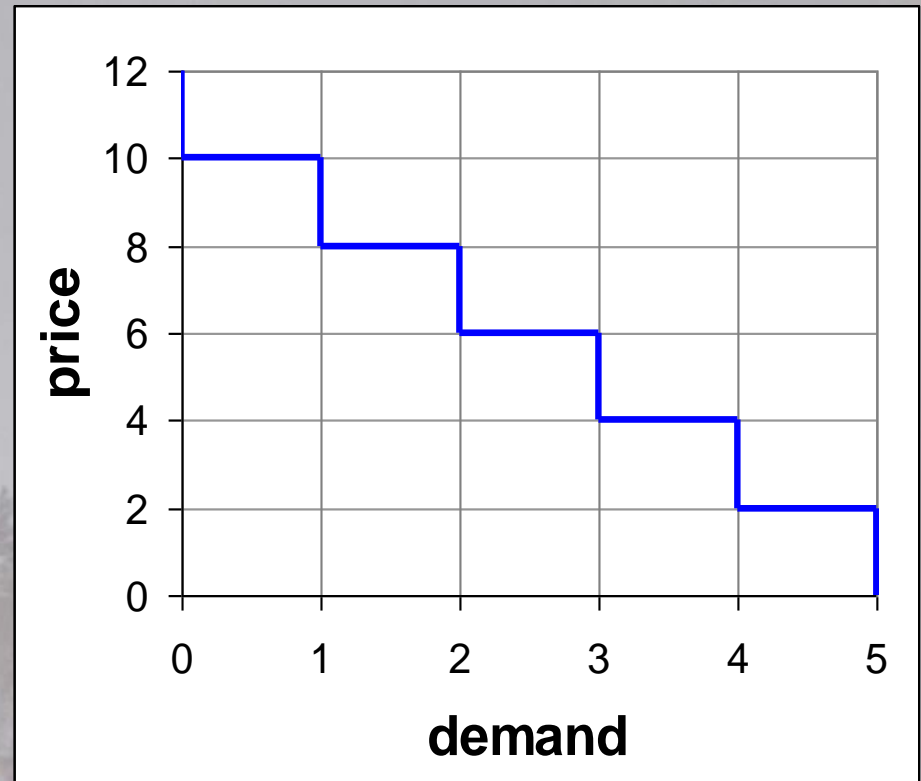
As the price of coffee goes up, I'll be willing to buy fewer cups. That is, I will demand less coffee when the price is higher.
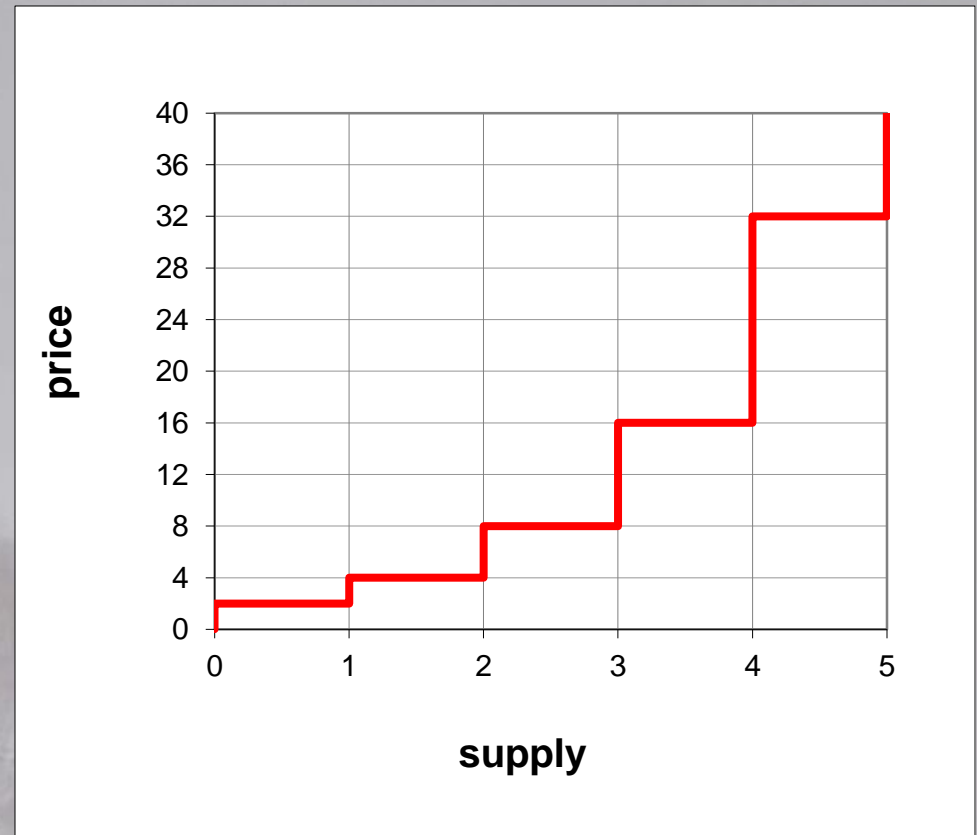
continuous demand curve

$Q_D = 100 - 5P$

typical demand curve

discrete supply schedule

price of fish	my supply of fish
< $2	0
$2 - $4	1
$4 - $8	2
$8 - $16	3
$16 - $32	4
$32 +	5

As the price of fish goes up, I'll be willing to sell more fish. That is, I will supply more fish when the price is higher.
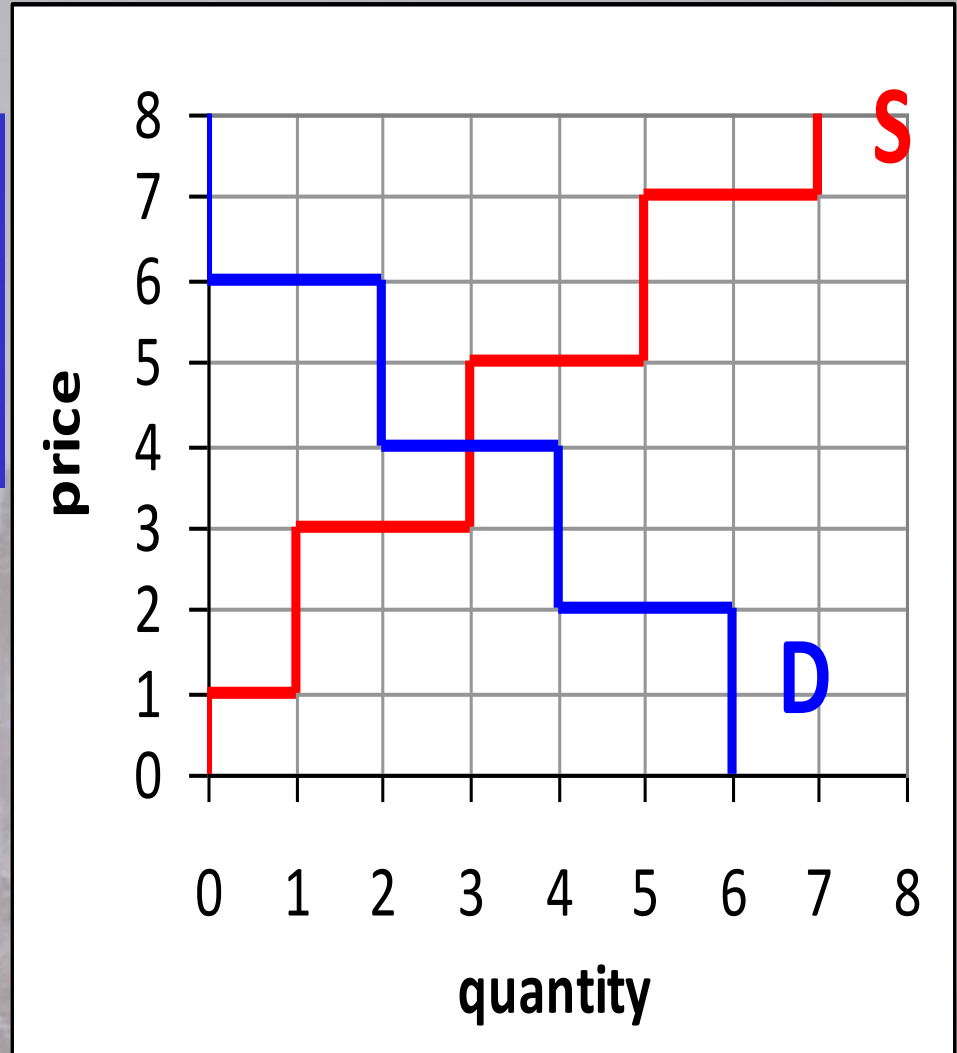
continuous supply curve

$Q_S = 5P$

typical supply curve

price vs quantity supplied
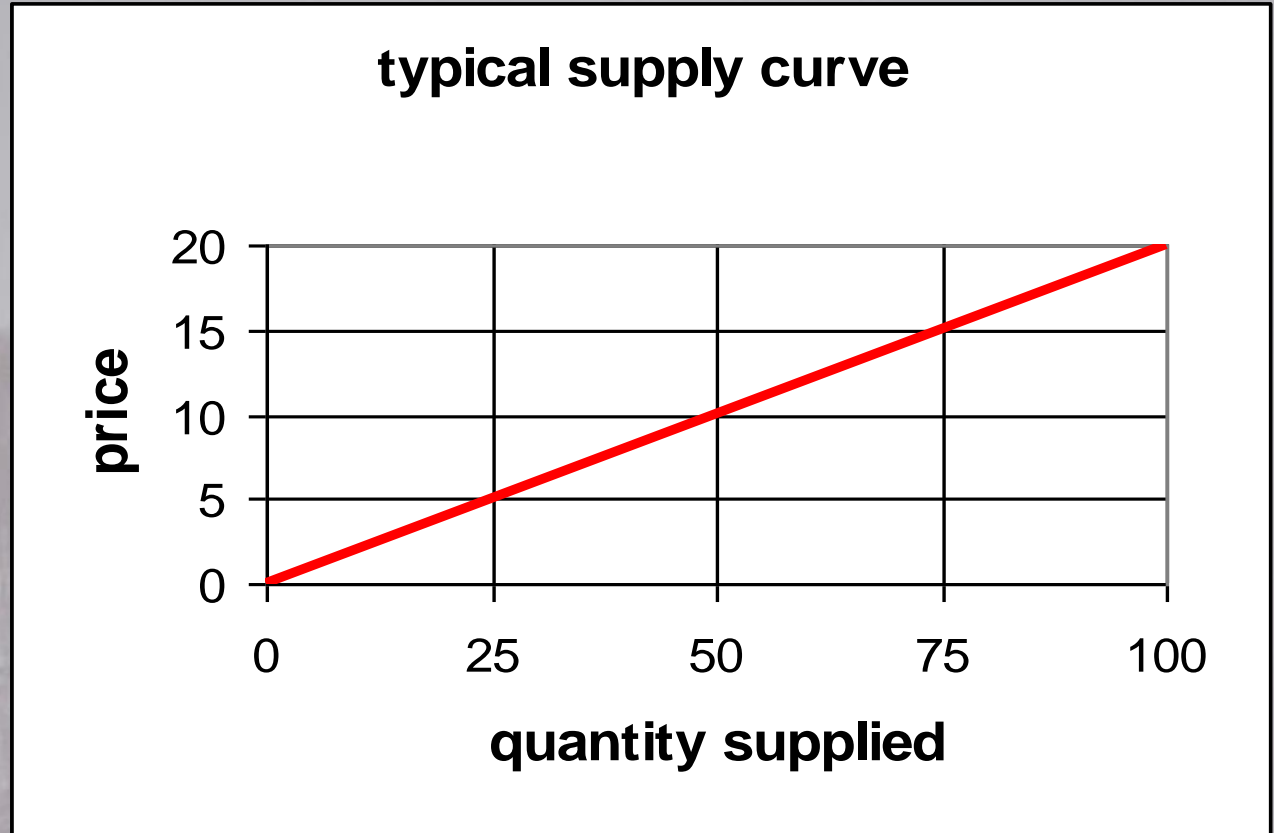
discrete supply and demand

demand

price	QD
$0-$2	6
$2-$4	4
$4-$6	2
>$6	0

Q	MB
1,2	6
3,4	4
5,6	2
7+	0

supply

price	QS
$0-$1	0
$1-$3	1
$3-$5	3
$5-$7	5
>$7	7

Q	MC
1	1
2,3	3
4,5	5
6,7	7

CONTINUOUS SUPPLY AND DEMAND (algebra)

Q_S

Q_D
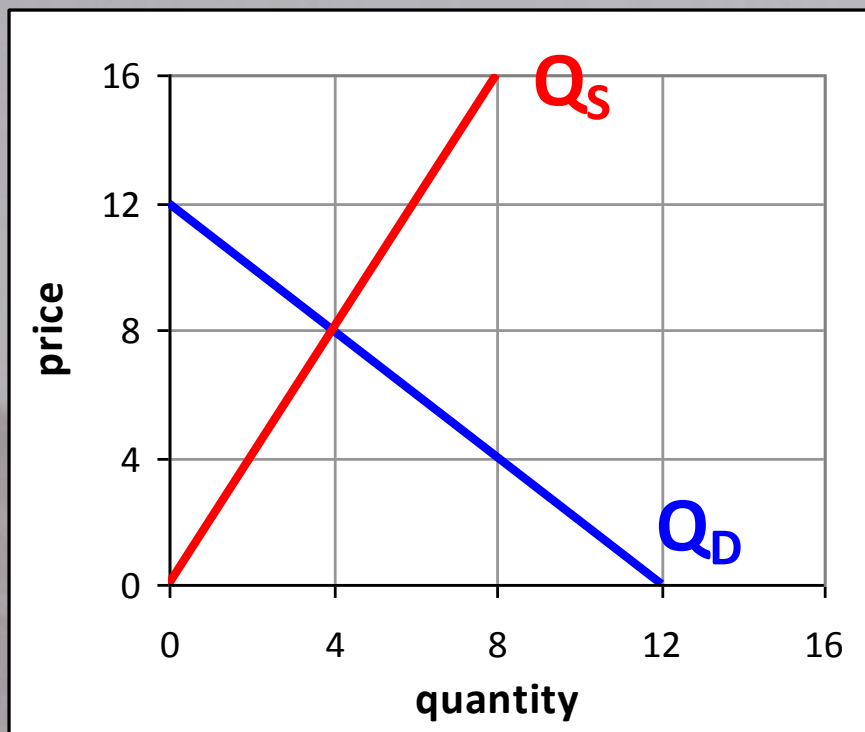
price

quantity

$MC(Q_S) = 2Q_S$.
Thus, $P = 2Q_S$, and
$Q_S = P/2$.

$MB(Q_D) = 12 - Q_D$.
Thus, $P = 12 - Q_D$, and
$Q_D = 12 - P$.

At market equilibrium, $Q_S = Q_D$. You can use this to solve for equilibrium price and quantity.

$P/2 = 12 - P \rightarrow 3P/2 = 12 \rightarrow P^* = 8$

$Q_S^* = P^*/2 = 8/2 = 4$ and $Q_D^* = 12 - P^* = 12 - 8 = 4$
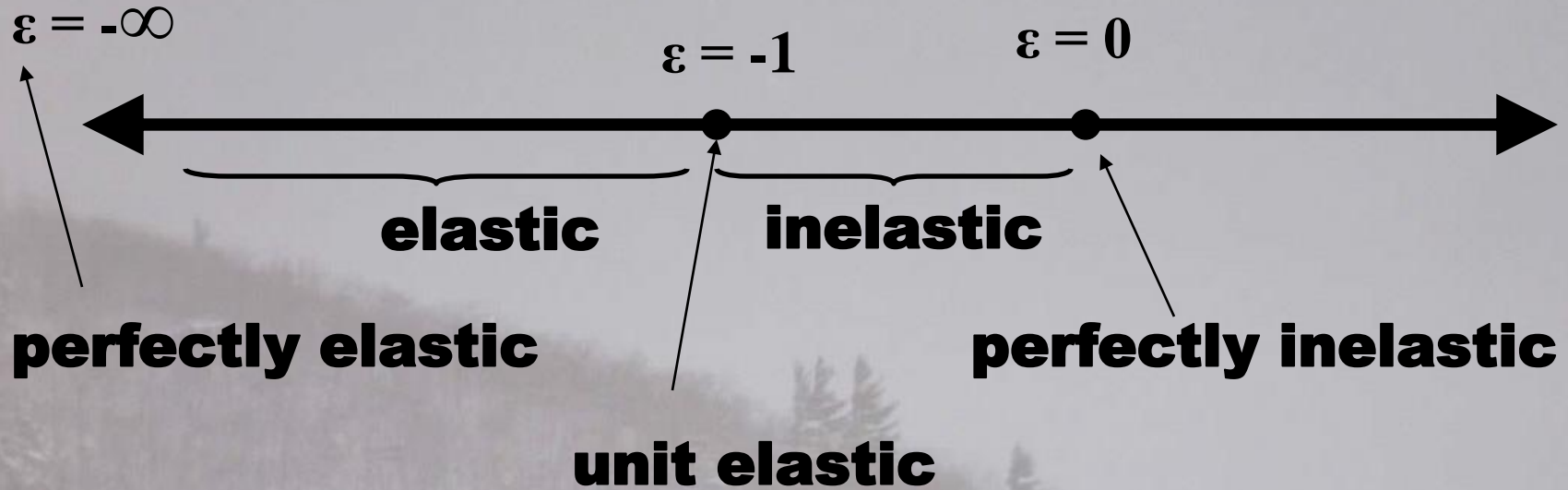
PRICE ELASTICITIES

Elasticity most commonly refers to

price elasticity of demand, ε_D, can be written as

$$\frac{\%\,\Delta Q_D}{\%\,\Delta P} \quad , \quad \frac{\Delta Q_D/Q_D}{\Delta P/P} \quad \text{or} \quad \frac{\Delta Q_D}{\Delta P}\frac{P}{Q_D}$$

price elasticity of supply, ε_S, can be written as

$$\frac{\%\,\Delta Q_S}{\%\,\Delta P} \quad , \quad \frac{\Delta Q_S/Q_S}{\Delta P/P} \quad \text{or} \quad \frac{\Delta Q_S}{\Delta P}\frac{P}{Q_S}$$

DEMAND ELASTICITY: RANGES

$\varepsilon = -\infty$

$\varepsilon = -1$

$\varepsilon = 0$

elastic   inelastic

perfectly elastic

perfectly inelastic

unit elastic

When demand elasticity is more negative than –1, demand is "elastic".

When it is less negative than –1, demand is "inelastic".

When it is equal to –1, demand is "unit elastic".

CONSUMER SURPLUS (discrete)

Note that consumer surplus for each unit is the difference between the marginal benefit and the price.
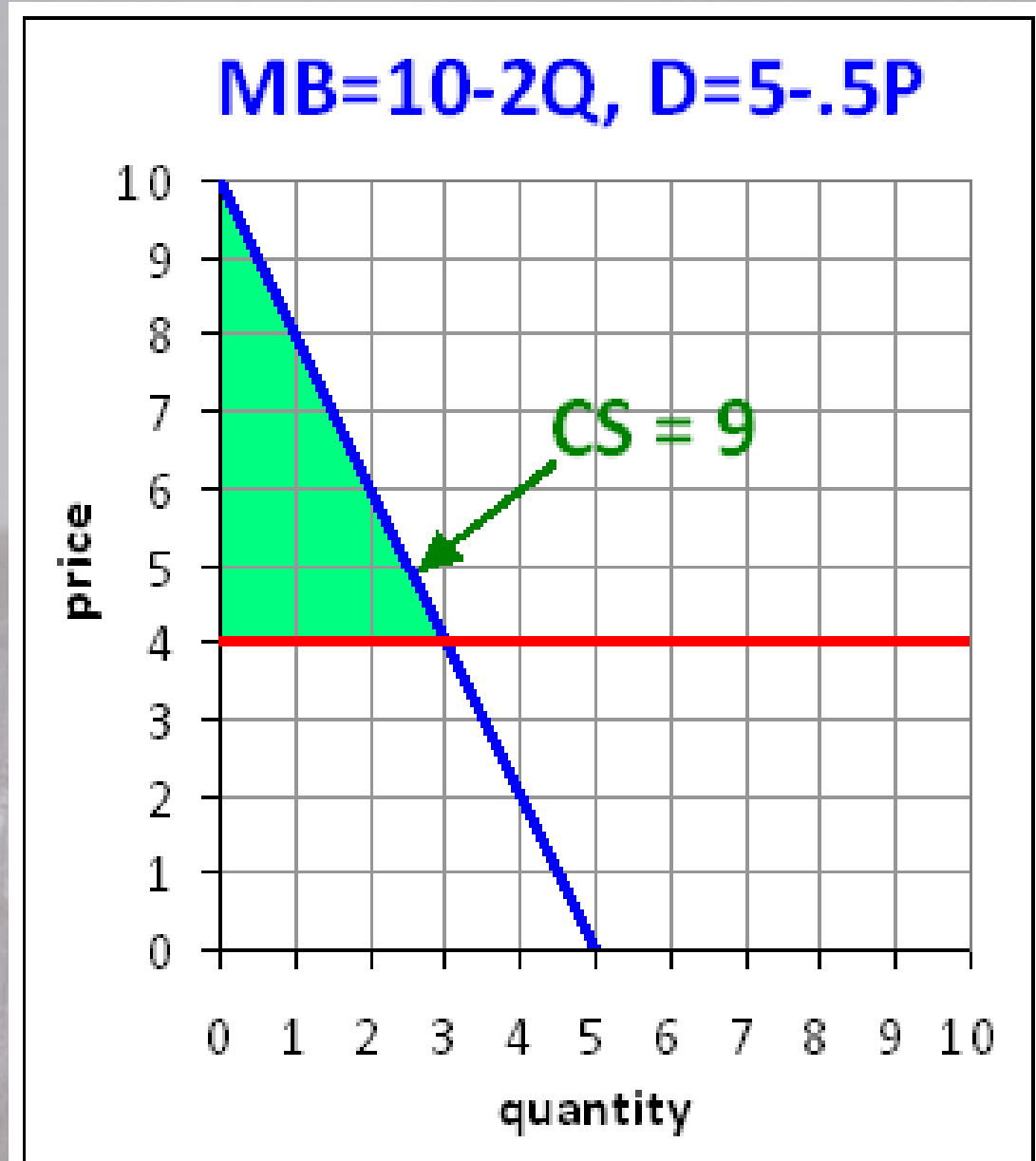
Total consumer surplus is the sum of consumer surplus for all of the units consumed.
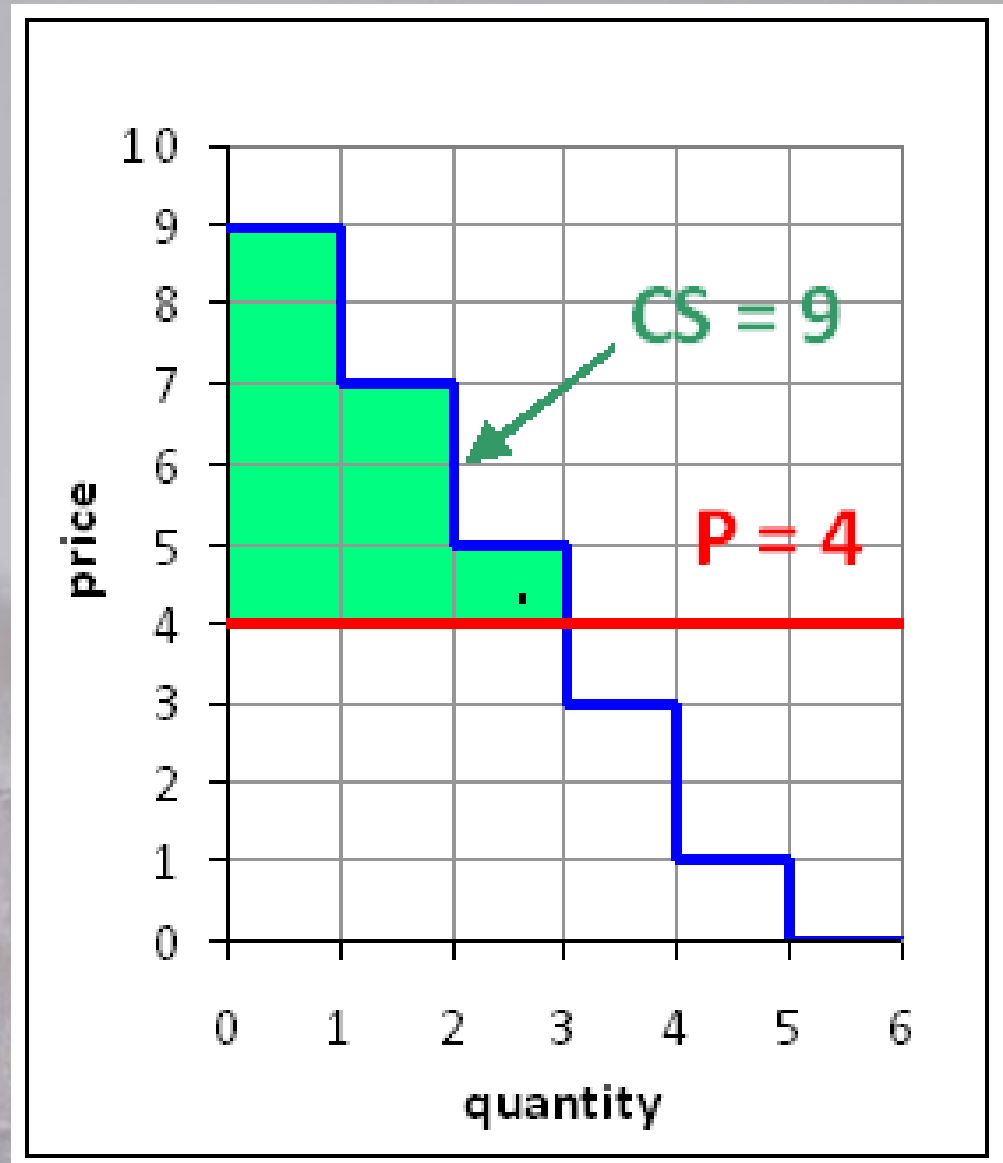
CONSUMER SURPLUS (continuous)

You can find the consumer surplus for a linear demand curve using the formula for the area of a triangle:

area = B × H ÷ 2

MB=10-2Q, D=5-.5P

CS = 9

TOTAL ECONOMIC SURPLUS

MB = 18 – 2Q

MC = 6 + Q
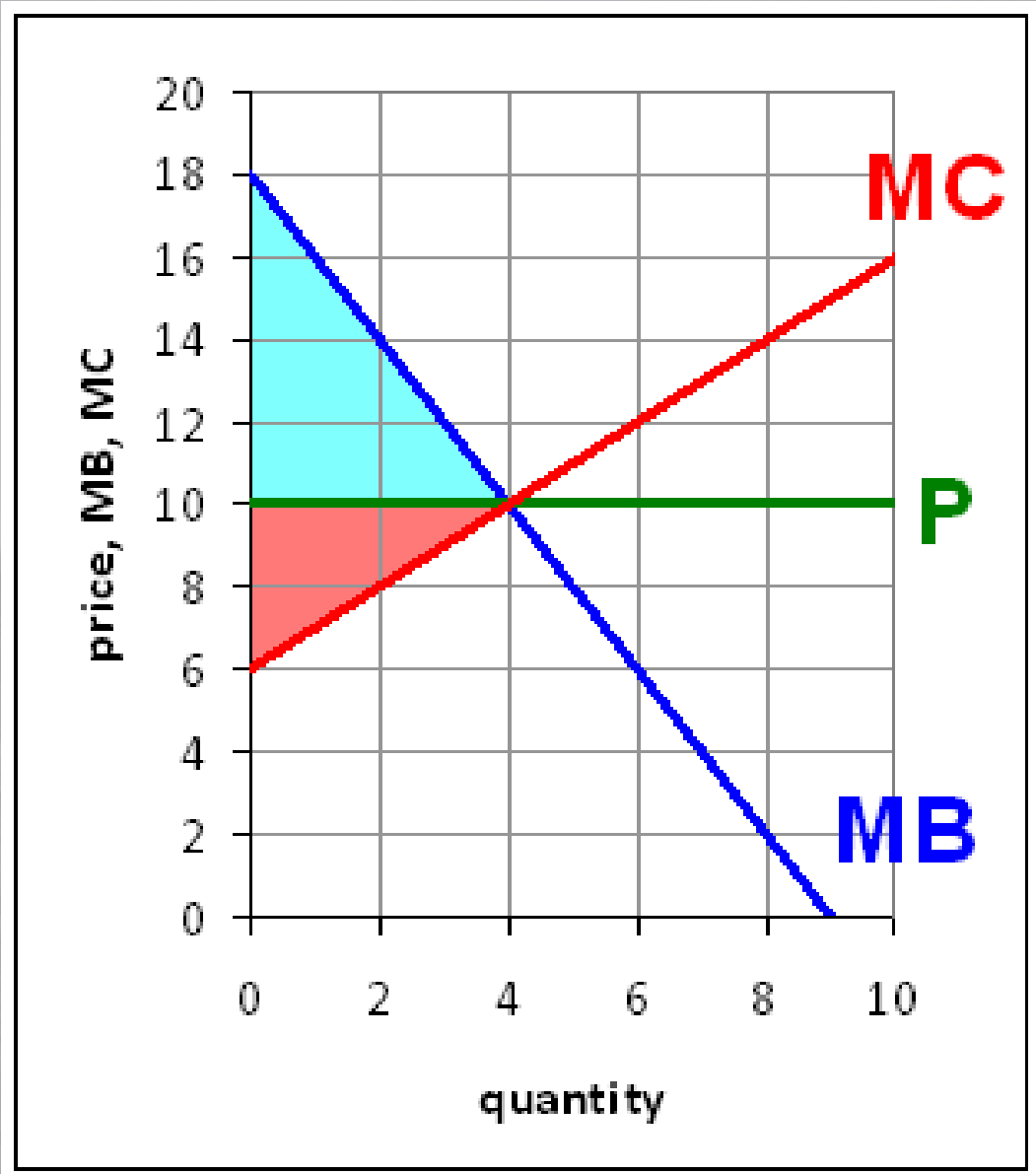
P = 10

Q = 4

CS = 16

PS = 8

TES = 24

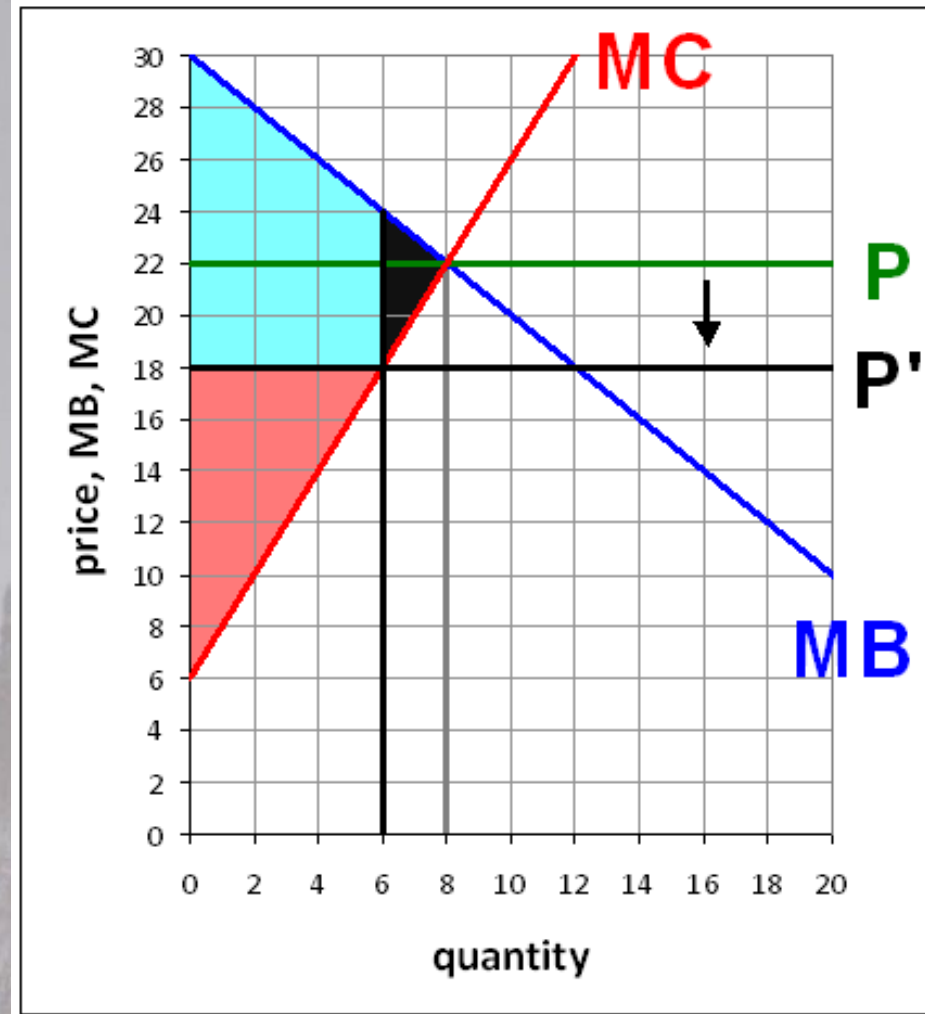# PRICE CEILING: DEADWEIGHT LOSS

Without the price ceiling, CS = 32, PS = 64, and TES = 96.

With the price ceiling, CS = 54, PS = 36, and TES = 90.

Thus, the producers lose more than the consumers gain. This surplus that is lost and not regained by anyone is known as a "deadweight loss".

As the name might suggest, deadweight loss is something that we should avoid when possible.

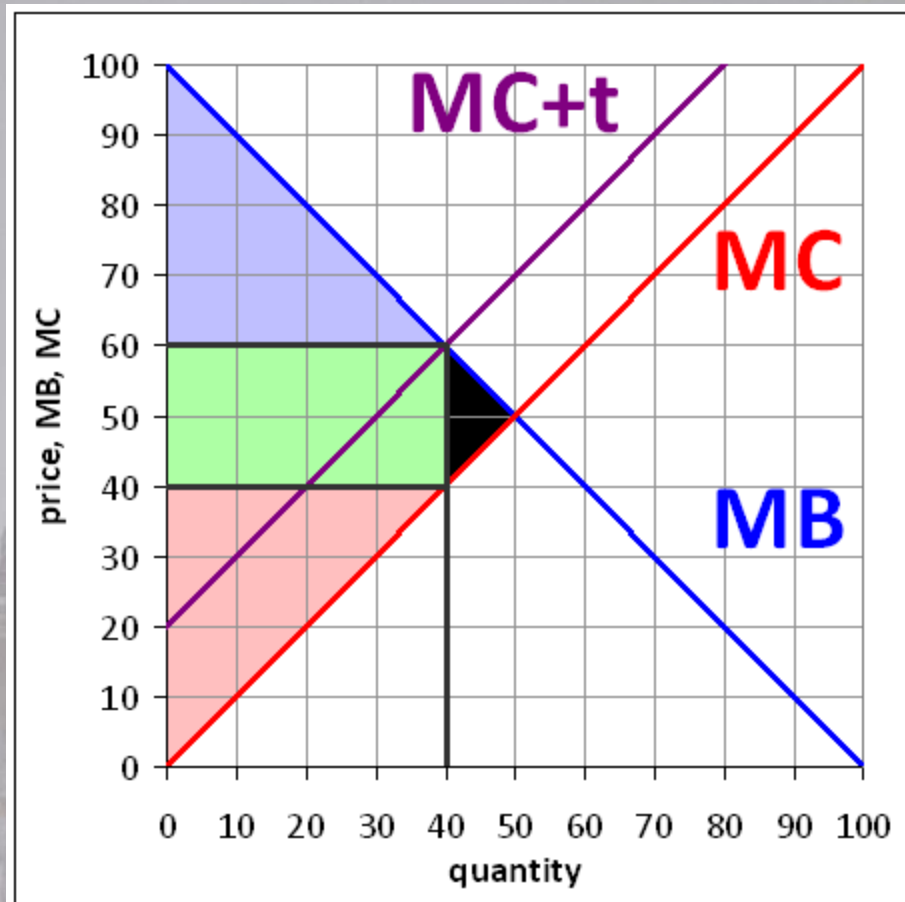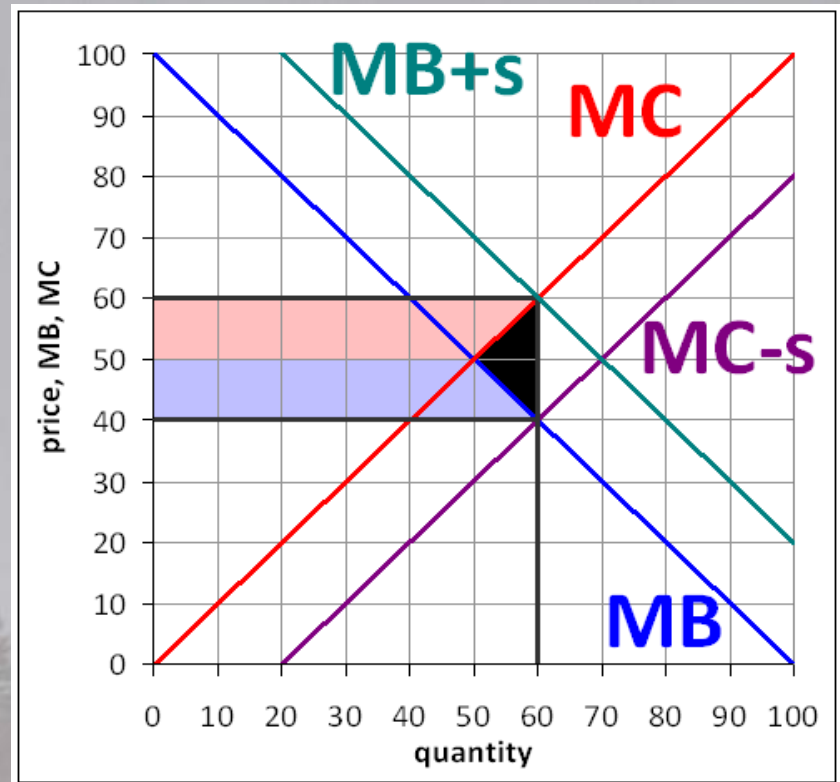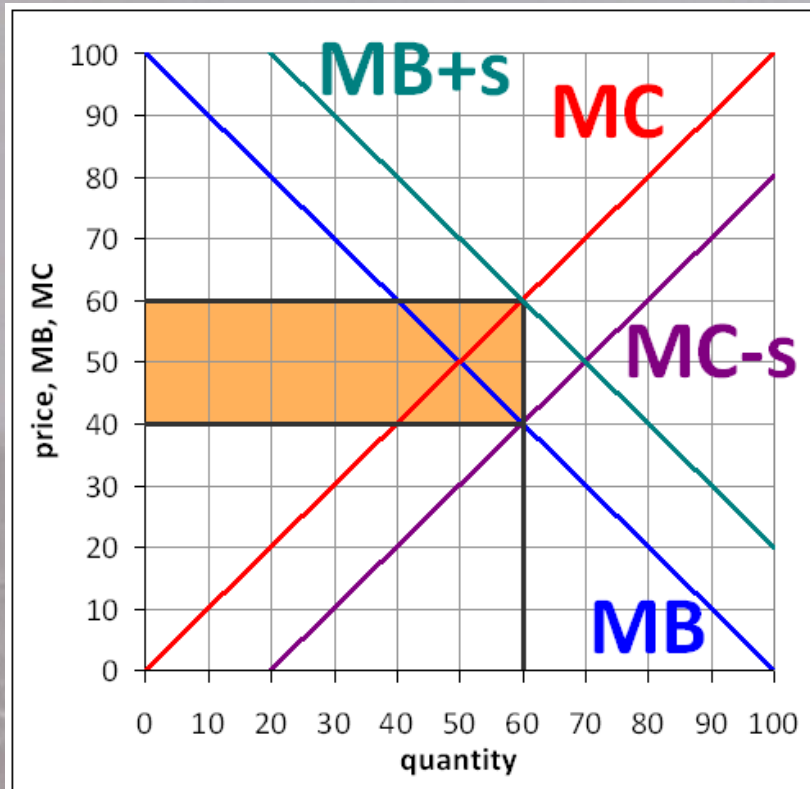# TAXES ON EFFICIENT MARKETS

Suppose that we have an initially efficient market (perfectly competitive, with no externalities), and we apply an excise (per unit) tax.

The **blue** area shows **consumer surplus**, the **red** area shows **producer surplus**, and the **green area** shows **government revenue, G**.

If t is the tax per unit, and Q is the quantity of the good sold, then **G = tQ**.

ADDING SUBSIDIES TO EFFICIENT MARKETS

Adding a subsidy to an already-efficient market can also cause a loss in total economic surplus. Here, the orange area represents the money that the government must pay to support the subsidy, the blue area represents the gain in consumer surplus, the red area represents the gain in producer surplus, and the black area is a deadweight loss, i.e. lost government revenue that doesn't become either consumer or producer surplus.

ECONOMIC PROFIT

For example, a firm has revenue = 400 per year, explicit costs = 250 per year, and is using capital that is worth 1000. The interest rate is 10% per year.

Accounting profit = 400 – 250 = 150

Economic profit = 400 – 250 – ?

If the firm's owners sell the capital and loan the money to someone at the prevailing interest rate, they will get 100 per year. Thus, implicit costs are 100.

Economic profit = 400 – 250 – 100 = 50

PROFIT AND ENTRY
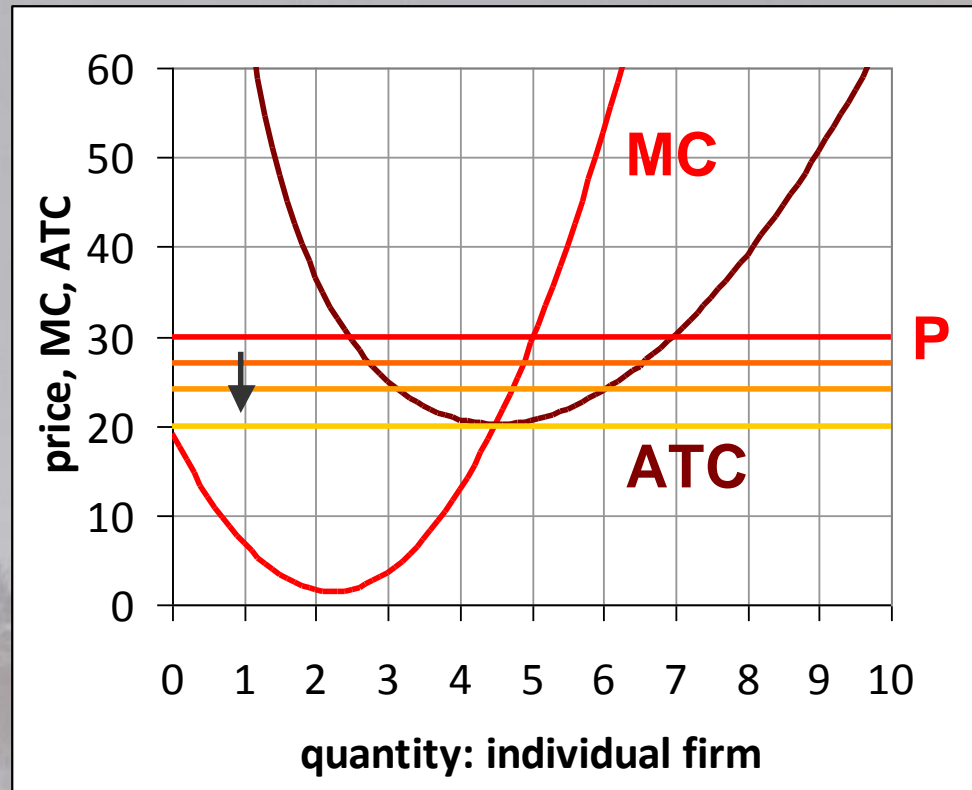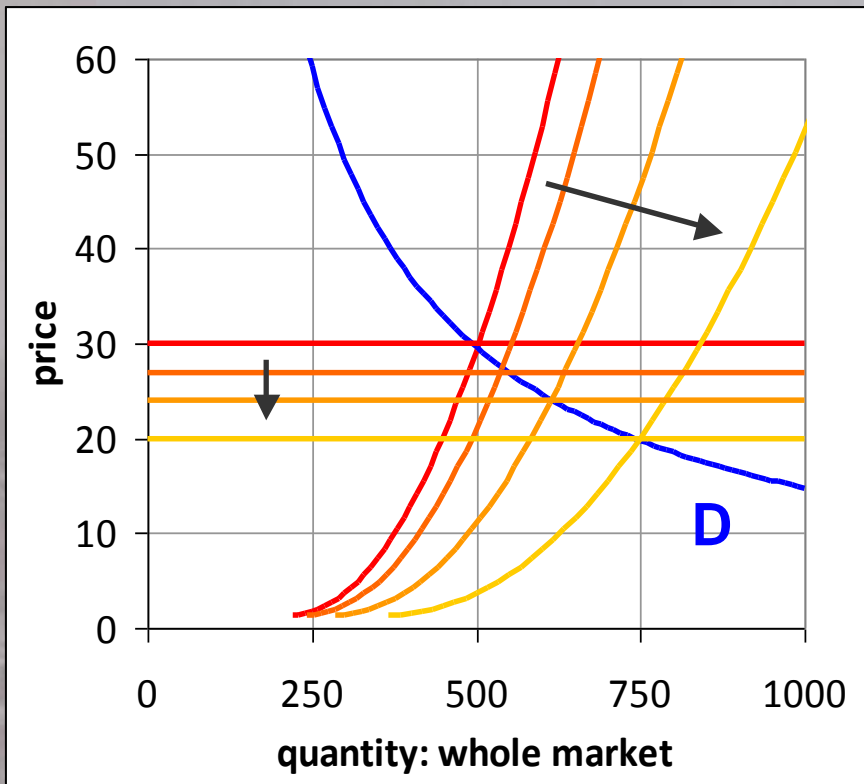
As more firms enter, the supply curve shifts outward, and thus the market-wide price decreases. This continues until each of the firms is earning zero profit, i.e. until the price is equal to the minimum of their ATC curve.

LOSS AND EXIT
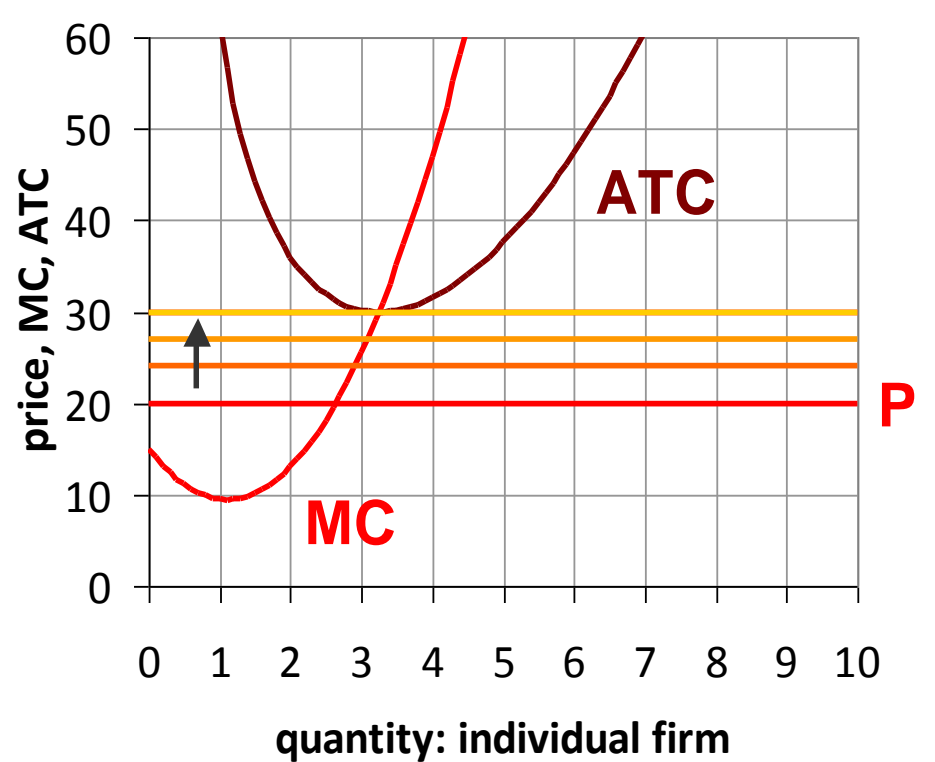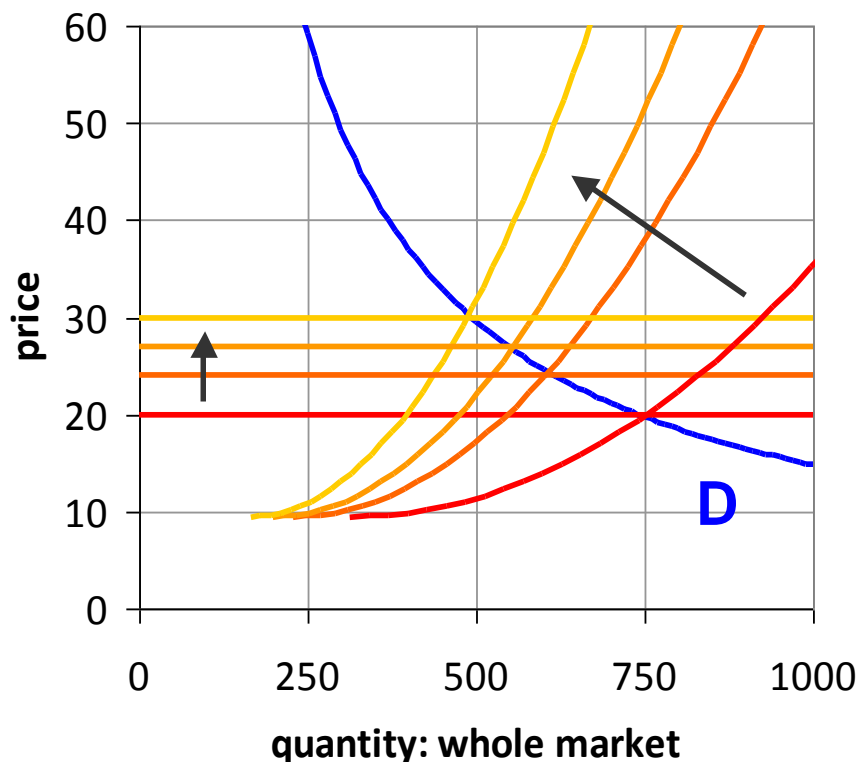
As firms exit, the supply curve shifts inward, and thus the market-wide price increases. Again, this continues until each of the firms is earning zero profit, i.e. until the price is equal to the minimum of their ATC curves.

MONOPOLY, DISCRETE: DEADWEIGHT LOSS
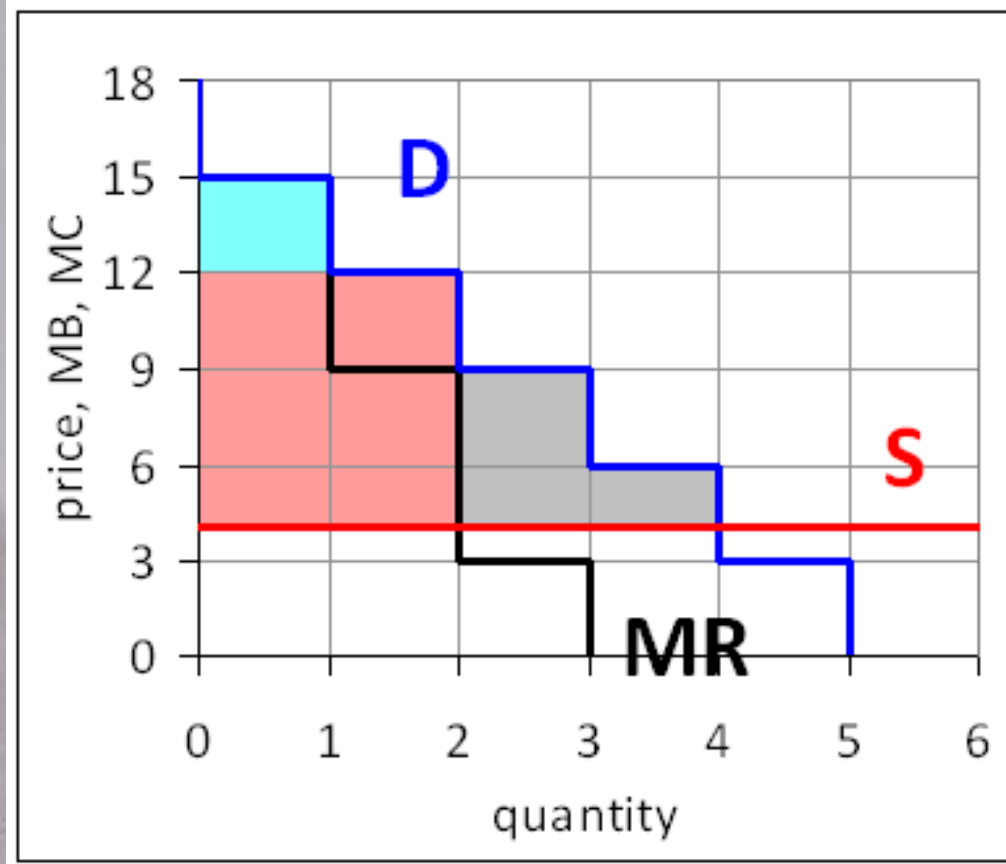
When the firm acts as a monopolist, the equilibrium is Q = 2, *P = 12*. Notice that consumer surplus has decreased from 26 to only 3! Meanwhile, the firm gets a profit or producer surplus of 2(12-4) = 16. The remaining 7 from the original consumer surplus—the grey area—is a **deadweight loss** from monopolization.

MONOPOLY, CONTINUOUS: DEADWEIGHT LOSS
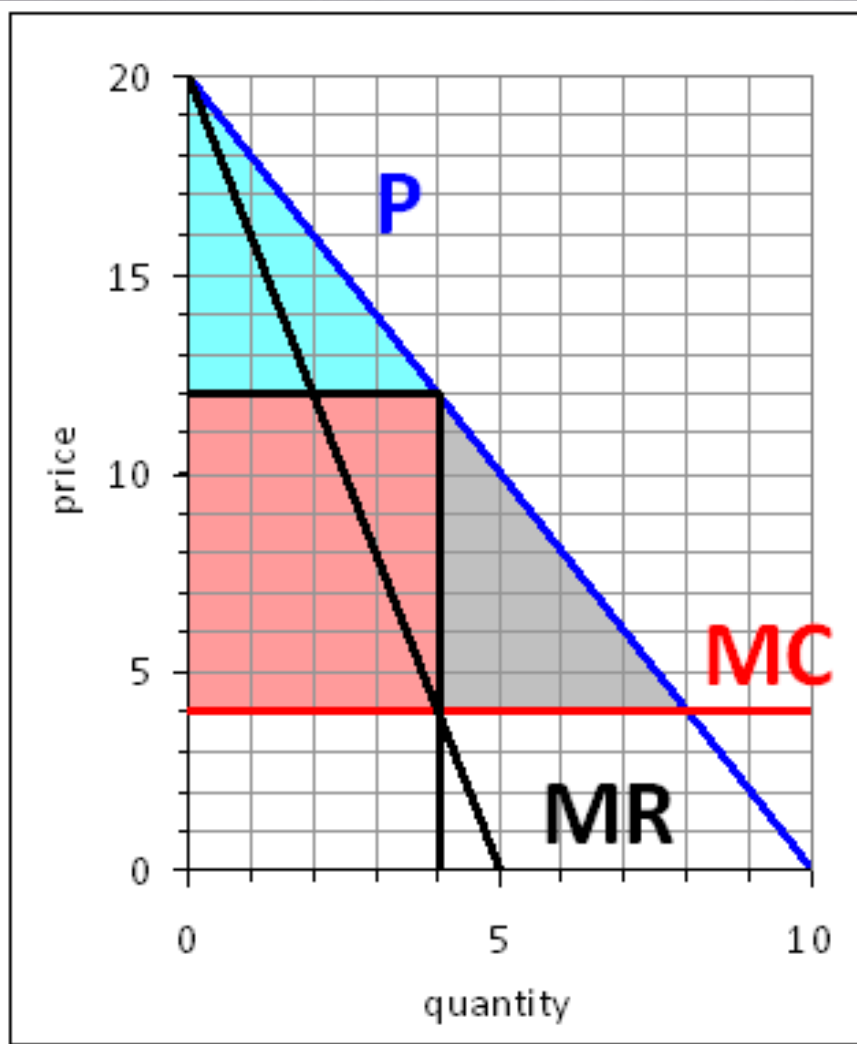
PRISONER'S DILEMMA

Mike

	confess	deny
confess	**-10 -10**	**0 -20**
deny	**-20 0**	**-1 -1**

Jim

If neither criminal confesses, then the police can only convict them for the lesser crime, so that they each serve 1 year in prison.

If both confess, then they will be convicted of the major crime, and each serve 10 years in prison.

However, if only one criminal confesses, then the police will let him go free, and give the other criminal the maximum sentence of 20 years.

NEGATIVE EXTERNALITY: TOTAL SURPLUS
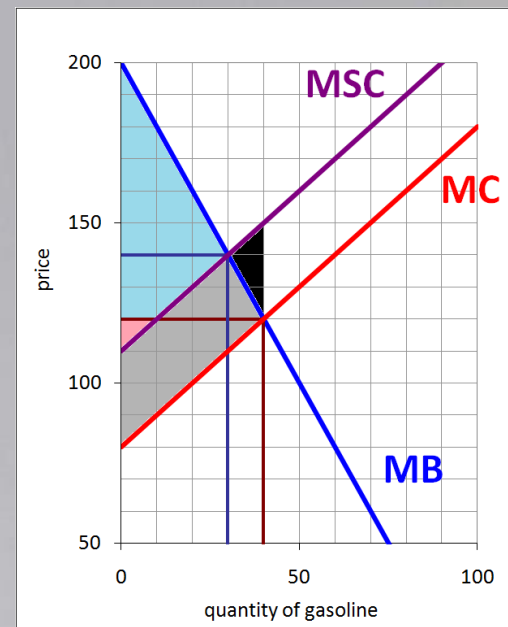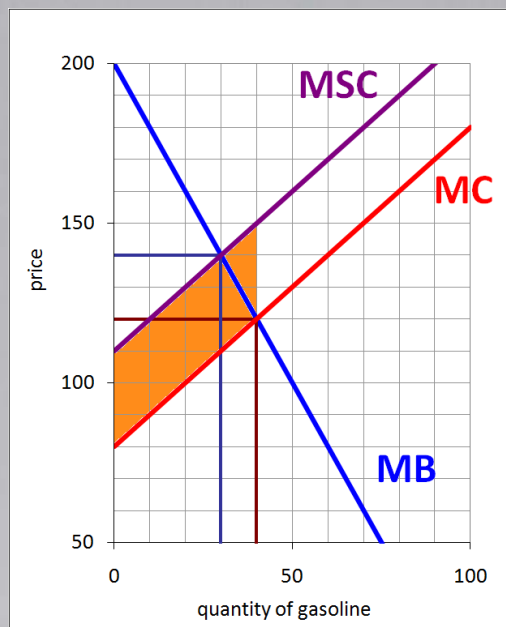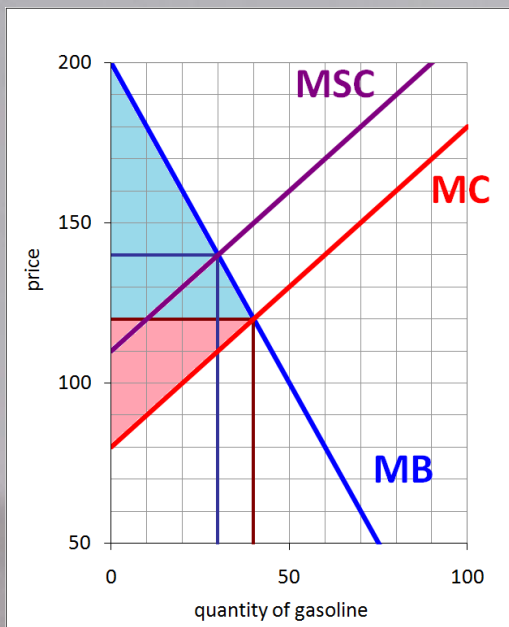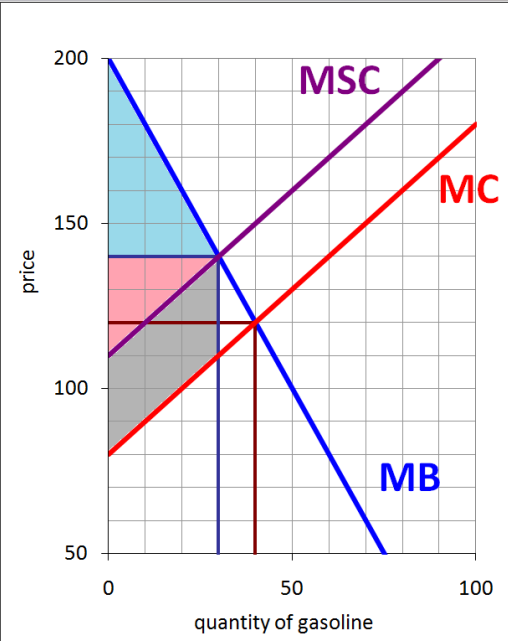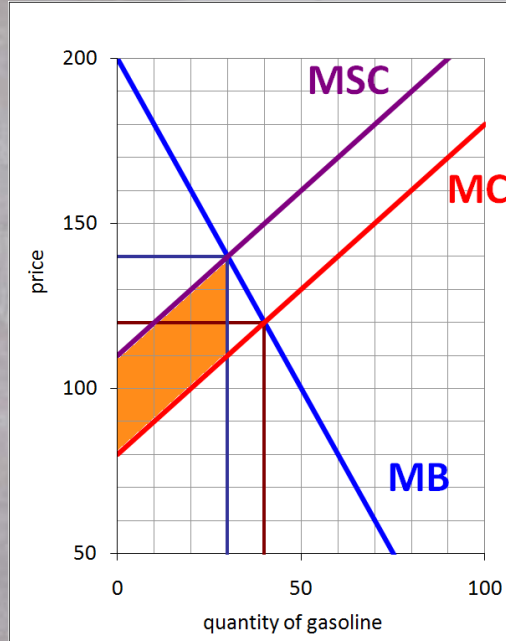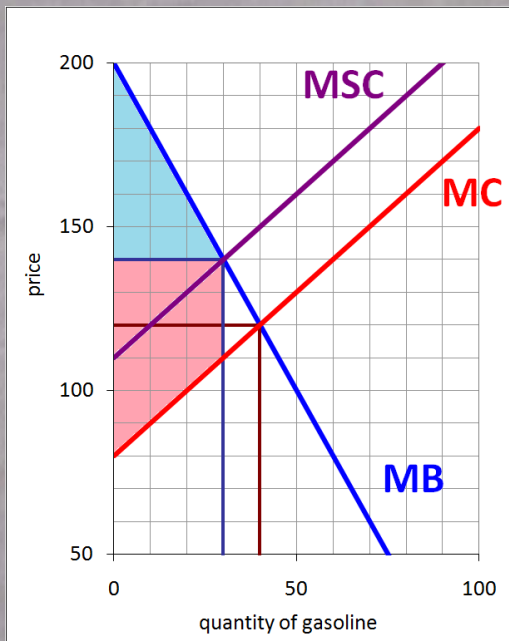
POSITIVE EXTERNALITY: UNREGULATED
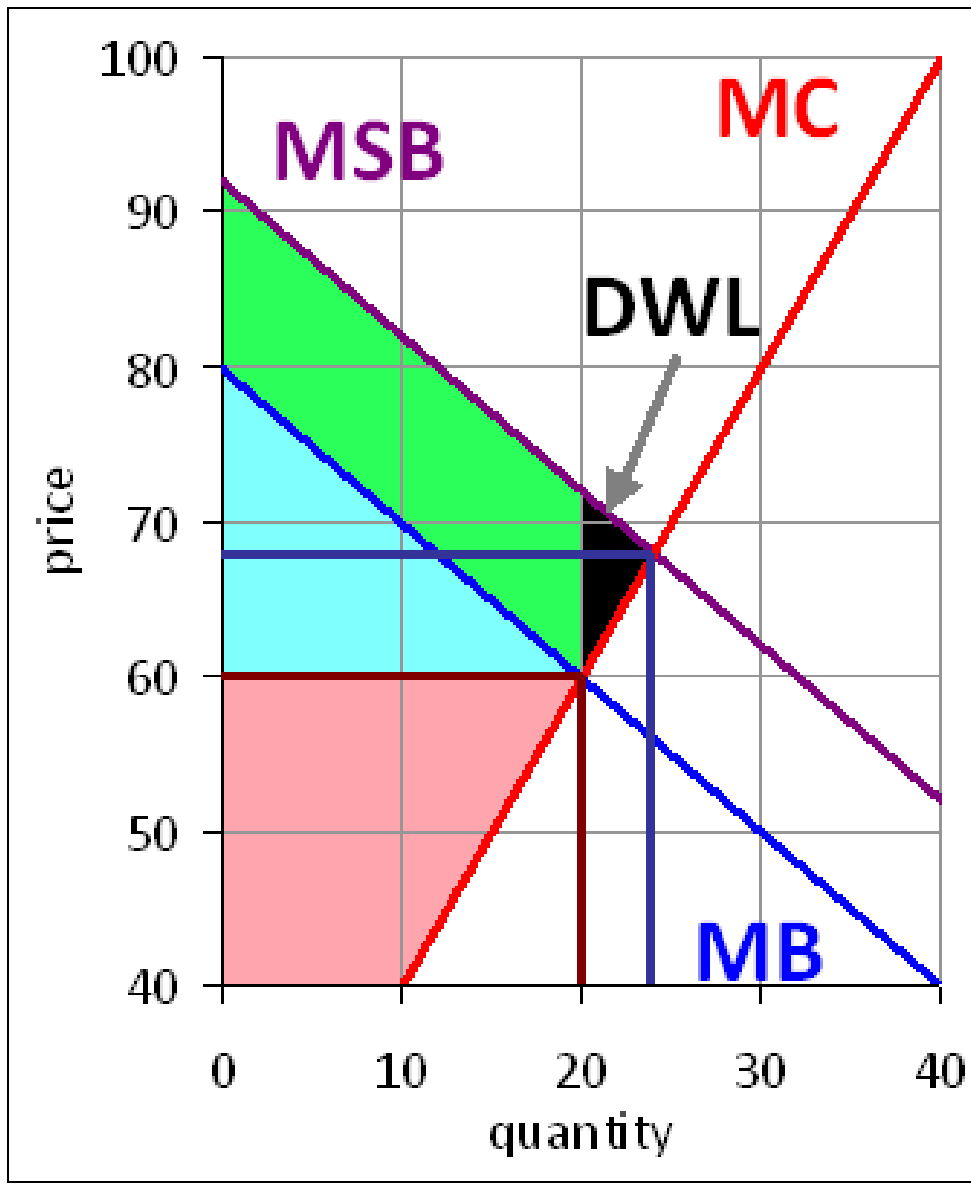
The blue and pink areas are consumer and producer surplus. The green area is external benefit. The black area is deadweight loss from not increasing provision of the good to its socially optimal level.

MINIMUM WAGE
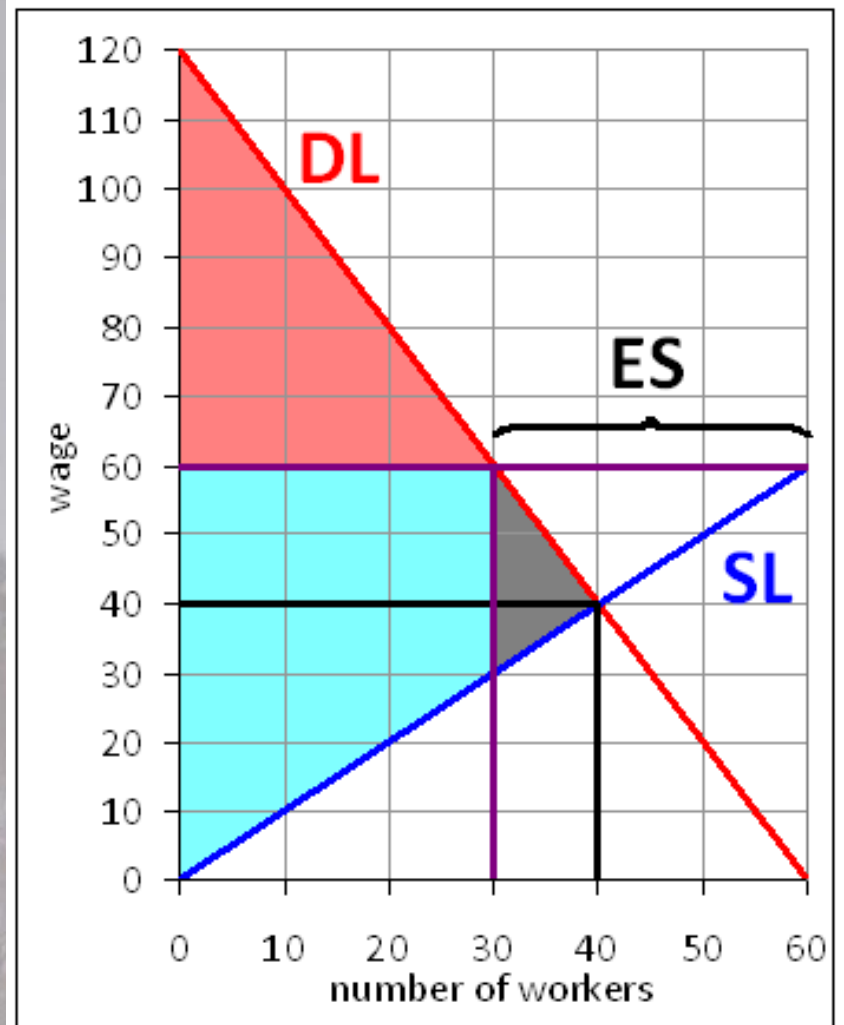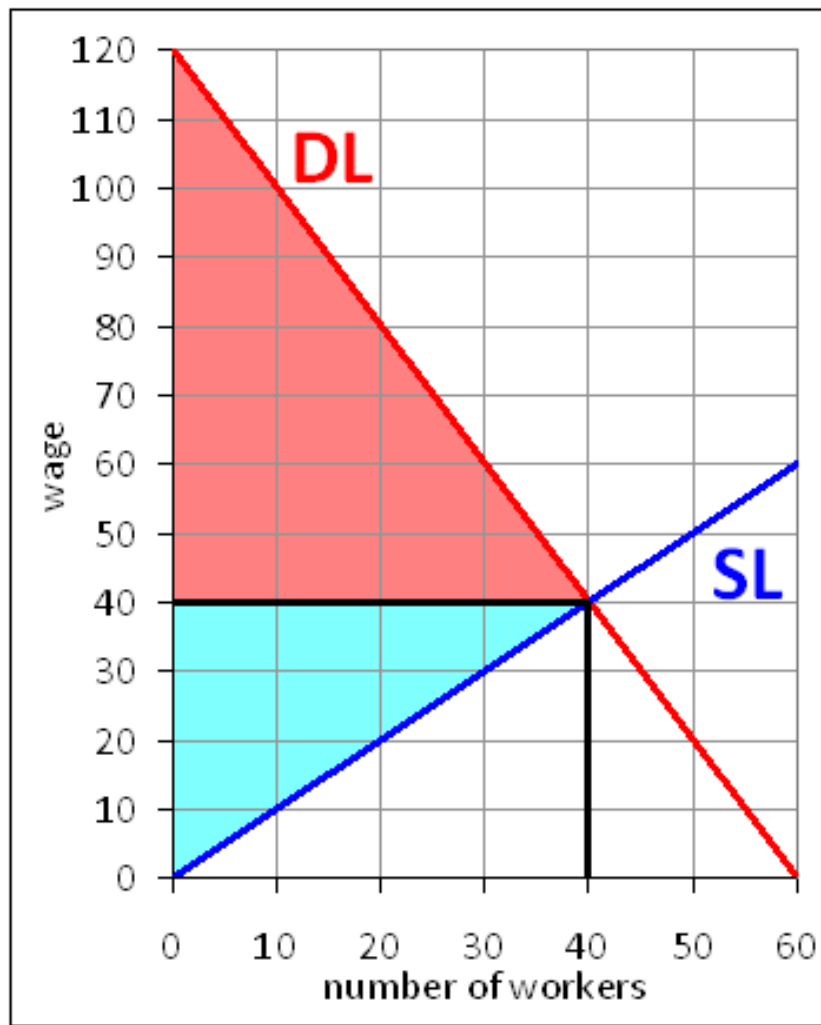
The minimum wage is a kind of price floor. If it's binding, then it may cause deadweight loss as well as unemployment.

PUBLIC GOODS: DISCRETE
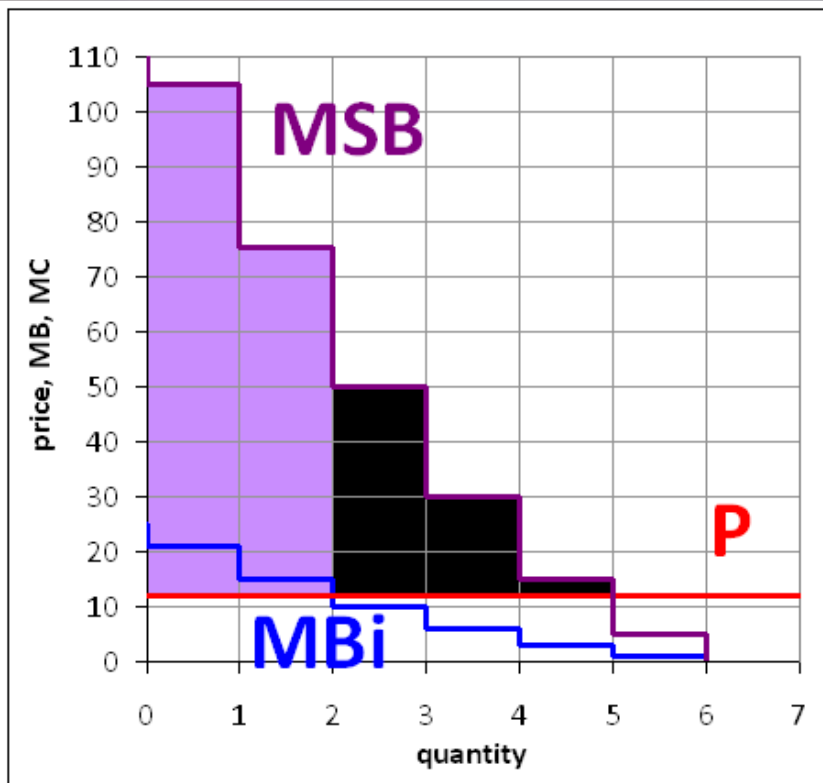
TSB
105
180
230
260
275
280
280
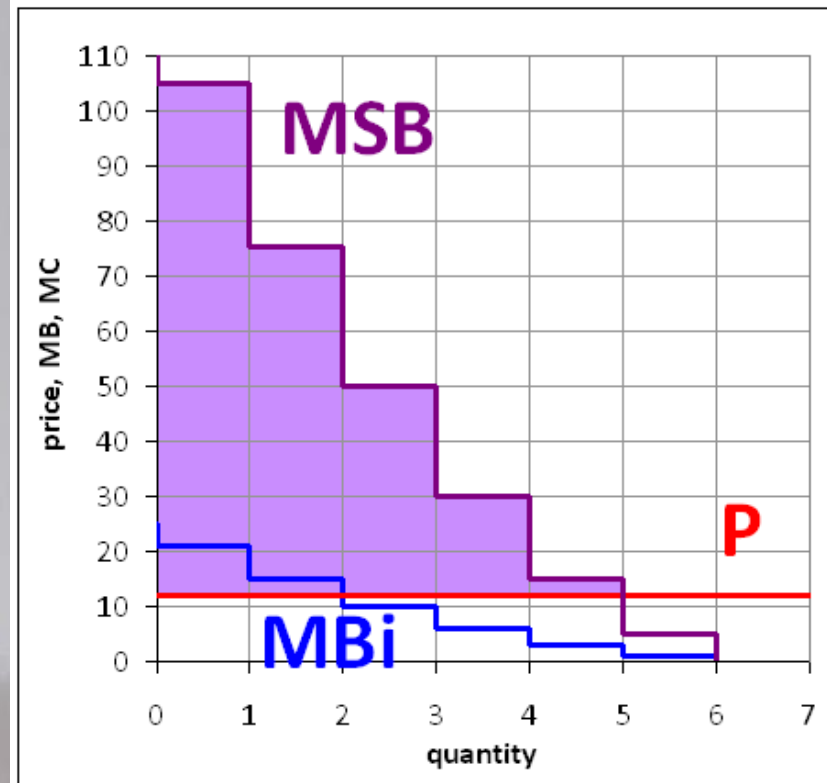
TSB = 180
TC = 2×12 = 24
TES = 180 – 24 = 156

TSB = 275
TC = 5×12 = 60
TES = 275 – 60 = 215

Thus, the gain from collective action (or the deadweight loss from the lack of collective action) is 215 – 156 = 59.

PUBLIC GOODS: CONTINUOUS

$TB_i = 100Q - Q^2$ $MB_i = 100 - 2Q$ $MC = 80$

$TSB = 500Q - 5Q^2$ $MSB = 500 - 10Q$
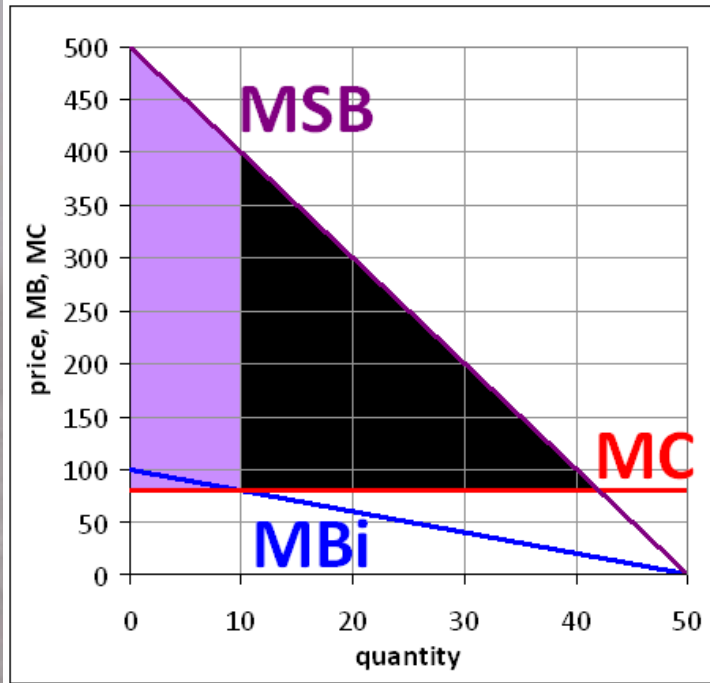
TES = (10)(420+320)/2
= 3700
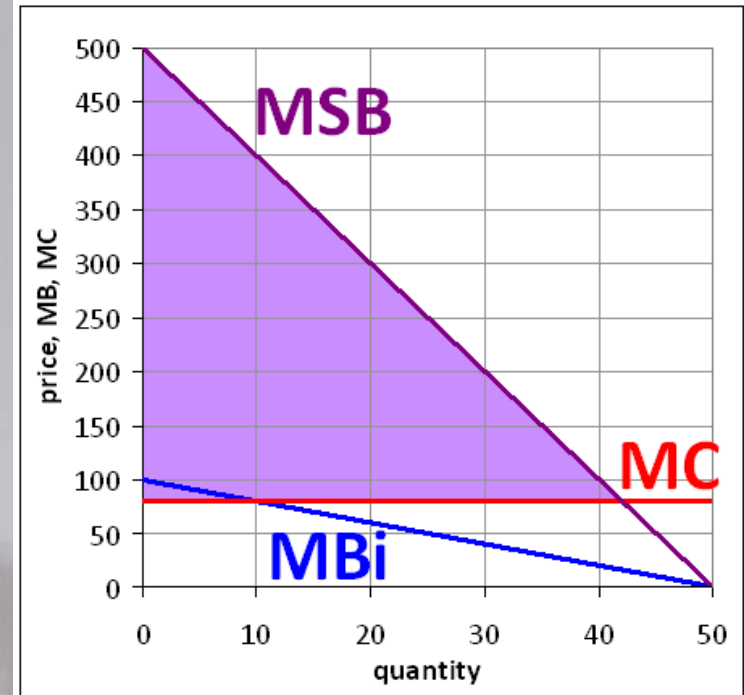
TES = (.5)(42)(420)
= 8820

DWL = (.5)(32)(320) = 5120

TWO-MARKET MODEL OF GOVERNMENT
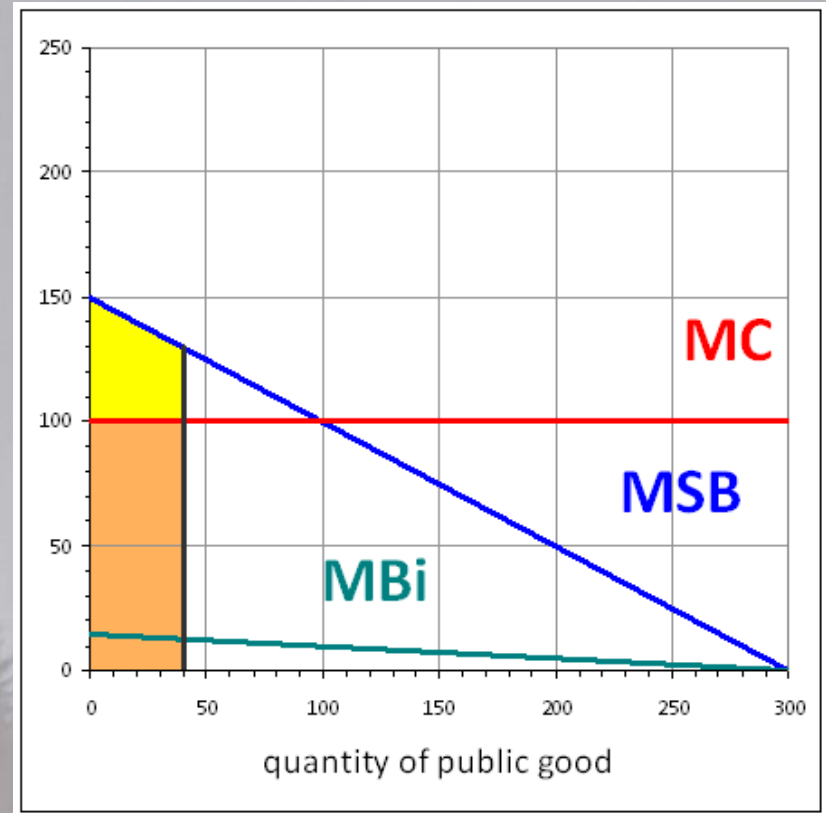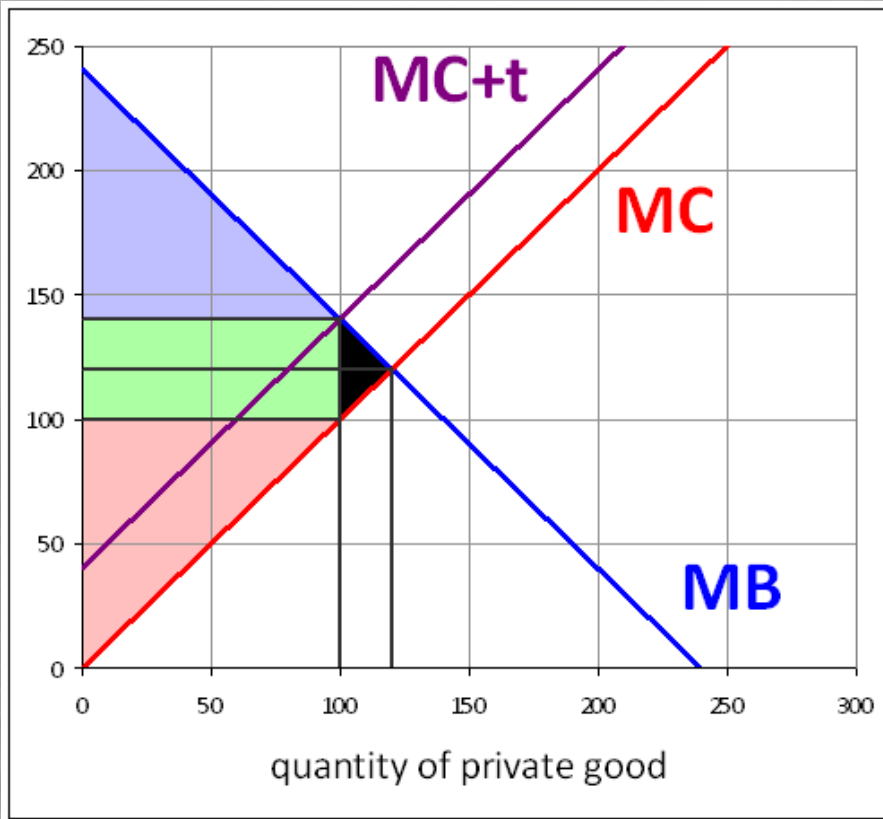
MB = 240 – x   MC = x
t = 40   G = 4000
DWL = 400
CS = 5000   PS = 5000
TES = 4000 + 5000 + 5000 =
14000 (down from 14400)

4000 spent;
surplus gained: 1600
Compare to surplus loss of
400 from taxation of the
private good: taxing and
spending has improved
total surplus by 1200.

KEY CONCEPTS IN CHAPTER 1

1. SCARCITY PRINCIPLE

2. COST-BENEFIT PRINCIPLE

3. ECONOMIC SURPLUS

4. OPPORTUNITY COST

5. THINKING AT THE MARGIN

1. SCARCITY PRINCIPLE

Life is full of tradeoffs...

Example: Time tradeoffs: sleep vs. work vs. friends vs. dating vs. exercise vs. TV, video games, etc.

Example: Leisure vs. income tradeoff: More leisure and less income, or more income and less leisure

Example: More coal & oil use now, or reducing global warming in the long run

2. COST-BENEFIT PRINCIPLE

Axiom: One should take an action if and only if its benefits outweigh its costs.

Example: If you take a part-time job, you will gain $150 per week, and lose 10 hours of leisure or study time. You should take the job if and only if the extra money is worth more to you than the extra time.

Example: Creating a new park in an empty lot costs $5000. There are 200 people in the neighborhood, and each person would be willing to pay $40 to have the park. Since the benefits (200×$40 = $8000) outweigh the costs ($5000), the park should be built.

3. ECONOMIC SURPLUS

Definition: Economic surplus = benefits - costs

Economic surplus experienced by consumers is often called consumer surplus.

Economic surplus experienced by producers is often called producer surplus.

Example: I'm willing to pay $5000 for a particular car, but the seller is only asking for $3200. My consumer surplus is $1800.

Example: It costs me $3 to make a trinket, and I sell it for $10. My producer surplus for the trinket is $7.

QUESTION 1 (consumer surplus)

I'm willing to pay **$20** to watch a movie, but it only costs **$9**. How much is my consumer surplus?

A) $20

B) $15

C) $11

D) $9

E) $5

answer to question 1

I'm willing to pay **$20** to watch a movie, but it only costs **$9**. How much is my consumer surplus?

A) $20

B) $15

C) $11

D) $9

E) $5

Surplus = **benefit** – **cost** = **$20** – **$9** = **$11**

QUESTION 2 (producer surplus)

Each wallet that I make costs me **$1**, but I sell them for **$5** each. I sell **50** wallets. How much is my total producer surplus?

A) $1

B) $5

C) $100

D) $200

E) $250

answer to question 2

Each wallet that I make costs me **$1**, but I sell them for **$5** each. I sell **50** wallets. How much is my total producer surplus?

A) $1

B) $5

C) $100

D) $200

E) $250

Surplus = benefit – cost = 50×$5 – 50×$1 = $200

4. OPPORTUNITY COST

Definition: A comprehensive definition of economic cost, that includes implicit costs as well as explicit costs.

Explicit cost: The more obvious kind of cost, like an actual payment that you make to someone to get something.

Implicit cost: The less obvious kind of cost, like an opportunity that you give up to get something.

OPPORTUNITY COST: Example 1

There are 200 people in the neighborhood, and each person would be willing to pay $40 to have the park. So, the total benefit of the park is 200×$40 = **$8000**.

Creating a new park in an empty lot requires $5000 in construction costs. So, explicit costs are **$5000**.

However, suppose that a private developer is willing to pay $4000 for the lot. So, if we create the park instead, we forego the $4000 in public income. Thus, implicit costs are **$4000**. What should we do?

A) Build the park.

B) Accept the private bid.

QUESTION 3 (opportunity cost)

There are 100 people in the neighborhood, and each person would be willing to pay **$50** to have the park.

Creating a new park in an empty lot requires **$1000** in construction costs.

Also, there is a private developer who is willing to pay **$X** for the lot.

We should build the park as long as X is less than...

A) 50   B) 500   C) 1000

D) 4000   E) 5000

answer to question 3

There are 100 people, each willing to pay $50 to have the park. So, total benefits from the park are **$5000**. Construction costs (explicit costs) are **$1000**. Implicit costs are **$X**.

For the park to be worth it, we need total benefits > total costs (where total cost is explicit plus implicit costs).

So, we need **5000** > **1000** + **X**

So, 4000 > X, or X < 4000.

Thus, We should build the park as long as X is less than...

D) 4000

OPPORTUNITY COST: Example 2

Example: I am deciding whether to go to law school. However, I am also a talented basketball player, and have an offer to play in the NBA.

Law school will take three years and cost me **$200,000**. The NBA will pay **$3,000,000** for the same three-year period.

Thus, while the explicit cost of law school for me is **$200,000**, the total economic cost or opportunity cost is **$3,200,000**.

OPPORTUNITY COST: Example 3

activity:	beach	work	movie
money effect:	-1	+$20	-$9
happiness effect:	+20	-5	+25
total effect:	+19	+15	+16

activity:	beach	work	movie
money effect:	-1	+$20	-$9
happiness effect:	+20	-5	+25
total effect:	+19	+15	+16

The best alternative is the beach, with a net benefit of 19.

Consider the question "should I go to the movie"?

The benefit it $25, and the explicit cost is $9, so it would seem like a good idea, unless you consider the implicit cost of missing out on the beach.

This implicit cost is missing out on the net benefit of $19. So, total costs for the movie are $9 + $19 = $28. Since the benefit is only $25, I should not go to the movie.

QUESTION 4 (opportunity cost)

Question: I can make lemonade for 10¢ per cup, and sell it for $1 per cup. I can sell 10 cups of lemonade this afternoon. If I don't sell lemonade, then I will do odd jobs around the neighborhood, which will earn $X. (Assume that I have just about as much fun doing odd jobs as I do making lemonade, and that these are the only two options worth considering.) I should sell lemonade this afternoon only if...

A) X is greater than 9   B) X is greater than 10

C) X is smaller than 9   D) X is smaller than 10

E) X is smaller than 20

answer to question 4

Benefits from lemonade: 10 cups × $1 per cup = $10.

Explicit costs: 10 cups × 10¢ per cup = $1.

Implicit costs: $X.

I should sell lemonade this afternoon only if 10 > 1 + X.

So, I need 9 > X, or X < 9.

A) X is greater than 9   B) X is greater than 10

C) X is smaller than 9   D) X is smaller than 10

E) X is smaller than 20

5. THINKING AT THE MARGIN

Extends cost-benefit principle from "yes or no" questions to questions of "how much?"

Example: coffee costs $1.50 per cup

cups of coffee	total benefit (willingness to pay)
1	5
2	9
3	12
4	14
5	15
6	15

QUESTION 5 (the margin: bonus question)

coffee costs $1.50 per cup

cups of coffee	total benefit (willingness to pay)
1	5
2	9
3	12
4	14
5	15
6	15

How many cups of coffee should I buy?

A) 1   B) 2   C) 3   D) 4   E) 5

answer to question 5

coffee costs $1.50 per cup

cups	total benefit	marginal benefit	marginal cost
1	5	5	1.50
2	9	4	1.50
3	12	3	1.50
4	14	2	1.50
5	15	1	1.50
6	15	0	1.50

How many cups of coffee should I buy?   **D) 4**

QUESTION 6 (the margin)

fancy dinners cost $50

fancy dinners	total benefit
1	75
2	135
3	180
4	210
5	225
6	225
7	225

How many fancy dinners should I buy?

A) 1   B) 2   C) 3   D) 4   E) 5

answer to question 6

fancy dinners cost $50

fancy dinners	total benefit	marginal benefit	marginal cost
1	75	75	50
2	135	60	50
3	180	45	50
4	210	30	50
5	225	15	50
6	225	0	50
7	225	0	50

How many fancy dinners should I buy?   B) 2

QUESTION 7 (the margin)

pies	total cost
10	20
20	60
30	120
40	200
50	300
60	420
70	560

If I get paid $9 per apple pie, how many pies should I sell?

A) 30   B) 40   C) 50   D) 60   E) 70

answer to question 7

pies	total cost	marginal cost	marginal revenue
10	20	2	9
20	60	4	9
30	120	6	9
40	200	8	9
50	300	10	9
60	420	12	9
70	560	14	9

If I get paid $9 per apple pie, how many pies should I sell?

A) 30   **B) 40**   C) 50   D) 60   E) 70

QUESTION 8 (the margin)

hours waiting tables	total money in tips	total sadness (willingness to pay to avoid)
1	20	5
2	38	12
3	54	21
4	68	32
5	80	45
6	90	60
7	98	77

How many hours should I work?

A) 3   B) 4   C) 5   D) 6   E) 7

answer to question 8

hours	money	sadness	marginal benefit	marginal cost	surplus
1	20	5	20	5	15
2	38	12	18	7	26
3	54	21	16	9	33
4	68	32	14	11	36
5	80	45	12	13	35
6	90	60	10	15	30
7	98	77	8	17	21

How many hours should I work?

A) 3   B) 4   C) 5   D) 6   E) 7