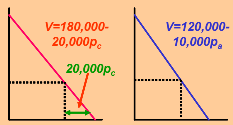
Extending the Problem



A Golden Oldie

- Demand for the park:

$$V_C = 180,000 - 20,000p_c$$
$$V_A = 120,000 - 10,000p_a$$

A Golden Oldie

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- Capacity = 200,000

A Golden Oldie

- Demand for the park:

$$V_C = 180,000 - 20,000p_c$$
$$V_A = 120,000 - 10,000p_a$$

- Capacity = 200,000
- Adding Capacity $3 a visit.

A Golden Oldie

- If demand is to be restricted to 200,000 what single fee would you recommend?

A Golden Oldie

- If demand is to be restricted to 200,000 what single fee would you recommend?
- If children and adults can be charged a separate fee, what fees would you recommend?

A Golden Oldie

- If demand is to be restricted to 200,000 what single fee would you recommend?
- If children and adults can be charged a separate fee, what fees would you recommend?
- Should the park expand capacity in that case?

Charging a Single Fee

- Demand for the park:

$V_C = 180{,}000 - 20{,}000p_c$

$V_A = 120{,}000 - 10{,}000p_a$

Charging a Single Fee

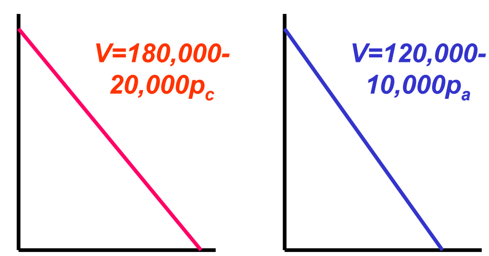
- Demand for the park:

$V_C = 180{,}000 - 20{,}000p_c$

$V_A = 120{,}000 - 10{,}000p_a$

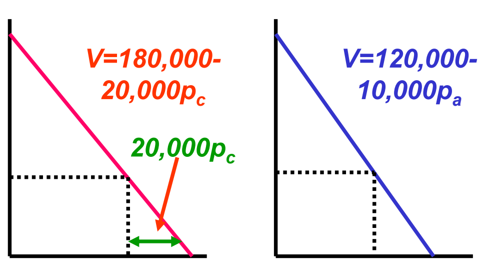
- When p = 0, demand is 300,000

Charging a Single Fee



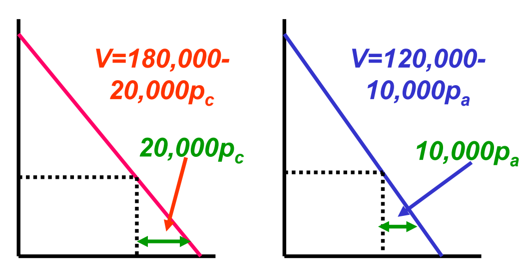
Children Adults

Charging a Single Fee



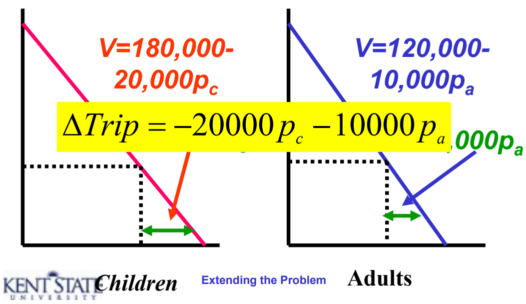
Children Adults

Charging a Single Fee

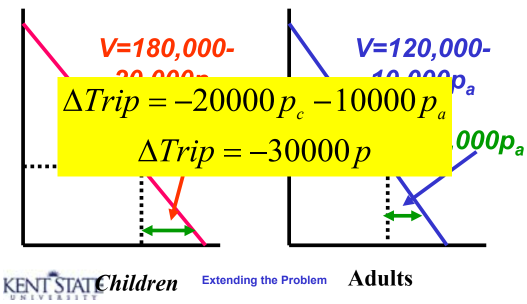


Children Adults

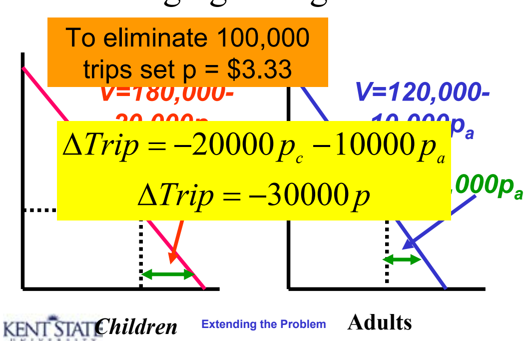
Charging a Single Fee



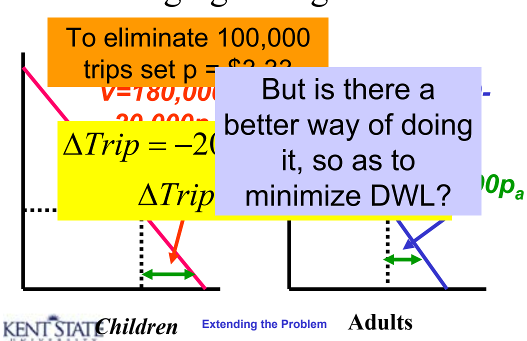
Charging a Single Fee



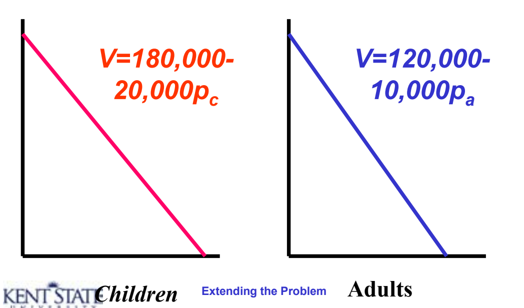
Charging a Single Fee



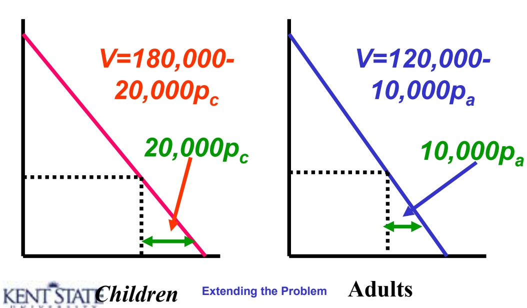
Charging a Single Fee



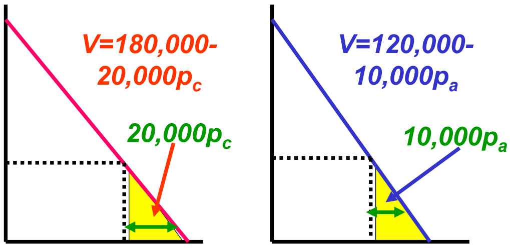
Charging a Single Fee



Charging a Single Fee



Charging a Single Fee

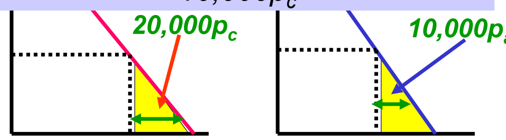


Children **Adults**

Charging a Single Fee

Dead Weight Loss from Children is $(1/2)\ (20{,}000p_c)(p_c) =$

$10{,}000p_c^2$

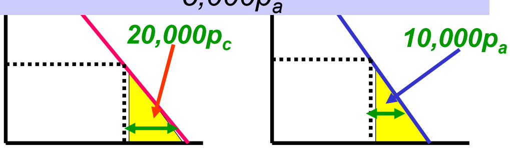


Children **Adults**

Charging a Single Fee

Dead Weight Loss from Adults is $(1/2)\ (10{,}000p_a)(p_a) =$

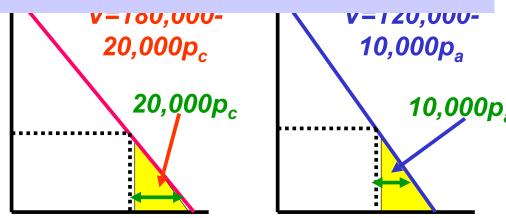
$5{,}000p_a^2$



Children **Adults**

Charging a Single Fee

$DWL = 10{,}000p_c^2 + 5{,}000p_a^2$

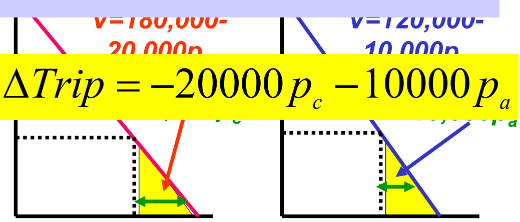


Children **Adults**

Charging a Single Fee

$DWL = 10{,}000p_c^2 + 5{,}000p_a^2$

$$\Delta Trip = -20000\,p_c - 10000\,p_a$$



Children **Adults**

Charging Separate Fees

- Many different adult and child's fees will cut demand

Charging Separate Fees

- Many different adult and child's fees will cut demand
- But

$$20{,}000p_c + 10{,}000p_a = 100{,}000$$

Charging Separate Fees

- Many different adult and child's fees will cut demand
- But

$$20{,}000p_c + 10{,}000p_a = 100{,}000$$

$$p_a = 10 - 2p_c$$

Charging Separate Fees

- Deadweight loss is

$$10{,}000p_c^2 + 5{,}000p_a^2$$

- The two prices are

$$p_a = 10 - 2p_c$$

- Deadweight loss is

$$10{,}000p_c^2 + 5{,}000(10-2p_c)^2$$

Charging Separate Fees

$$10{,}000p_c^2 + 5{,}000(10-2p_c)^2$$

Charging Separate Fees

$$10{,}000p_c^2 + 5{,}000(10-2p_c)^2$$

$$10{,}000p_c^2 + 5{,}000(100-40p_c+4p_c^2)$$

Charging Separate Fees

$$10{,}000p_c^2 + 5{,}000(10-2p_c)^2$$

$$10{,}000p_c^2 + 5{,}000(100-40p_c+4p_c^2)$$

$$10{,}000p_c^2 + 500{,}000-200{,}000p_c+20{,}000p_c^2$$

Charging Separate Fees

$10{,}000p_c^2 + 5{,}000(10-2p_c)^2$

$10{,}000p_c^2 + 5{,}000(100-40p_c+4p_c^2)$

$10{,}000p_c^2 + 500{,}000-200{,}000p_c+20{,}000p_c^2$

DWL $=500{,}000-200{,}000p_c+30{,}000p_c^2$

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Charging Separate Fees

$500{,}000-200{,}000p_c+30{,}000p_c^2$

KENT STATE UNIVERSITY

Charging Separate Fees

$500{,}000-200{,}000p_c+30{,}000p_c^2$

- In sum, we can achieve our objective with many different values of p_c (and p_a).

KENT STATE UNIVERSITY

Charging Separate Fees

$500{,}000-200{,}000p_c+30{,}000p_c^2$

- In sum, we can achieve our objective with many different values of p_c (and p_a).
- Lets find the one that minimizes DWL.

KENT STATE UNIVERSITY

Charging Separate Fees

$500{,}000-200{,}000p_c+30{,}000p_c^2$

- In sum, we can achieve our objective with many different values of p_c (and p_a).
- Lets find the one that minimizes DWL.
- To do that….

KENT STATE UNIVERSITY

Charging Separate Fees

$500{,}000-200{,}000p_c+30{,}000p_c^2$

- In sum, we can achieve our objective with many different values of p_c (and p_a).
- Lets find the one that minimizes DWL.
- To do that….
  - Take the derivative
  - Set it equal to zero

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Charging Separate Fees

$500,000-200,000p_c+30,000p_c^2$

- Differentiating

$-200,000+60,000p_c$

Charging Separate Fees

$500,000-200,000p_c+30,000p_c^2$

- Differentiating

$-200,000+60,000p_c$

$p_c = \$3.33$

Charging Separate Fees

$500,000-200,000p_c+30,000p_c^2$

- Differentiating

-200

$p_a = 10 - 2p_c$

$p_c = \$3.33$

Charging Separate Fees

$500,000-200,000p_c+30,000p_c^2$

- Differentiating

-2

$p_a = 10 - 2p_c$

$p_a = \$3.33$

$p_c = \$3.33$

The Dead Weight Loss

$DWL = 500,000-200,000p_c+30,000p_c^2$

The Dead Weight Loss

$DWL = 500,000-200,000p_c+30,000p_c^2$

$DWL = 500,000-200,000(\$3.33)+30,000(\$3.33)^2$

The Dead Weight Loss

$DWL = 500{,}000 - 200{,}000p_c + 30{,}000p_c^2$

$DWL = 500{,}000 - 200{,}000(\$3.33) + 30{,}000(\$3.33)^2$

$DWL = \$55{,}556$

The Dead Weight Loss

$DWL = 500{,}000 - 200{,}000p_c + 30{,}000p_c^2$

$DWL = 500{,}000 - 200{,}000(\$3.33) + 30{,}000(\$3.33)^2$

$$\frac{Cost}{DWL} = ?$$

End