# Chapter Five

- Choice

# Chapter Five

- Choice

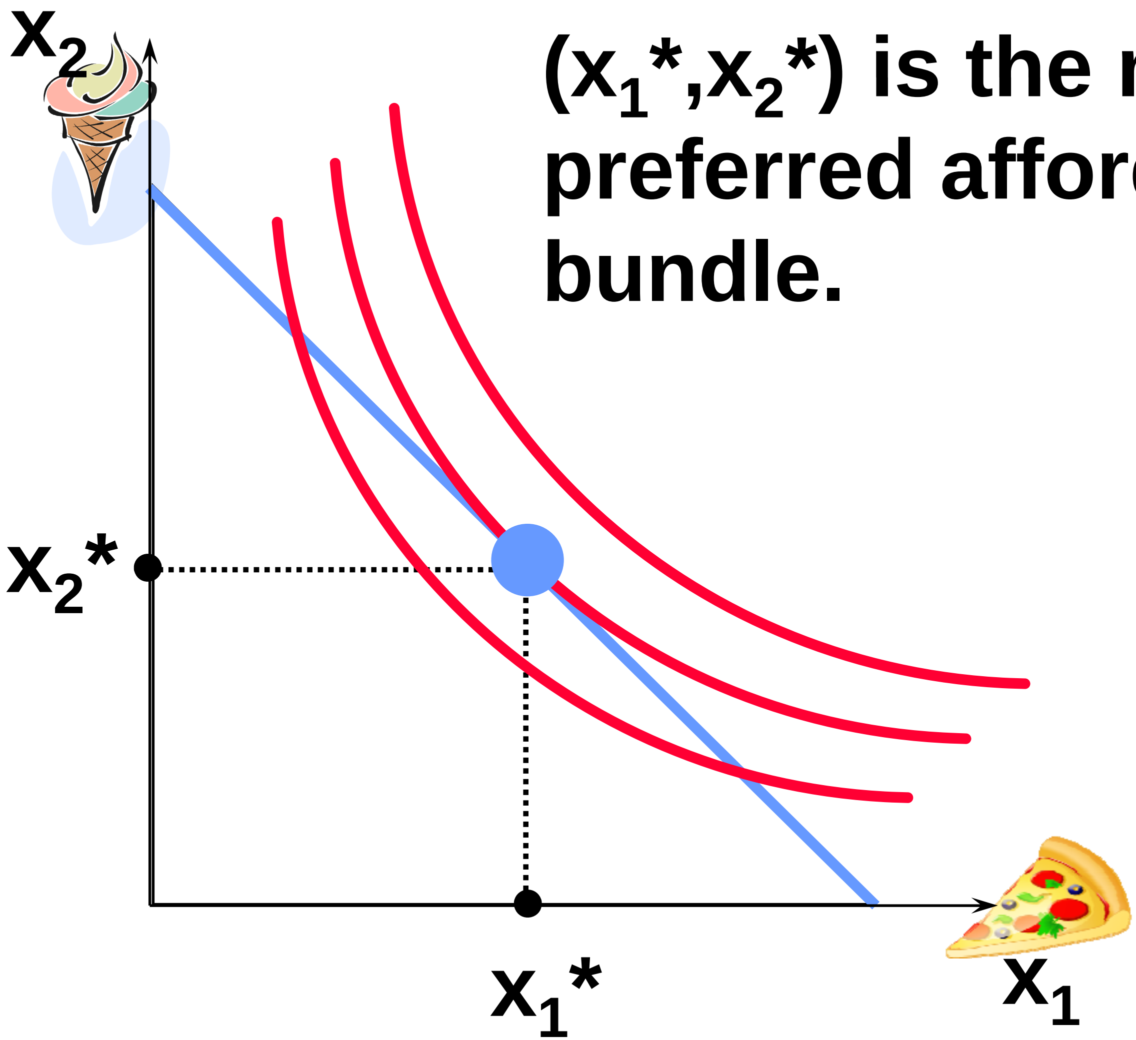
# Economic Rationality

- The consumer choice limited within budget constraint
  - No shop lifting!
- Consumer chooses the "best" bundle based on preferences
  - If I like pizza more than milk and I can afford both, I will eat pizza

**U(**  **) > U(** 

**)**

# Rational Constrained Choice

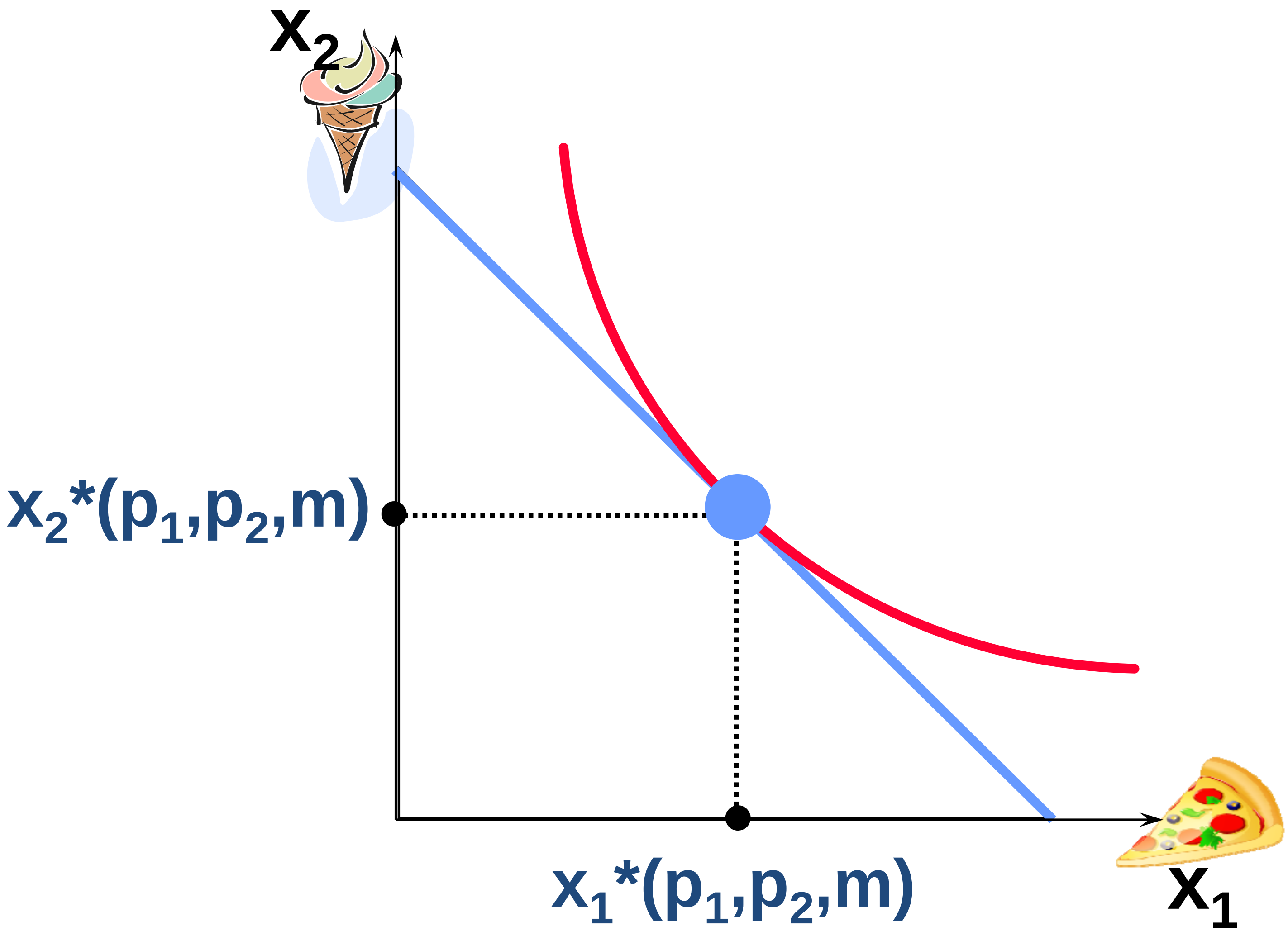



**$(x_1^*, x_2^*)$ is the most preferred affordable bundle.**

# Rational Constrained Choice

- The most preferred affordable bundle is called the consumer's ORDINARY DEMAND at the given prices and budget.
- Ordinary demands will be denoted by $x_1^*(p_1,p_2,m)$ and $x_2^*(p_1,p_2,m)$.

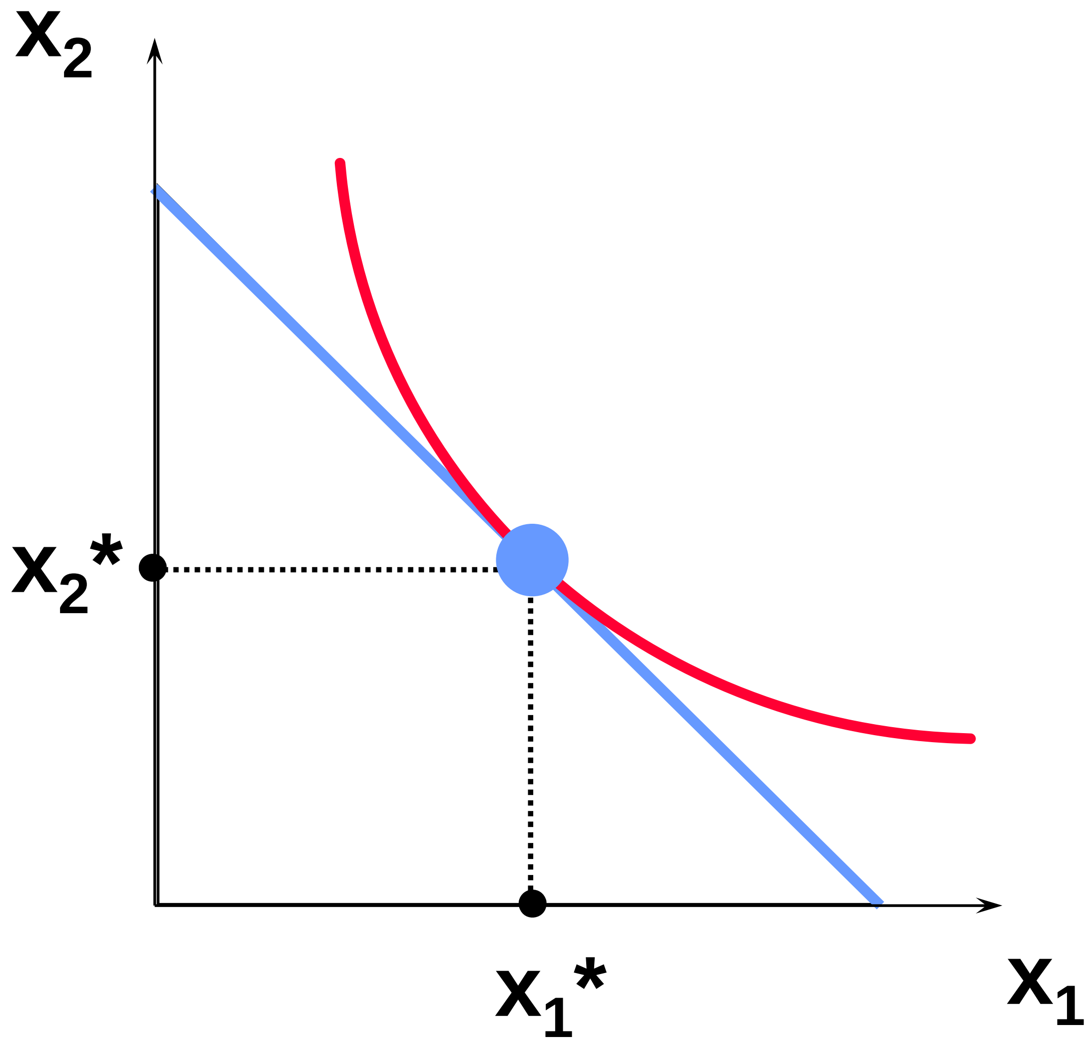
# Rational Constrained Choice



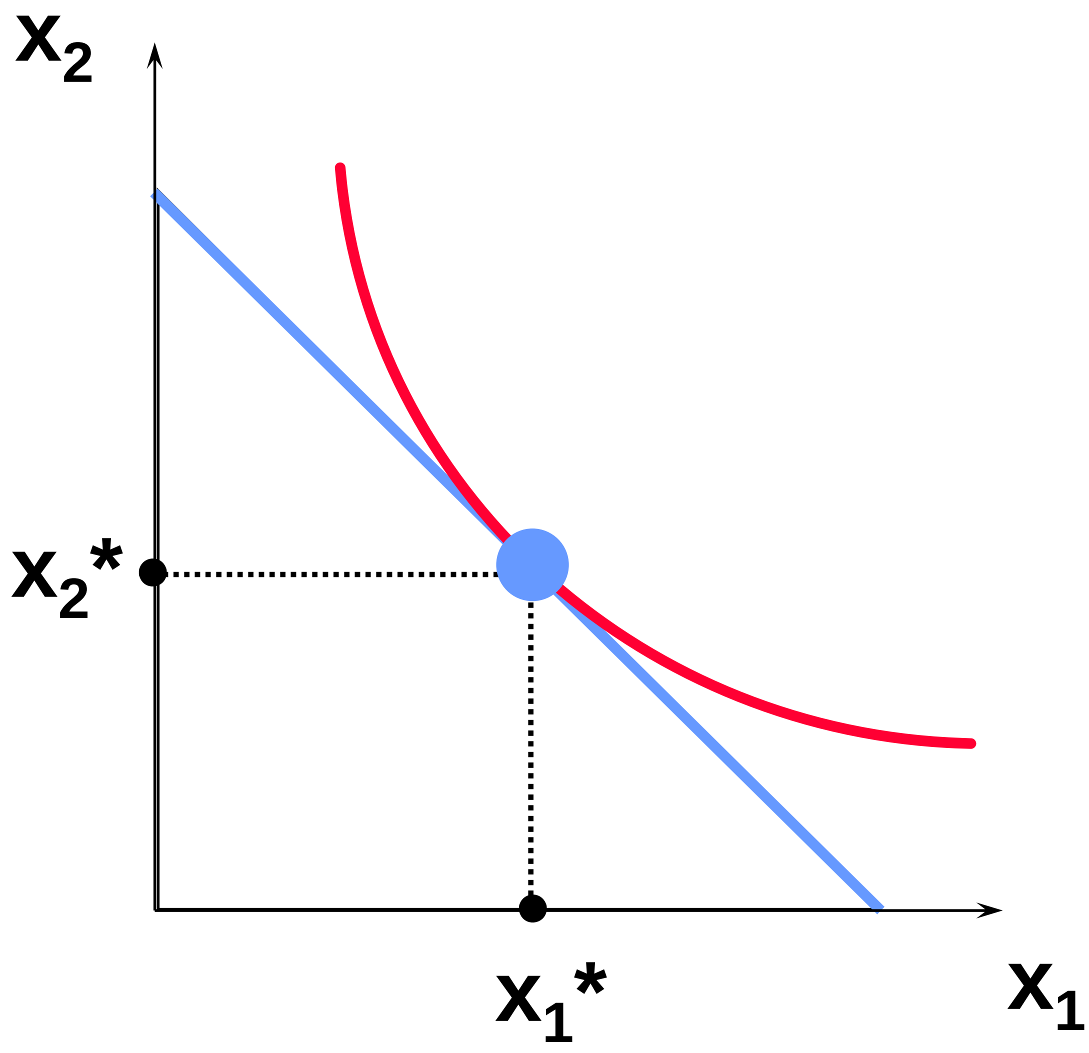
# Rational Constrained Choice

- When $x_1^* > 0$ and $x_2^* > 0$ the demanded bundle is INTERIOR.
- If buying $(x_1^*,x_2^*)$ costs \$m then the budget is exhausted.

# Rational Constrained Choice



# Rational Constrained Choice



# Rational Constrained Choice

$(x_1^*, x_2^*)$ satisfies two conditions:

a) the budget is exhausted;

$$p_1x_1^* + p_2x_2^* = m$$

b) the slope of the budget constraint, $-p_1/p_2$, and the slope of the indifference curve containing $(x_1^*, x_2^*)$ are equal at $(x_1^*, x_2^*)$. – i.e., $-p_1/p_2 = MRS$

# Computing Ordinary Demands

- Two equations in two unknowns
- The equations can be solved to find $(x_1^*, x_2^*)$ for given $p_1$, $p_2$ and $m$?

# Computing Ordinary Demands - a Cobb-Douglas Example.

- Suppose that the consumer has Cobb-Douglas preferences.

$$U(x_1, x_2) = x_1^a x_2^b$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

- Suppose that the consumer has Cobb-Douglas preferences.

$$U(x_1, x_2) = x_1^a x_2^b$$

- Then

$$\mathbf{MU_1 = \frac{\partial U}{\partial x_1} = a x_1^{a-1} x_2^b}$$

$$\mathbf{MU_2 = \frac{\partial U}{\partial x_2} = b x_1^a x_2^{b-1}}$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

- So the MRS is

$$MRS = \frac{dx_2}{dx_1} = -\frac{\partial U/\partial x_1}{\partial U/\partial x_2} = -\frac{ax_1^{a-1}x_2^b}{bx_1^a x_2^{b-1}} = -\frac{ax_2}{bx_1}.$$

- At ($x_1$*,$x_2$*), MRS = -$p_1$/$p_2$ so

$$-\frac{ax_2^*}{bx_1^*} = -\frac{p_1}{p_2} \quad \Rightarrow \quad x_2^* = \frac{bp_1}{ap_2}x_1^*. \qquad \textbf{(A)}$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

- $(x_1^*, x_2^*)$ also exhausts the budget so

$$p_1 x_1^* + p_2 x_2^* = m. \qquad \textbf{(B)}$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

- So now we know that

$$x_2^* = \frac{bp_1}{ap_2} x_1^* \qquad \textbf{(A)}$$

**Substitute**

$$p_1 x_1^* + p_2 x_2^* = m. \qquad \textbf{(B)}$$

**and get**

$$p_1 x_1^* + p_2 \frac{bp_1}{ap_2} x_1^* = m.$$

**This simplifies to ….**

# Computing Ordinary Demands - a Cobb-Douglas Example.

$$x_1^* = \frac{am}{(a+b)p_1}.$$

**Substituting for $x_1$* in**

$$p_1 x_1^* + p_2 x_2^* = m$$

**then gives**

$$x_2^* = \frac{bm}{(a+b)p_2}.$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

**So we have discovered that the most preferred affordable bundle for a consumer with Cobb-Douglas preferences**

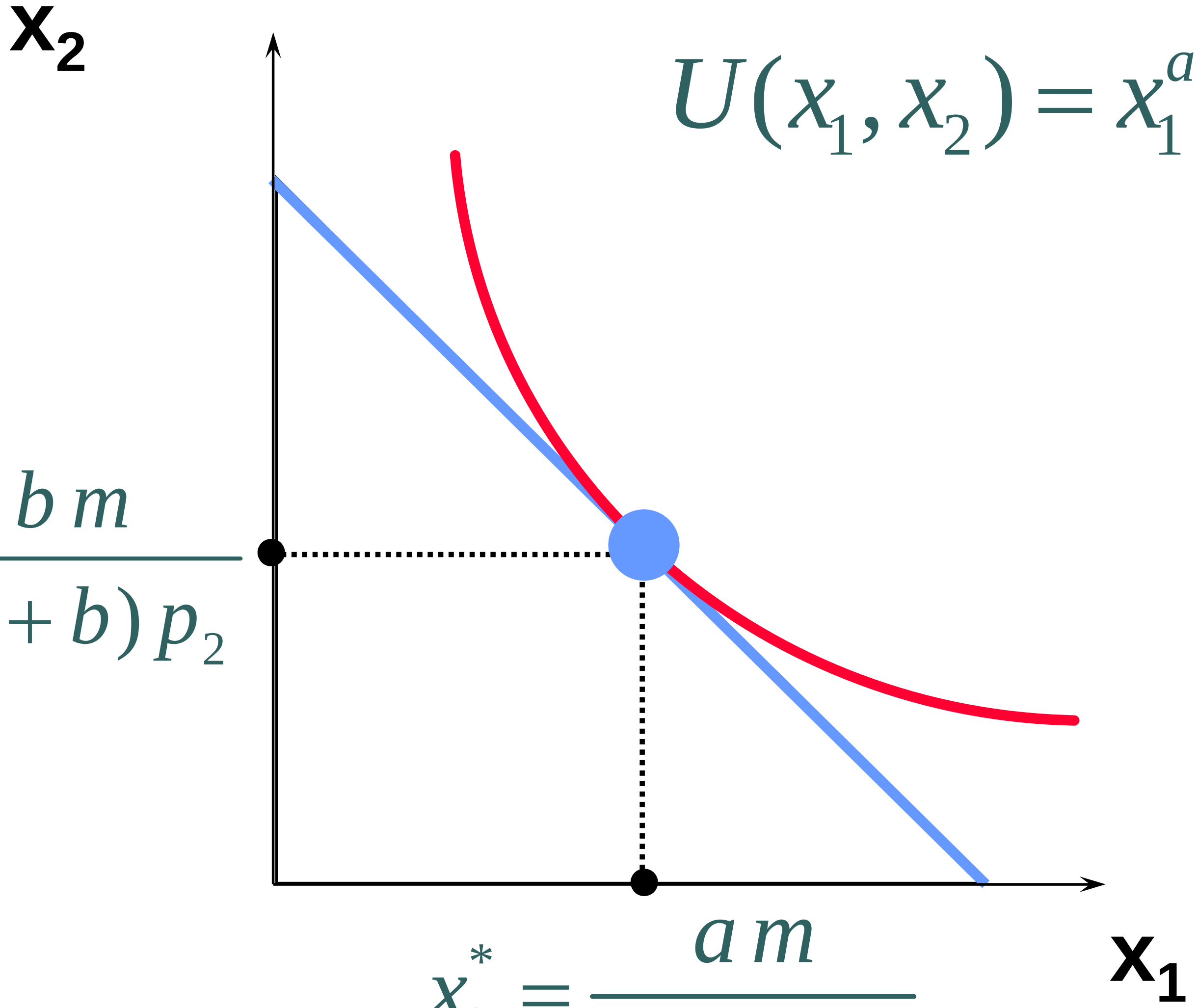
$$U(x_1, x_2) = x_1^a x_2^b$$

**is**

$$(x_1^*, x_2^*) = \left( \frac{am}{(a+b)p_1}, \frac{bm}{(a+b)p_2} \right)$$

# Computing Ordinary Demands - a Cobb-Douglas Example.

$$U(x_1, x_2) = x_1^a x_2^b$$




$$x_2^* = \frac{bm}{(a+b)p_2}$$

$$x_1^* = \frac{am}{(a+b)p_1}$$

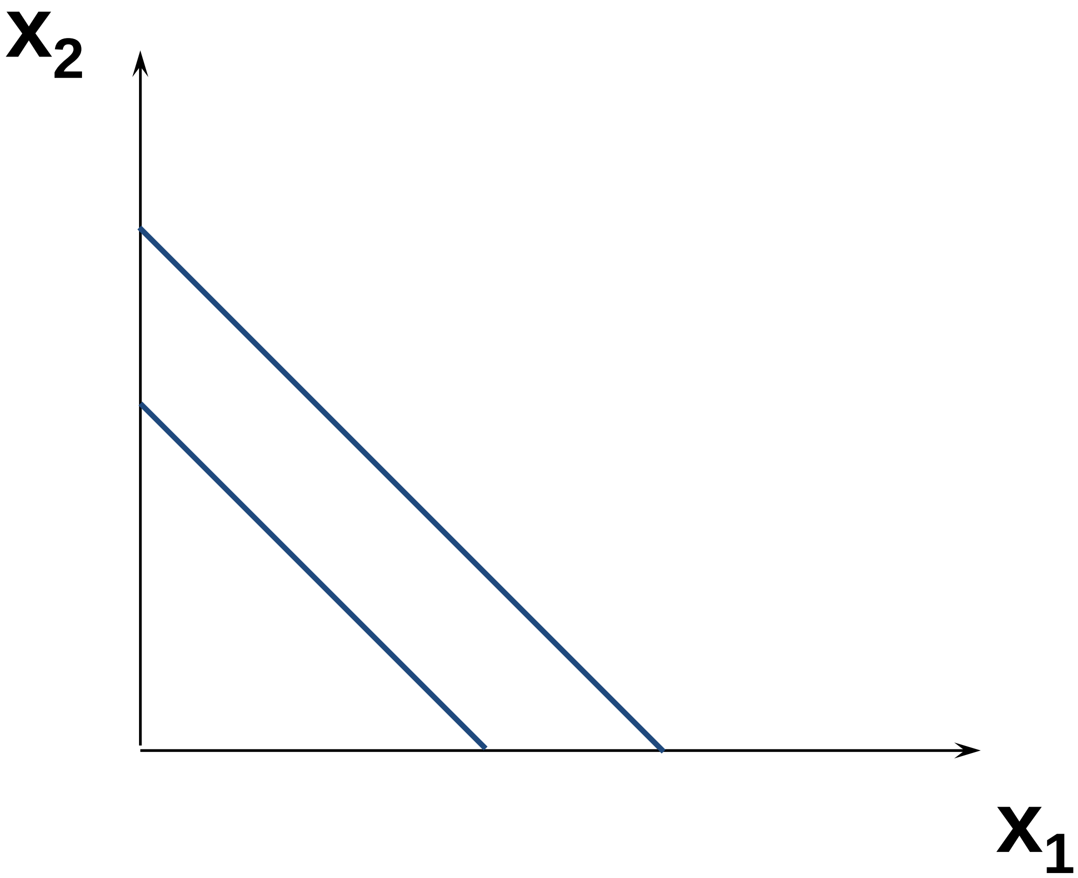
# Rational Constrained Choice

- When $x_1^* > 0$ and $x_2^* > 0$
  and $(x_1^*, x_2^*)$ exhausts the budget,
  and indifference curves have no
  'kinks', the ordinary demands are obtained
  by solving:
- (a) $p_1x_1^* + p_2x_2^* = y$
- (b) the slopes of the budget constraint, $-p_1/p_2$, and of the indifference curve containing $(x_1^*, x_2^*)$ are equal at $(x_1^*, x_2^*)$.

# Rational Constrained Choice

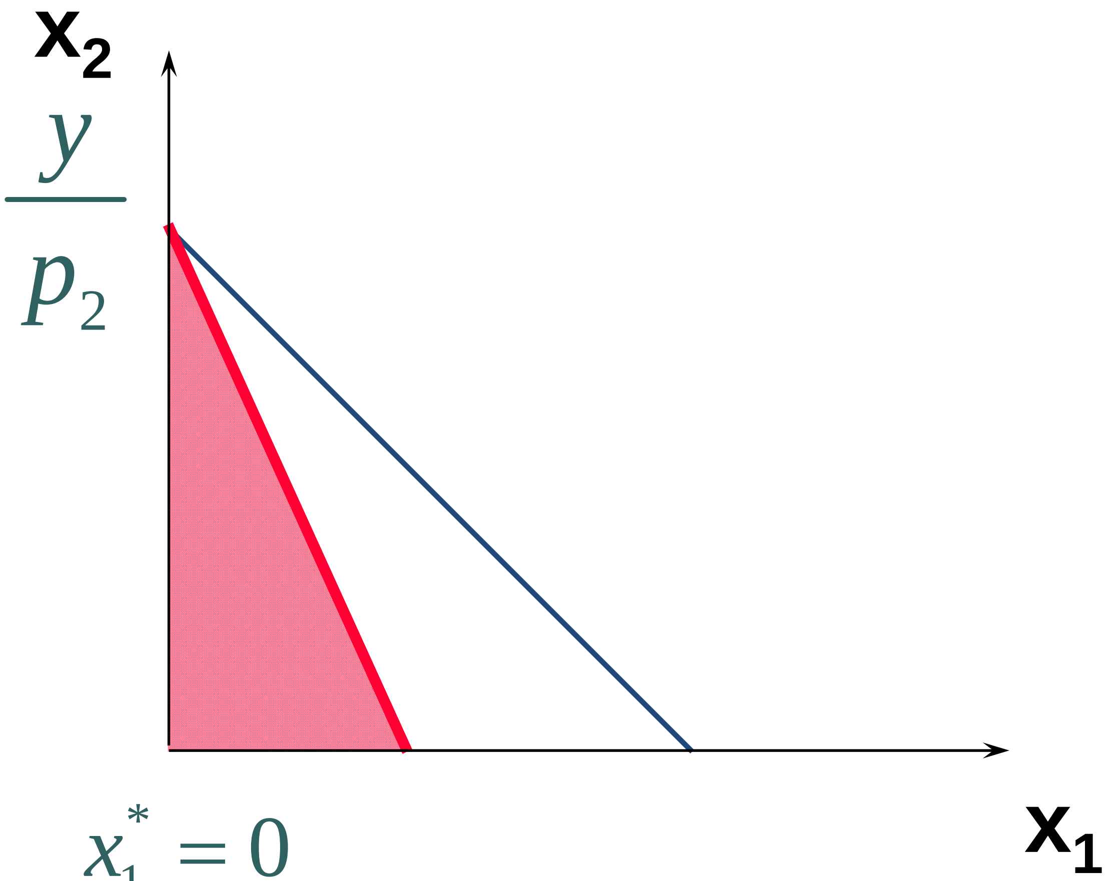
- What if $x_1^* = 0$ or $x_2^* = 0$?
- Then the ordinary demand $(x_1^*,x_2^*)$ is at a corner solution to the problem of maximizing utility subject to a budget constraint.

# Examples of Corner Solutions -- the 1-1 Perfect Substitutes Case



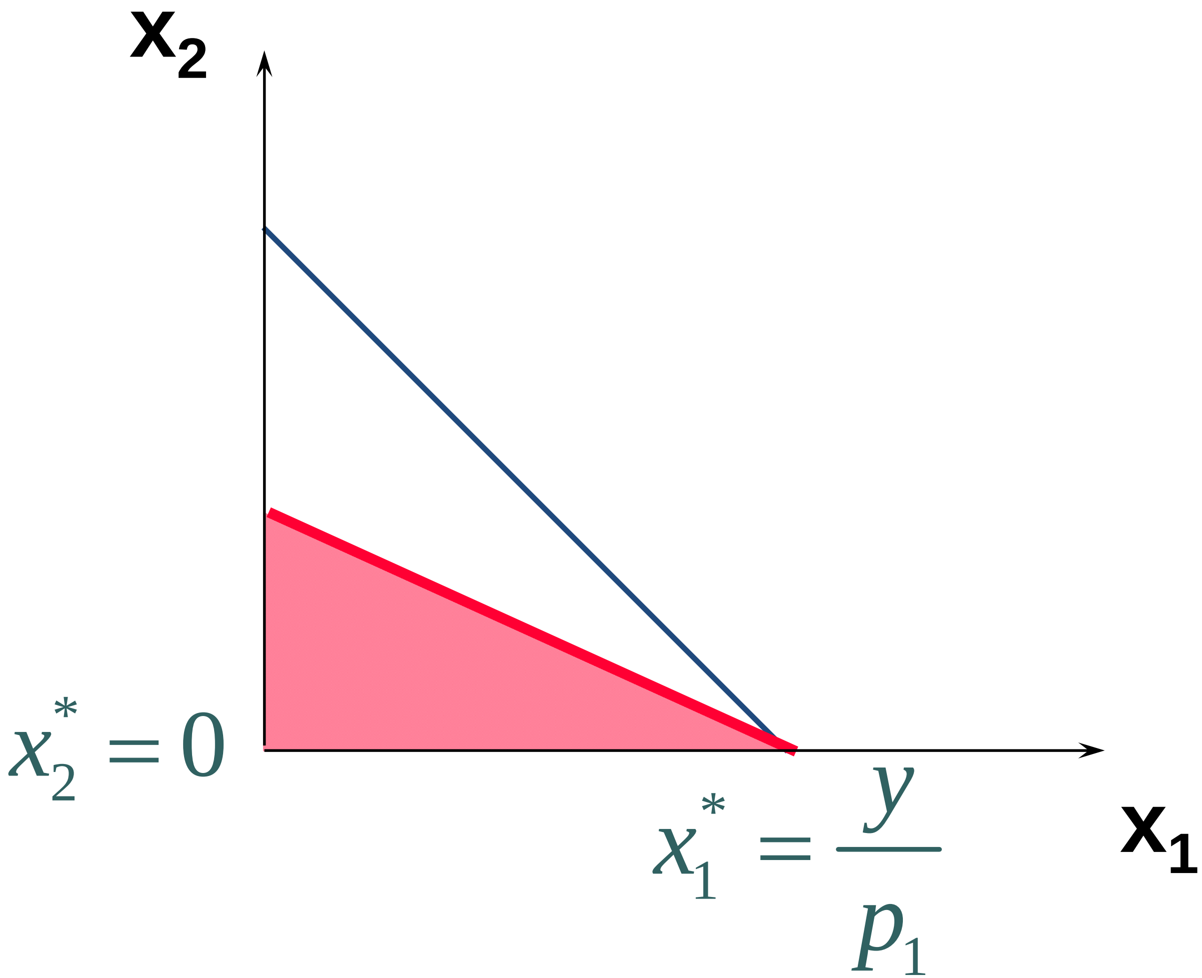
# Examples of Corner Solutions -- the Perfect Substitutes Case

$$x_2^* = \frac{y}{p_2}$$




$$x_1^* = 0$$

# Examples of Corner Solutions -- the Perfect Substitutes Case



# Examples of Corner Solutions -- the Perfect Substitutes Case

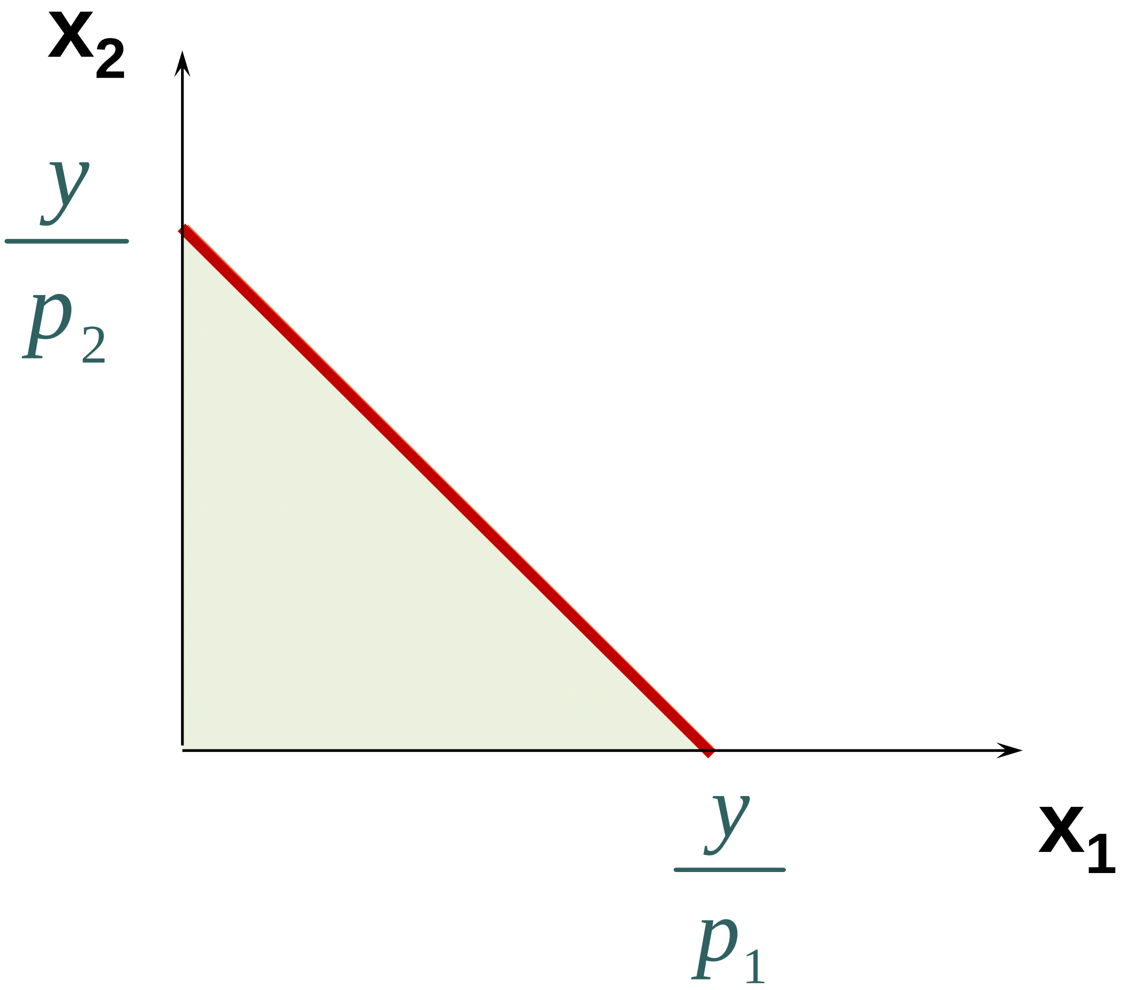
**So when $U(x_1,x_2) = x_1 + x_2$, the most preferred affordable bundle is $(x_1^*,x_2^*)$ where**

$$(x_1^*, x_2^*) = \left( \frac{y}{p_1}, 0 \right) \quad \textbf{if } p_1 < p_2$$

**and**

$$(x_1^*, x_2^*) = \left( 0, \frac{y}{p_2} \right) \quad \textbf{if } p_1 > p_2.$$

# Examples of Corner Solutions -- the Perfect Substitutes Case



# Examples of Corner Solutions -- the Perfect Substitutes Case