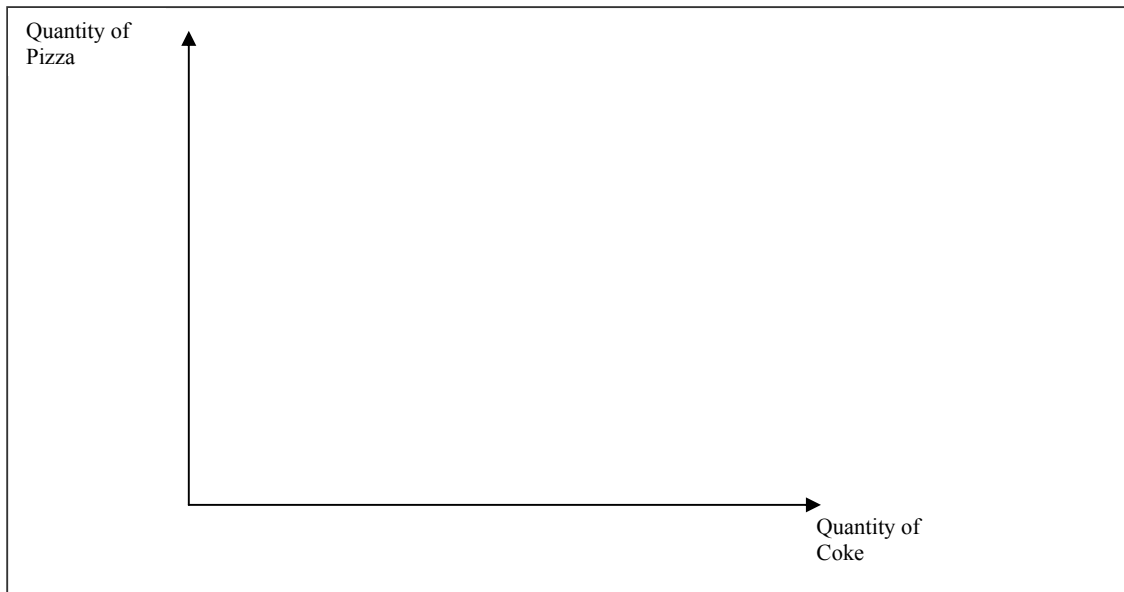


## FIVE EASY STEPS TO FIND THE SUBSTITUTION AND INCOME EFFECT

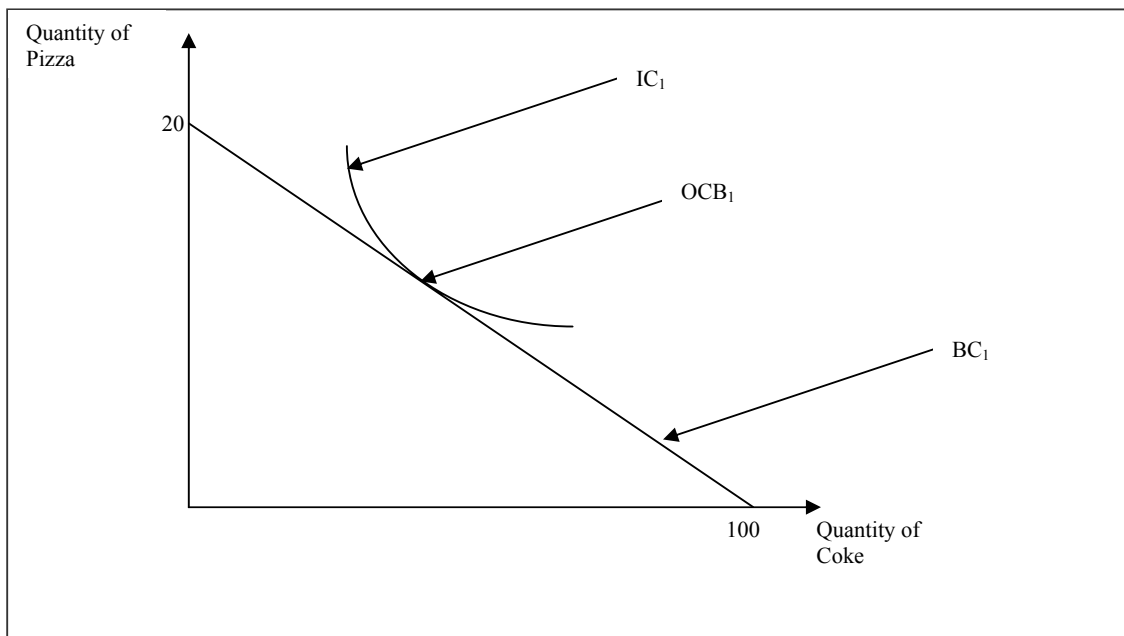
### TWO NORMAL GOODS

In the first example we will analyze the substitution and income effect for two normal goods. Let us assume that we have two normal good: my famous pizzas and coke. The price of pizza is originally \$5 and the price of coke is \$1, while your income is \$100. We will analyze the substitution and income effect when the price of pizza increases from \$5 to \$10!

**Step 1:** Draw the y and x-axis and clearly label them.



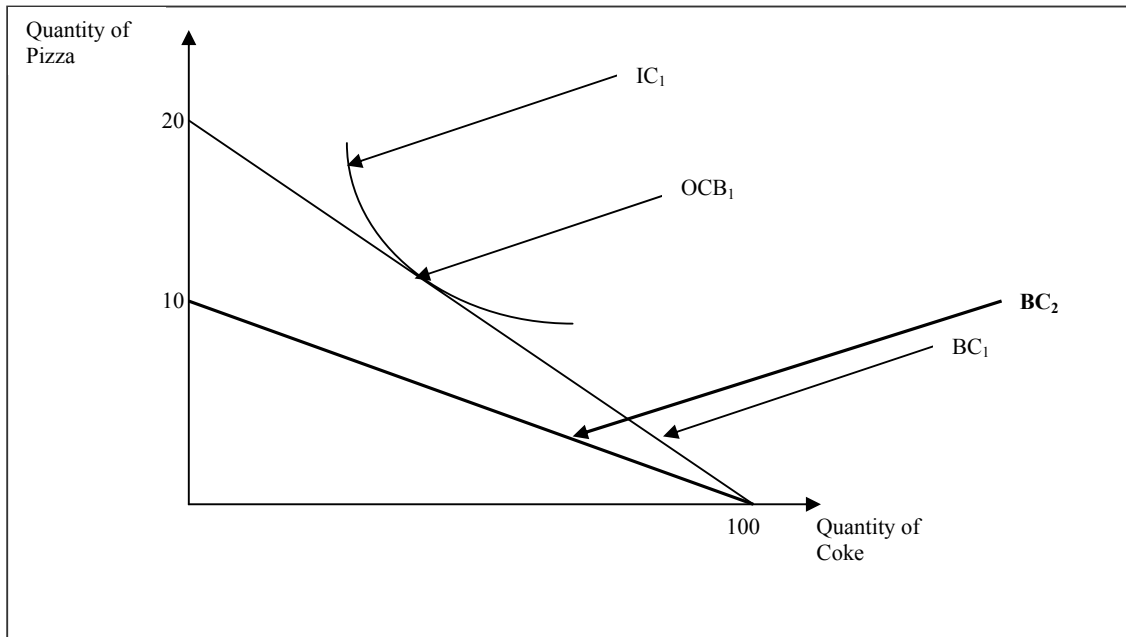
**Step 2:** Insert the budget constraint and indifference curve. Do not forget to label the y and x-axis.



And how exactly did we get those numbers? It's easy. For the Quantity of Pizza we simply divided the income by the price of pizza ( $100/5 = 20$ ) and for the Quantity of Coke we divided the income by the price of coke ( $100/1 = 100$ ). We also inserted the indifference curve (IC<sub>1</sub>) so that we could find our optimal consumption bundle. And how

did we know where to draw it? Just draw it so that it is tangent to the Budget Constraint - so that it touches the  $BC_1$  at exactly one point.

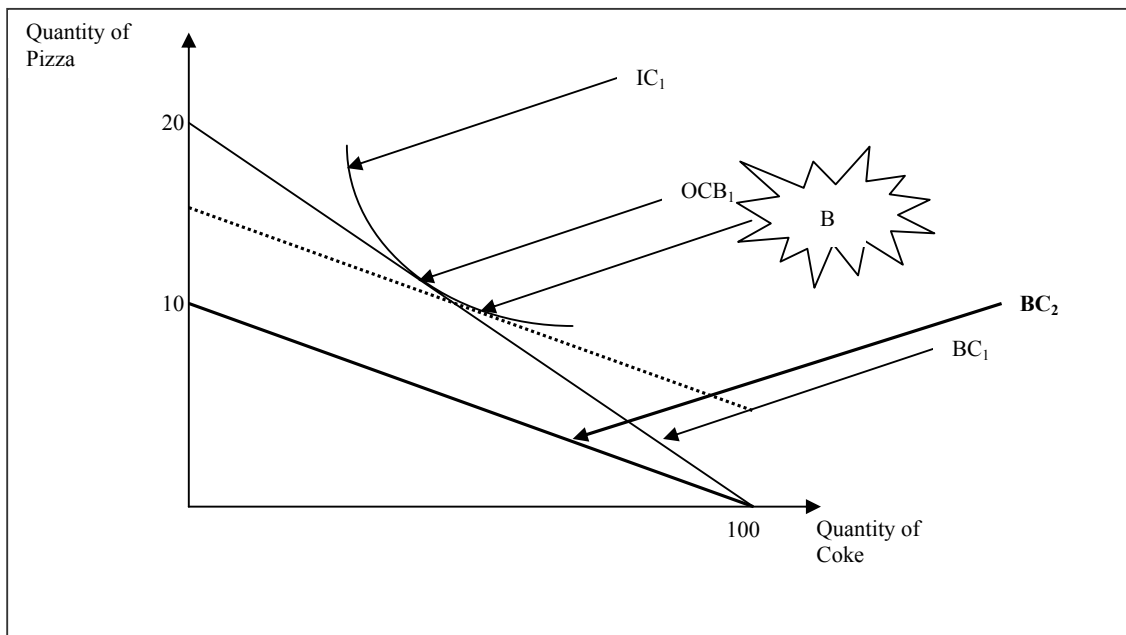
**Step 3:** Draw the new Budget Constraint after the price of Pizza goes from \$5 to \$10.



How did we draw this new budget constraint ( $BC_2$ )? Well, we know that the price of coke did not change and that with the same income, we can still buy the same amount of coke. But pizza became more expensive so that we can buy less of pizza with \$100. More precisely, we can now buy 10 pizzas if we only buy pizzas. Remember that we get this amount by dividing our income with the new price of pizza ( $100/10 = 10$ ).

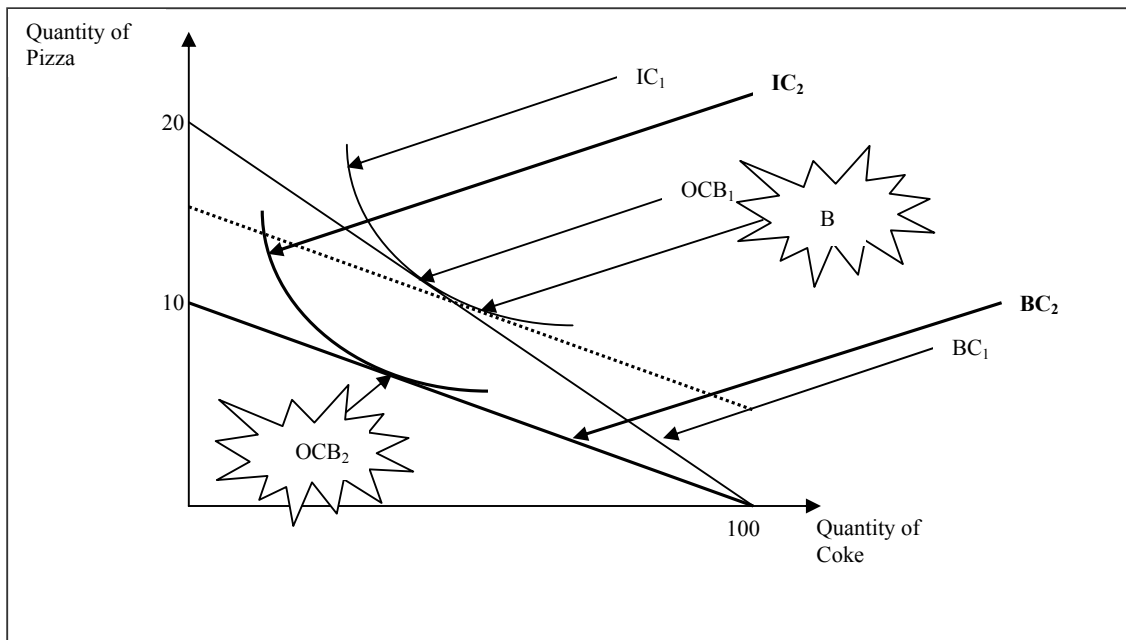
Now we are all set and ready to find out what the substitution effect is.

**Step 4:** Draw a new line that is tangent to the old indifference curve ( $IC_1$ ) and is at the same time parallel to the new budget constraint ( $BC_2$ ).



It is obvious that our dashed line is indeed tangent to  $IC_1$  and parallel to  $BC_2$ . More precisely, our dashed line is tangent to  $IC_1$  at the point B! Now the substitution effect is simply the movement from  $OCB_1$  to point B! That's it. It's, that simple. But we are not done yet. We still have to show the income effect.

**Step 5:** This one is a bit tricky...but not too difficult. What we have to do is to figure out where our new Optimal Consumption Bundle ( $OCB_2$ ) is. Well, we know that we are dealing with two normal goods. This means that when the price of pizza goes up, we feel almost like our income went down (since we cannot afford the same amount of stuff as before). We also know that when our income goes down the demand for the two normal goods also goes down. That means that in order to find our new  $OCB_2$  we have to go down and to the left of point B. Here's how it's done.



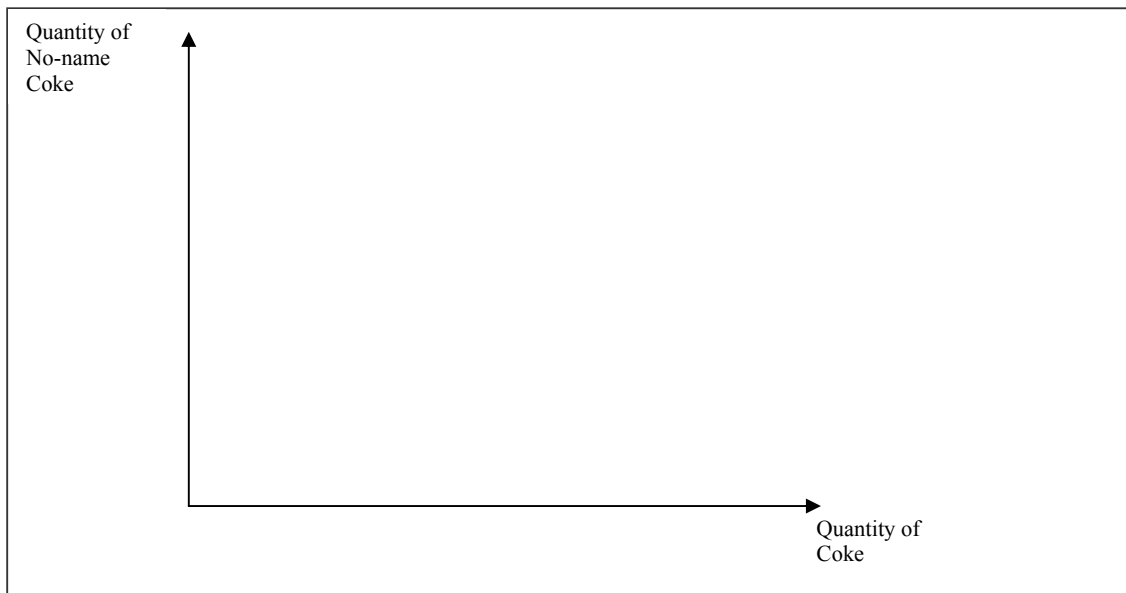
So, the movement from point B to the new Optimal Consumption Bundle ( $OCB_2$ ) is our income effect. And that's that.

Note: Do not forget to label the new Indifference Curve ( $IC_2$ )!!!

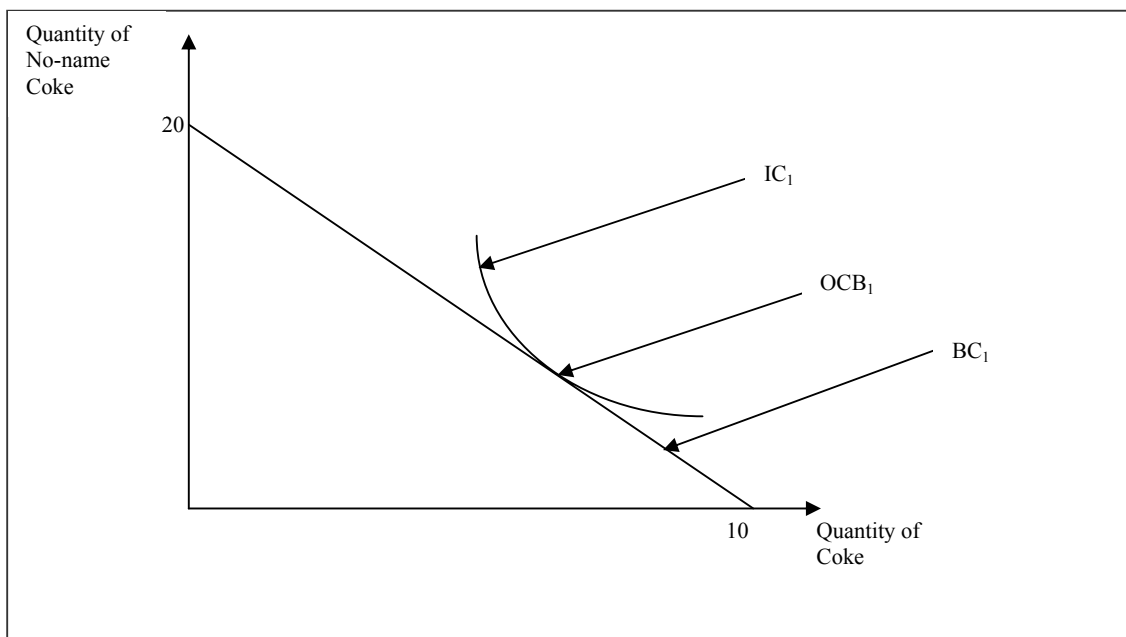
## ONE NORMAL GOOD AND ONE INFERIOR GOOD

In this second example we will analyze the substitution and income effect for one normal and one inferior good. Let us assume that the Coke is our normal good, and that the No-name Coke is our inferior good. The price of Coke is \$1 and the price of No-name Coke is \$0.5, while your income is \$10. We will analyze the substitution and income effect when the price of No-name Coke increases from \$0.5 to \$1!

**Step 1:** Draw the y and x-axis and clearly label them.



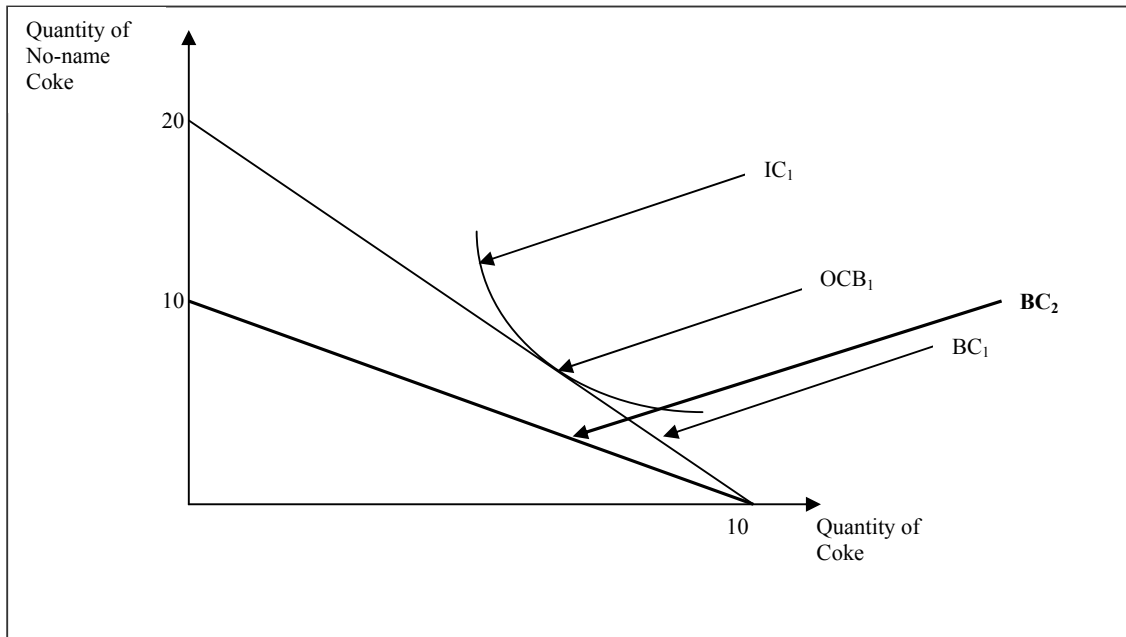
**Step 2:** Insert the budget constraint and indifference curve. Do not forget to label the y and x-axis.



And how exactly did we get those numbers? It's easy. For the Quantity of the No-name Coke we simply divided the income by the price of the No-name Coke ( $10/0.5 = 20$ ) and for the Quantity of Coke we divided the income by the price of coke ( $10/1 = 10$ ). We also inserted the indifference curve ( $IC_1$ ) so that we could find our optimal

consumption bundle. And how did we know where to draw it? Just draw it so that it is tangent to the Budget Constraint (so that it touches the  $BC_1$  at exactly one point).

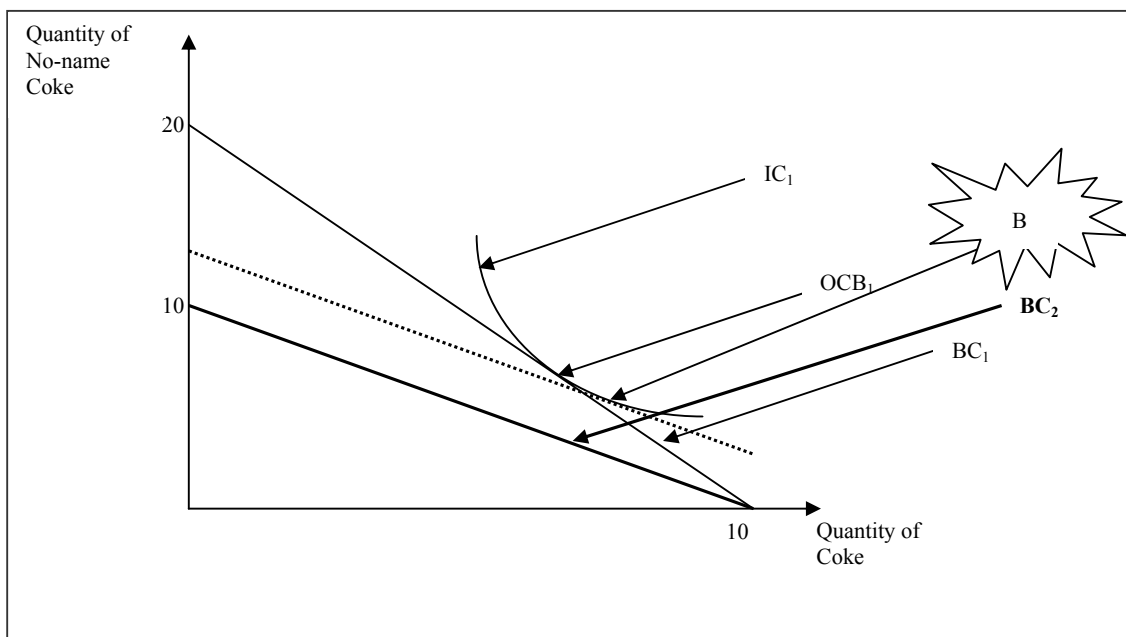
**Step 3:** Draw the new Budget Constraint after the price of No-name Coke goes from \$0.5 to \$1.



How did we draw this new budget constraint ( $BC_2$ )? Well, we know that the price of Coke did not change and that with the same income, we can still buy the same amount of Coke. But the No-name Coke became more expensive so that we can buy less of it with \$100. More precisely, we can now buy 10 No-name Cokes if we only buy that good. Remember that we get this amount by dividing our income with the new price of No-name Coke ( $100/1 = 10$ ).

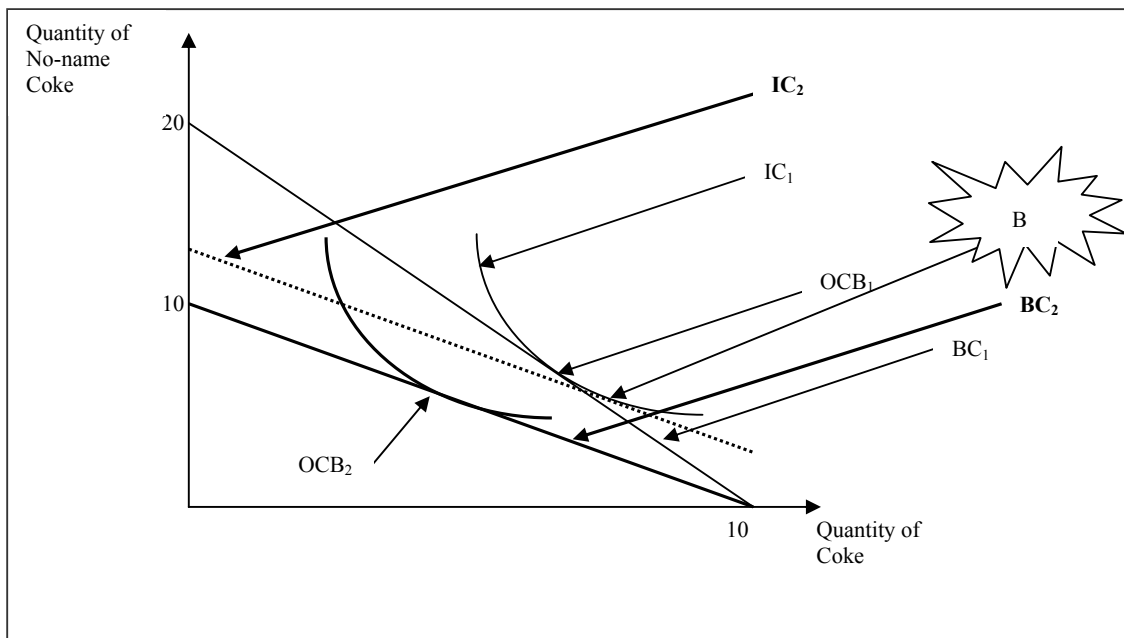
Now we are all set and ready to find out what the substitution effect is.

**Step 4:** Draw a new line that is tangent to the old indifference curve ( $IC_1$ ) and is at the same time parallel to the new budget constraint ( $BC_2$ ).



It is obvious that our dashed line is indeed tangent to  $IC_1$  and parallel to  $BC_2$ . More precisely, our dashed line is tangent to  $IC_1$  at the point B! Now, the substitution effect is the movement from  $OCB_1$  to point B! That's it. It's that simple. Now, we still have to show the income effect.

**\*Step 5:** This one is a bit trickier than for two normal goods...but it's not too difficult if you just pay a little bit of attention. Like before what we have to do is to figure out where our new Optimal Consumption Bundle ( $OCB_2$ ) is. Well, we know that now we are dealing with one normal good and one inferior good. This means that when the price of No-name Coke goes up, we feel almost like our income went down (since we cannot afford the same amount of stuff as before). We also know that when our income goes down the demand for the normal good also goes down, but the demand for the inferior good goes up! (You should know why!) That means that in order to find our new  $OCB_2$  we have to go up and to the left of point B. Here's how it's done.



So, the movement from point B to the new Optimal Consumption Bundle ( $OCB_2$ ) is our income effect. And that's that.

Note: Do not forget to label the new Indifference Curve ( $IC_2$ )!!!

I strongly encourage you that you practice the substitution and income effect before the Midterm exam by drawing similar graphs. You should know how to draw these graphs when dealing with two normal goods and the price of the good on the x-axis increases/decreases or when the price of the good on the y-axis increases/decreases. You should also know what happens when you are dealing with one normal and one inferior good and the price of the normal good increases/decreases or when the price of the inferior good increases/decreases. You should also be able to do this when you put the inferior good on the x-axis and the normal good on the y-axis.