

Graphing functions: An example with a demand function.

Oct 10, 2011

Assume, for example, the following demand function for ski days at Steamboat ski area.

$$D_{ssb} = 20 + .03(\text{snow}_{sb}) - .06p_{sb} + .01p_{vail}$$

Where  $D_{ssb}$  is the individual's demand, this year, for Steamboat ski days.

$\text{snow}_{sb}$  is Steamboat's total snow fall, last year, in inches

$p_{sb}$  is the cost of a steamboat ski day, measured in dollars

$p_{vail}$  is the cost of a vail ski day day, measured in dollars.

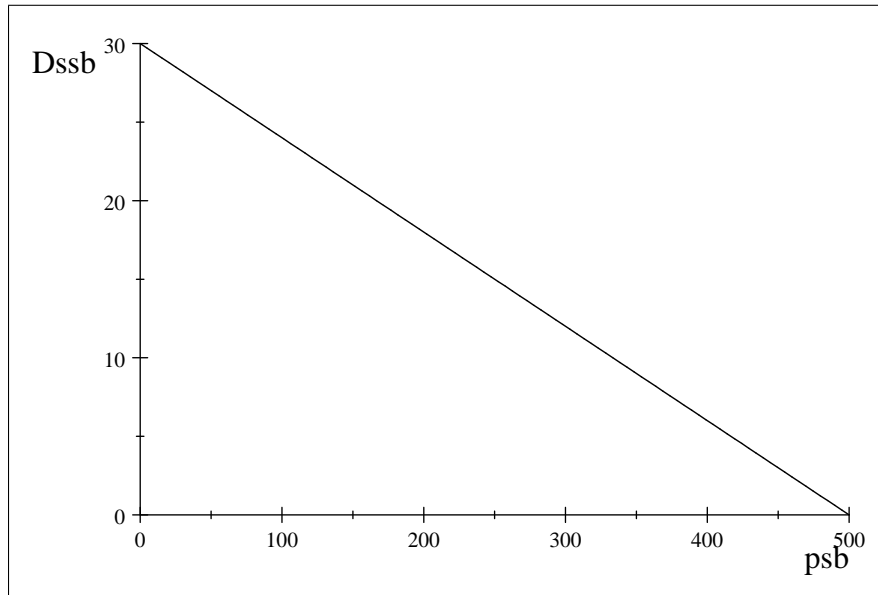
How many days will the individual ski if it cost nothing to ski at SB or Vail and last year SB got 500 inches of snow?

How many fewer days will the individual ski SB if the cost of skiing SB increases by \$50/day?

Graph the demand function with  $D_{ssb}$  on the vertical axis and  $p_{sb}$  on the horizontal axis, assuming  $snow_{sb} = 300$  and  $p_{vail} = 100$

In this case the demand function is

$$D_{ssb} = 20 + .03(300) - .06p_{sb} + .01(100) = 30.0 - 0.06p_{sb}$$



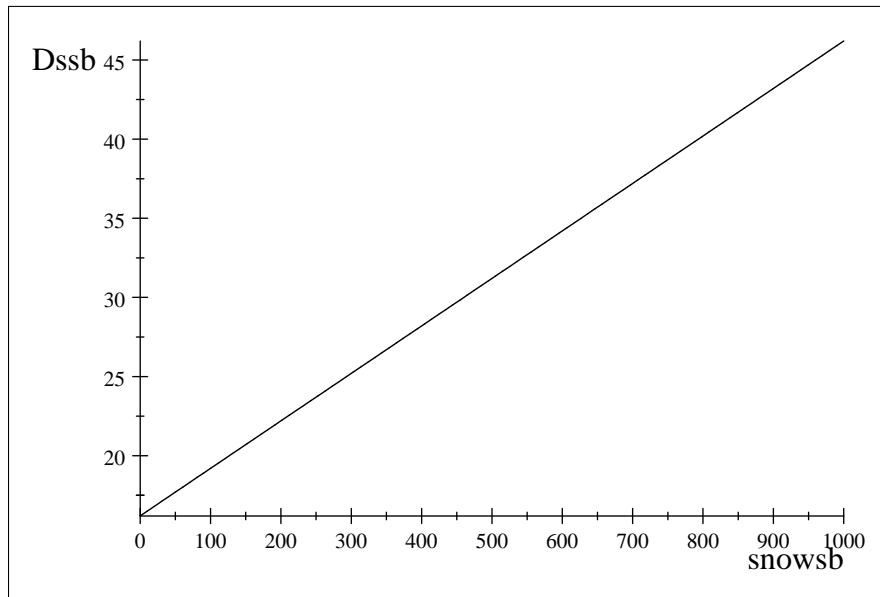
$D_{ssb}$  as a function  $p_{sb}$  assum.  $snow_{sb} = 300$  and  $p_{vail} = 100$

Could I have graphed this function if I had not specified  $snow_{sb}$  and  $p_{vail}$ ?  
No.

Figure out exactly how this graph is affected if  $snow_{sb}$  400 inches rather than 300 inches. If  $p_{vail}$  is \$120 rather than \$100.

Now graph the demand function with  $D_{ssb}$  on the vertical axis and  $snow_{sb}$  on the horizontal axis, assuming  $p_{sb} = 80$  and  $p_{vail} = 100$

$$D_{ssb} = 20 + .03(snow_{sb}) - .06(80) + .01(100) = 16.2 + 0.03snow_{sb}$$



$D_{ssb}$  as a function of  $snow_{sb}$  assum.  $p_{sb} = 80$  and  $p_{vail} = 100$

What does this demand function (demand as a function of snowfall) tell us?

What would this curve do if  $p_{sb}$  increased from \$80 to \$120?

Now graph the original demand function,  $D_{ssb} = 30.0 - 0.06p_{sb}$  but with \$ on the vertical axis and ski days on the horizontal axis.

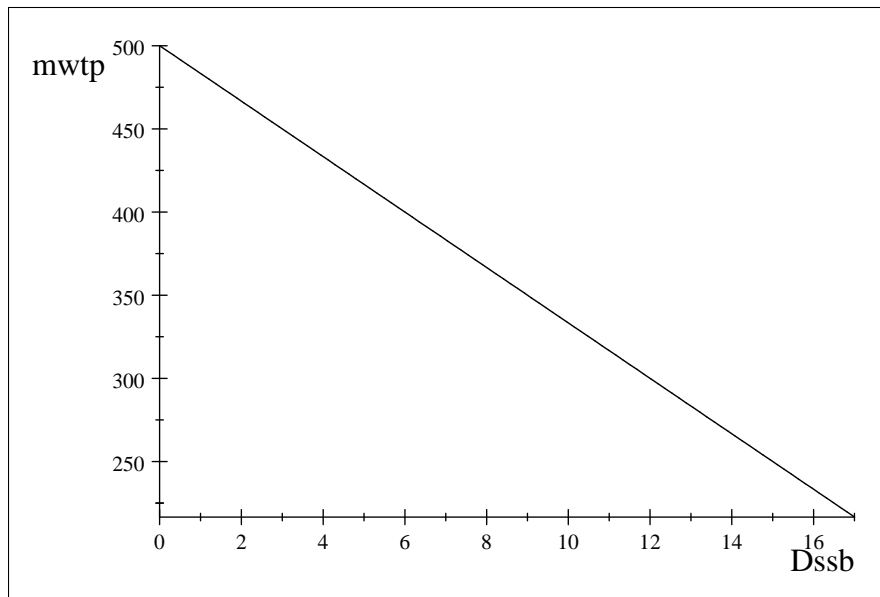
(flip the paper)

if  $D_{ssb} = 30.0 - 0.06p_{sb}$  then solving for  $p_{sb}$   
 $p_{sb} = 500.0 - 16.667D_{ssb}$  -price as a function of quantity rather than quantity as a function of price.

Written this way, the demand function is often called the "inverse demand function" or the *mwtp* (marginal *wtp* function)

The individual would pay for \$500 for the his first SB ski but  $500 - \$16.667$  for his second ski day and  $500 - \$16.667 - \$16.667$  for his third SB ski day.

Graphing the inverse demand function



mtwp for additional SB ski day as a function of SB ski days.

How would this curve shift is  $snow_{sb}$  decreased from 300 to 100?

When you are through with these notes you should be able to graph  $D_{ssb}$  or  $p_{sb}$  as function of any of the other variables, and be able to figure out how that graph would shift is something not graphed changes value.