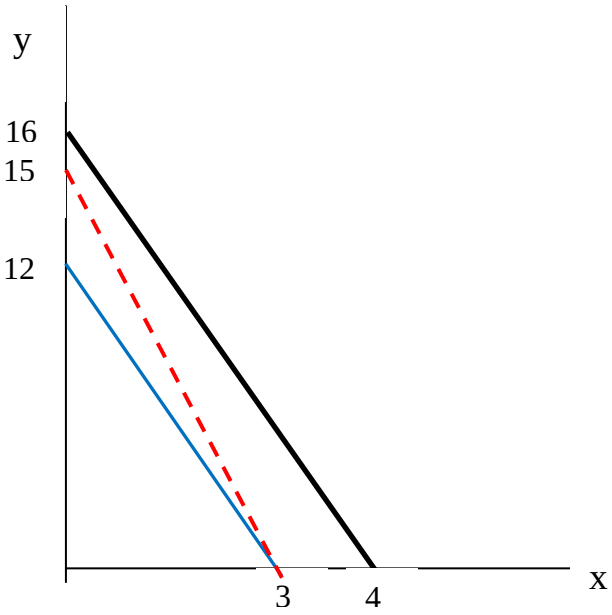
UNIVERSITY OF WISCONSIN

Economics 101 – Spring 2007

Professor Brown

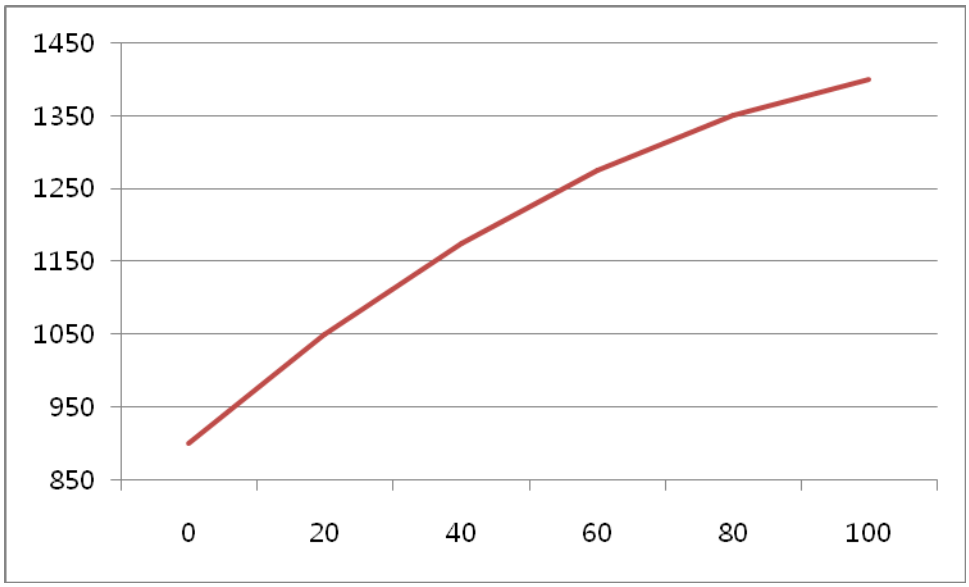
Problem Set 1 Answer Key

1.



a) y =15-5x is represented by the red dotted line above.
b) The slope of y =15-5x is the coefficient on x: -5. The vertical intercept is 15. If x were on the vertical axis the slope would be inverted – that is, the slope would be –1/5.
c) x and y are negatively related.
d) y =12 - 4x is represented by the blue line above.
e) The slope of y =12 - 4x is –4. This line is flatter than the first.
f) These two lines cross where x = 3 and y = 0. You can solve the two equations simultaneously by setting them equal to one another and solving for x, then substituting the value of x into either of the original equations to find the value for y.
g) y=16 – 4x. is represented by the bold black line.

2. A survey of high school students generated the following data.



a) above.
b) The slope of the relationship between hours spent studying and SAT score in the range of 40 to 60 hours is 5 (rise is 100, run is 20).
c) The slope decreases as the time spent studying increases. This means that as you study more, the incremental increase in SAT score falls. Later in the semester, we will come to know this as *decreasing returns* to studying.
d) Increasing from a 1175 to a 1275 will require an additional 20 hours/week of studying. Stephanie's parents will need to compensate her for those 20 hours each week at a cost of $10/hr. Thus, they must pay her $200/week.
e) The increase from a 1275 to a 1350 will require an additional 20 hours/week of studying. This will cost Stephanie's parents $200 *more* each week.

3. Recall, a newspaper, *USA-Yesterday*, prints the same number of pages every day. Readers like the news and photographs in the paper, but dislike advertising. As a result, as the number of pages devoted to ads increases, the number of readers declines. This relationship is described by the equation R=140-5A, where R is the number of readers (in thousands) and A is the number of pages of advertising.

   a) The number of readers hit zero when A=28. (Find this by substituting R = 0 into the equation above and solving for A.)
   b) Since the number of readers is declining in A, R is maximized when A=0 (at which point there will be 140,000 readers).
   c) To solve the 2 equations simultaneously, substitute A=R/2 into the first equation and solve for R*. Then using the known value for R, substitute back into A=R/2 to find A*.

$$R = 140 - 5(R/2)$$
$$2R = 280 - 5R$$
$$7R = 280$$
$$R^* = 40$$

$$A = R/2$$
$$A^* = 40/2$$
$$A^* = 20$$