

**Principles of Microeconomics – Econ1014**  
**Week 1 Homework Assignment (non-mandatory)**

**Basic Math and Graphing Review and Opportunity Cost**

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*Please complete this and turn it in to the TA at the classroom door at the start of class on Wednesday, September 3<sup>rd</sup>, if you wish it to be grade for extra credit. It will be available to be picked up and you can review it with a TA by Tuesday of the following week.*

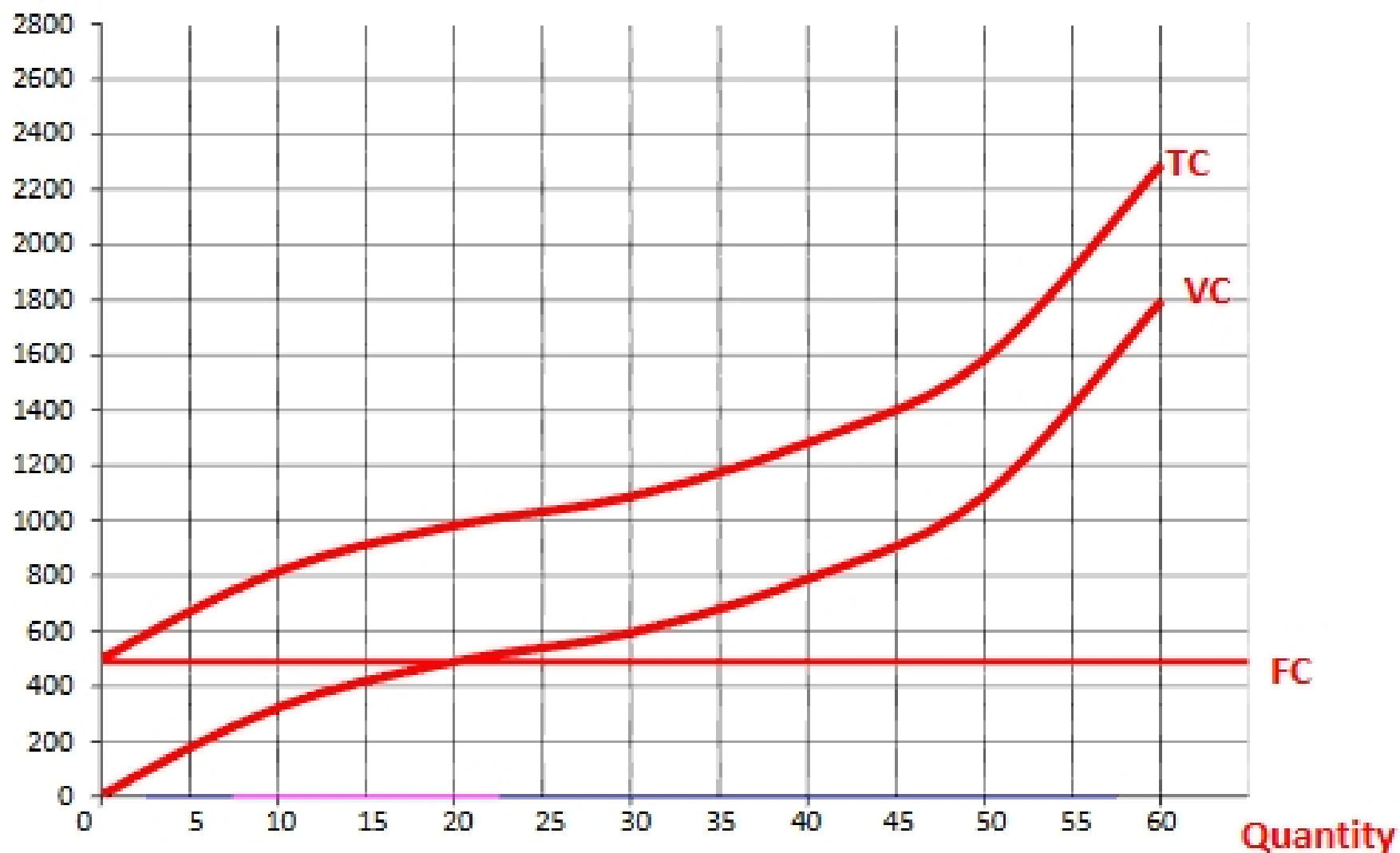
**1. Graphing**

One of the models we will deal with in this course this semester involves finding the relationship between production levels and the amount spent by a firm. Some firm spending is fixed; these costs don't vary with the level of production and are called fixed costs. Some firm spending is variable; these costs change or vary with the level of production; these are called variable costs. Suppose the following tables give possible production levels for a firm (Q) and the fixed cost (FC), variable cost (VC) and total cost ( $TC=FC+VC$ ) of producing each of these production levels, measured in U.S. dollars.

a. Plot the following points that show these cost relationships, connecting the points for each together with a smooth line and labeling them as FC, VC or TC. Don't forget to label your axes as well.

Q	FC	VC	TC
0	500	0	500
10	500	300	800
20	500	500	1000
30	500	600	1100
40	500	800	1300
50	500	1100	1600
60	500	1800	2300

U.S. \$'s



b. How much is the firm spending on fixed inputs, variable inputs and how much is it spending in total if it produces 50 units of output?

FC=\$500      VC=\$1100      TC=\$1600

c. If the firm has only \$1200 available to spend, what is the most it can produce?

Q=35 units

d. How much extra money does the firm spend on fixed inputs when it decides to increase its production from 10 units to 20 units?

Fixed cost does not increase; this is why it is called fixed cost

e. Calculate the slope of the fixed cost curve between 10 and 20 units. Does it matter which two points you choose on the FC curve to calculate the slope? Why or why not?

Slope = rise/run=(change in fixed spending)/(change in production)=0/10=0

It doesn't matter which two points we choose because the FC curve is a straight line and straight lines have a constant slope. The amount of fixed spending (the rise) is always the same regardless of how much we increase the production level (the run).

f. How much extra money does the firm spend on variable inputs when it decides to increase its production from 10 to 20 units?

Variable input spending rises by \$200 when production increases from 10 to 20 units.

g. Calculate the slope of the variable cost curve between 10 and 20 units. Does it matter which two points you choose on the VC curve to calculate the slope? Why or why not?

Slope = rise/run=(change in variable spending)/(change in production)=200/10=20

In this case it does matter which two points we choose because the variable cost curve is not a straight line so its slope is different at each point on the line; the increase in variable spending (the rise) is bigger between some production values (the run) than between some other production values.

h. When the firm increases production from 30 to 40 units, what is the percentage change in spending on fixed inputs?

Percentage change in fixed spending =  $(+\$0/500) \times 100 = +0\%$

i. When the firm increases production from 30 to 40 units, what is the percentage change in spending on variable inputs?

Percentage change in variable spending =  $(+\$200/600) \times 100 = +33\%$

j. When the firm increases production from 30 to 40 units, what is the percentage change in spending on all inputs?

Percentage change in total spending =  $(+\$200/1100) \times 100 = +18\%$

k. When the firm decreases production from 30 to 20 units, what is the percentage change in spending on fixed inputs?

Percentage change in fixed spending =  $(-\$0/500) \times 100 = 0\%$

l. When the firm decreases production from 30 to 20 units, what is the percentage change in spending on variable inputs?

Percentage change in variable spending =  $(-\$100/600) \times 100 = -16.7\%$

m. When the firm decreases production from 30 to 20 units, what is the percentage change in spending on all inputs?

Percentage change in total spending =  $(-\$100/1100) \times 100 = -9\%$