

An Extremely Brief (One Page) Review of Graphs and Terminology

Business Terms:

$P(q) = TR(q) - TC(q)$	$TC(q) = FC + VC(q)$
price = $p = AR(q) = \frac{TR(q)}{q}$	$TR(q) = pq$
$AC(q) = \frac{TC(q)}{q}$	$TC(q) = qAC(q)$
$AVC(q) = \frac{VC(q)}{q}$	$VC(q) = qAVC(q)$
$MC(q) = \frac{TC(q+\text{'one item'})-TC(q)}{\text{'one item'}}$	$MR(q) = \frac{TR(q+\text{'one item'})-TR(q)}{\text{'one item'}}$

Graphical Facts:

graphically	distance	water amount	$TC(q)$	$VC(q)$	$TR(q)$	stock value
slope of diagonal line	$ATS(t)$	NO NAME	$AC(q)$	$AVC(q)$	$AR(q)$	NO NAME
slope from y -intercept	$ATS(t)$	overall rate	NO NAME	$AVC(q)$	$AR(q)$	overall rate
slope of secant	$AS(t)$	rate of flow	$MC(q)$	also $MC(q)$	$MR(q)$	rate of change

Special note: When the increment is *small* on the graph, then the secant line looks like a tangent line that just touches the graph (as we discussed in class).

When asked to **find a slope or a rate**, then you put the ruler on the page, draw and extend out the line and use any two points to find the slope. Use points that are easy to read and far apart to be more accurate.

When **given a slope or a rate and you need to find a time or interval**, then draw a reference line! That is, draw a line with the given slope and use that line for reference. Then you slide the ruler parallel to the reference line until it forms a line on the graph that answers the desired question.

Profit is zero when $TR = TC$.

Profit is maximized where there is the largest vertical gap when TR is above TC . This always occurs at a quantity where the slope of the tangent to TR matches the slope of the tangent to TC (in other words, this is when $MR = MC$).

Break Even Price (BEP) is the lowest market price for which it is possible to make a profit greater than or equal to zero for some quantity. If the price is above BEP, then positive profit is possible. It is the slope of the lowest diagonal line that touches the TC graph.

Shutdown Price (SDP) is the lowest market price for which it is possible to recover some fixed costs for some quantity. If the price is above SDP, then it is possible to recover some fixed costs. It is the slope of the lowest diagonal line that touches the VC graph.

Increments or Rates Graphs:

When you see a graph gives incremental or rate information first **PUT AWAY YOUR RULER** then **read the description carefully!**

Ask yourself: Is each value talking about the next or previous interval? What are the definitions/formulas for what is given? Once you understand the graph, it might help to make a table of the first few values.

In particular, you should know well how to read and interpret a picture that gives AC , AVC , MC , and MR graphs. In this case, it is important to remember that $TC(q) = qAC(q)$ and $VC(q) = qAVC(q)$. And you should know how to find BEP, SDP, and the quantity that maximizes profit by looking at these graphs. In particular, you should know that BEP is the lowest value of $AC(q)$ (which is also the value where AC intersects MC) and you should know that SDP is the lowest value of $AVC(q)$ (which is also the value where AVC intersects MC). And you should know that profit is maximized at the quantity at which you switch from $MR > MC$ to $MR < MC$.