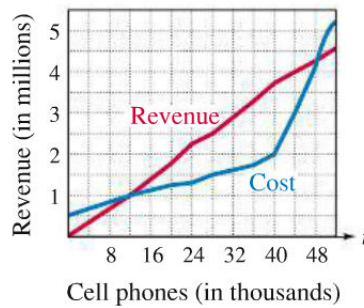


Graph Reading

EXAMPLE: Monthly revenue and costs for the Webster Cell Phone Company are determined by the number t of phones produced and sold, as shown in the Figure below.



(a) How many phones should be produced each month if the company is to make a profit (assuming that all phones produced are sold)?

Solution: Recall that

$$\boxed{\text{Profit} = \text{Revenue} - \text{Cost}}$$

So the company makes a profit whenever revenue is greater than cost — that is, when the revenue graph is above the cost graph. The Figure above shows that this occurs between $t = 12$ and $t = 48$ — that is, when 12,000 to 48,000 phones are produced. If the company makes fewer than 12,000 phones, it will lose money (because costs will be greater than revenue.) It also loses money by making more than 48,000 phones. (One reason might be that high production levels require large amounts of overtime pay, which drives costs up too much.)

(b) Is it more profitable to make 40,000 or 44,000 phones?

Solution: On the revenue graph, the point with first coordinate 40 has second coordinate of approximately 3.7, meaning that the revenue from 40,000 phones is about 3.7 million dollars. The point with first coordinate 40 on the cost graph is $(40, 2)$, meaning that the cost of producing 40,000 phones is 2 million dollars. Therefore, the profit on 40,000 phones is about $3.7 - 2 = 1.7$ million dollars. For 44,000 phones, we have the approximate points $(44, 4)$ on the revenue graph and $(44, 3)$ on the cost graph. So the profit on 44,000 phones is $4 - 3 = 1$ million dollars. Consequently, it is more profitable to make 40,000 phones.