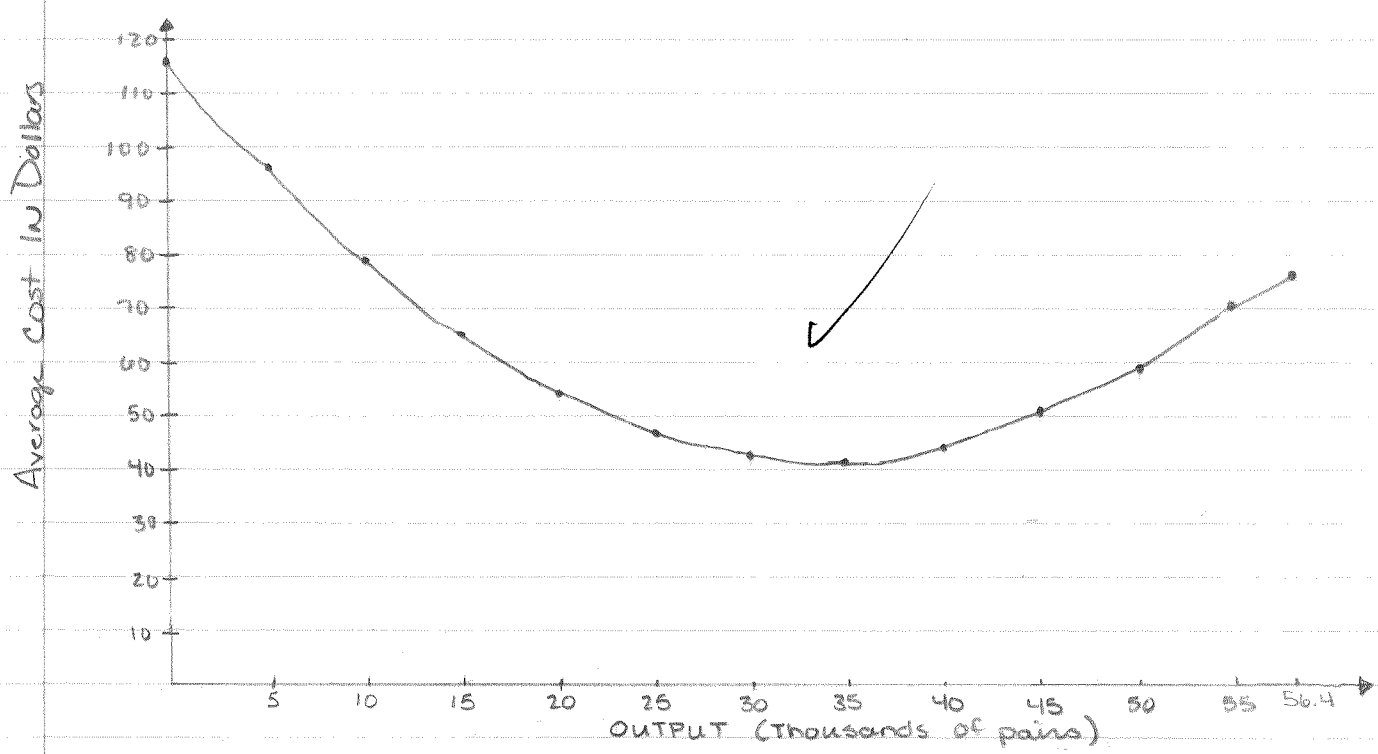
2.4

48. Cost Curve. Dean [5, page 340] made a statistical estimation of the average-cost-output relationship for a shoe chain for 1938. He found that if x is the output in thousands of pairs of shoes and y is the average cost in dollars, y was given approximately by $y = 0.0648x^2 - 4.3855x + 116.67$. Graph on graphing calculator using screen dimensions $[0, 56.4]$ by $[0, 120]$. Have calculator find the approximate derivative when x is 18, 27, 36, 42 and 48 using the dy/dx operation. Note slope and relate this to the rate of change. Based on this model, describe what happens to the rate of change of average cost as output increases.



Approximate derivative:

$x = 18$ $dy/dx \approx -2.0527$

$x = 27$ $dy/dx \approx -0.8863$

$x = 36$ $dy/dx \approx 0.2801$

$x = 42$ $dy/dx \approx 1.0577$

$x = 48$ $dy/dx \approx 1.8353$

After looking at the slope found at each point and comparing it to the rate of change, I notice that the rate of change is ~~greater~~ less between [18, 27] and [27,3 than between [36, 42] and [42, 48

Based on this model as the output increases the rate of change of average cost ~~decreases~~ increases