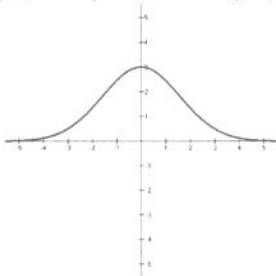


MATH 140: Quiz 2

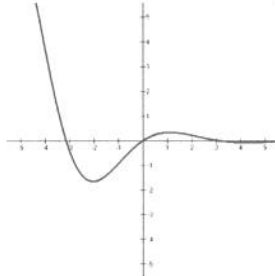
Name: *Ans Key*

#1 (8 points) Match the graph of the function with the graph of its derivative.



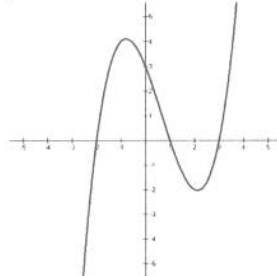
(i)

E



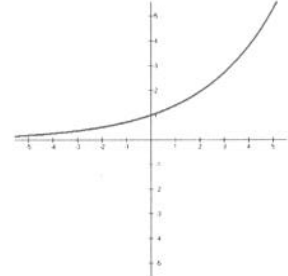
(ii)

B



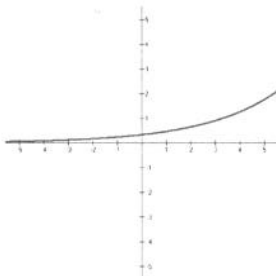
(iii)

F

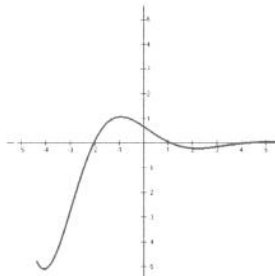


(iv)

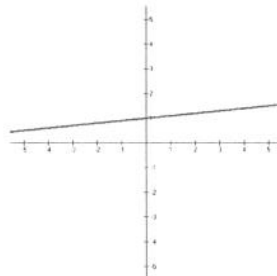
A



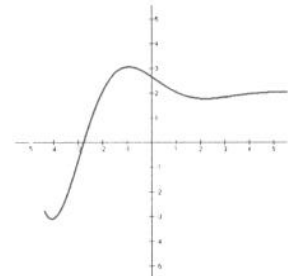
(A)



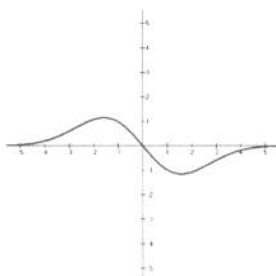
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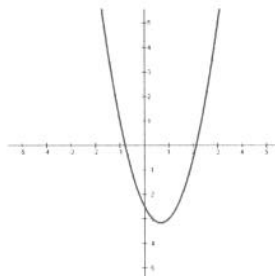
(C)



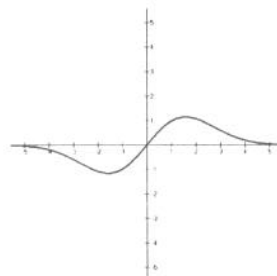
(D)



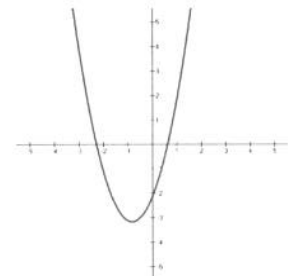
(E)



(F)



(G)



(H)

#2 (5 points). Given that $f(5) = 300$ and $f'(5) = 6$, give the equation of the line that locally approximates $f(x)$ near $x = 5$.

$$\begin{aligned} (y - y_0) &= f'(x_0)(x - x_0) \\ \Rightarrow (y - 300) &= 6(x - 5) \\ \Rightarrow y &= 6x + 270 \end{aligned}$$

#3 Given the following data, where $C(q)$ and $R(q)$ are cost and revenue functions, respectively, of the quantity, q , produced:

q	10	20	30	40	50	60
$C(q)$	100	120	130	135	145	160
$R(q)$	60	100	135	145	150	153

a. (4 points) Estimate the marginal cost and marginal revenue at $q = 30$.

$$MC \approx \text{Average of } \frac{135 - 130}{10} = \frac{1}{2} \text{ \& } \frac{130 - 120}{10} = 1 \Rightarrow MC = .75$$

$$MR \approx \text{Average of } \frac{145 - 135}{10} = 1 \text{ \& } \frac{135 - 100}{10} = 3.5 \Rightarrow MR = 2.25$$

b. (2 points) If the company is currently producing 30 units, should it produce less, the same amount, or more? Why?

More since $MR > MC$

c. (2 points) Over the interval from 10 to 60, is $\frac{d^2R}{dq^2}$ positive, negative, or zero? Why?

negative since the rate of change of R is slowing down.