

6. [13 points] Some values of the function $f(x)$, its derivatives, and second derivatives are given in the table below. Assume for all positive integers n that $f^{(n)}(x)$ is continuous for all real numbers x .

x	-2	0	2	4	6
$f(x)$	1	2	0	1	2
$f'(x)$	3	2	1	0	-2
$f''(x)$	-3	-2	0	2	1

Using the information given above, find the following. Be sure to show all of your work. Your answers should not involve the letter f , but you do not need to simplify them.

a. [4 points] Find $\int_{-2}^2 f'(x)f''(x) dx$.

Answer: _____

- b. [3 points] Find the second degree polynomial that best approximates $f(x)$ near $x = 6$.

$f(x) \approx$ _____

c. [3 points] Find $\lim_{x \rightarrow 0} \frac{f(x) - 2 + x^2}{x}$

The limit is _____

- d. [3 points] Find the approximate value of $\int_{-2}^6 x^2 f(x) dx$ using MID(2).

$\int_{-2}^6 x^2 f(x) dx \approx$ _____