

(B)

Solutions

MATH 1231 Quiz 8 (A) (50pts)
Fall 2014

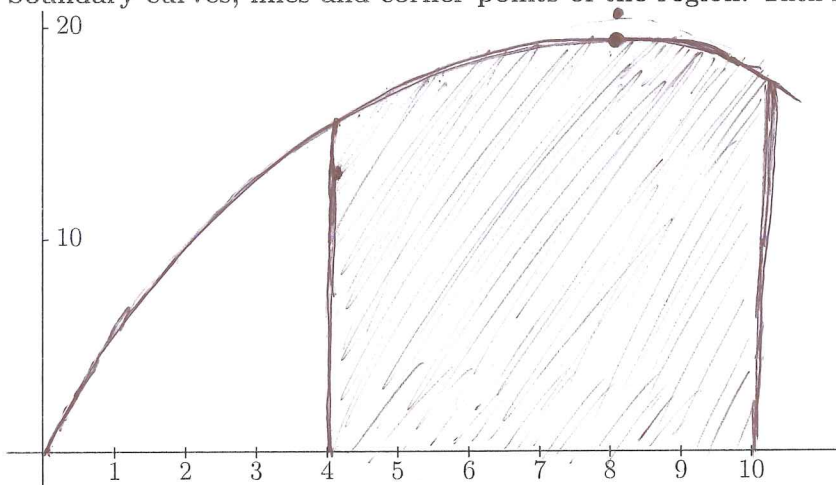
Name: _____

1. (6 points) Suppose that $f'(x) = h(x)$ for all x , and $f(3) = -7$, $f(7) = 10$, $h(3) = 5$ and $h(7) = 9$. Calculate $\int_3^7 h(x) dx$.

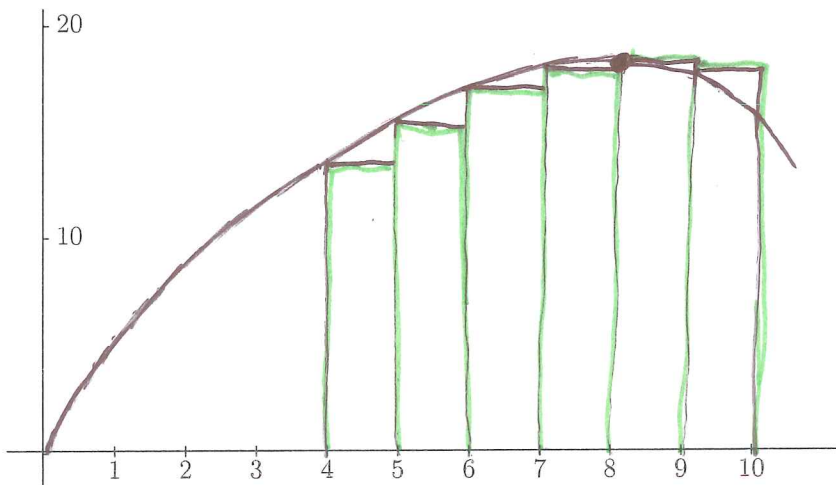
$$\int_3^7 h(x) dx = f(7) - f(3) = 10 - (-7) = 17$$

2.

- (a) (4 points) Sketch the region whose area is given by the definite integral: $\int_4^{10} \left(4x - \frac{x^2}{4}\right) dx$. Label the boundary curves, lines and corner points of the region. Then shade the region.



- (b) (8 points) Estimate the area (in square units) of the region in part a) using the 6 left rectangles approximation. Show all work including a sketch clearly shows the 6 left rectangles and give the exact answer.



$$\Delta X = \frac{10-4}{6} = 1$$

x	$f(x)$
4	12
5	13.75
6	15
7	15.75
8	16
9	15.75

$$\begin{aligned} \text{Area} &= (12 + 13.75 + 15 + 15.75 + 16 + 15.75) \times 1 \\ &= 88.25 \end{aligned}$$

Solutions

In problems 2 and 4, evaluate the given integral. (Do not use fnInt.) Give numerical answers to four decimal places. Show all work. Use your calculator only to perform basic arithmetic.

3. (8 points) $\int_{-2}^0 (12x^2 + 4x + 1) dx$

$$= 4x^3 + 2x^2 + x \Big|_{-2}^0 = 26$$

4. (8 points) $\int_2^4 \left(\frac{3}{x} - 3e^{-x} \right) dx$

$$= 3 \ln x + 3e^{-x} \Big|_2^4 = 1.7284$$

5. (8 points) $\int_1^4 \frac{d}{dx} (16x^{-4} + 4) dx$

$$= 16x^{-4} + 4 \Big|_1^4 = -15.9375$$

6. (8 points) Let $s(t) = 3.01(1.5)^t$ be the rate of change of the number of sports utility vehicles (SUVs) sold in the United States in millions of SUVs per year, t years after 1988. Find the value of integral: $\int_5^8 s(t) dt$.
~~SUV's sold, light trucks, value of exports (billions of dollars per year)~~

$$\int_5^8 3.01(1.5)^t dt = \frac{3.01(1.5)^t}{\ln(1.5)} \Big|_5^8 = 133.8853$$

million of SUVs