

Assignment 523 – Recommended Review and AP Questions

For the following exercises, find $f'(x)$ for each function.

331. $f(x) = x^2 e^x$

332. $f(x) = \frac{e^{-x}}{x}$

333. $f(x) = e^{x^3 \ln x}$

334. $f(x) = \sqrt[3]{e^{2x} + 2x}$

335. $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

340. $f(x) = \ln(4x^3 + x)$

341. $f(x) = \ln\sqrt{5x - 7}$

342. $f(x) = x^2 \ln 9x$

In Exercises 77–80, find the average value of the function over the interval.

<u>Function</u>	<u>Interval</u>	<u>Function</u>	<u>Interval</u>
77. $f(x) = \frac{8}{x^2}$	$[2, 4]$	78. $f(x) = \frac{4(x + 1)}{x^2}$	$[2, 4]$

In Exercises 77–82, locate any relative extrema and inflection points. Use a graphing utility to confirm your results.

$$77. y = \frac{x^2}{2} - \ln x$$

$$78. y = x - \ln x$$

$$79. y = x \ln x$$

$$80. y = \frac{\ln x}{x}$$

$$81. y = \frac{x}{\ln x}$$

$$82. y = x^2 \ln \frac{x}{4}$$

In Exercises 61–64, find $F'(x)$.

$$61. F(x) = \int_1^x \frac{1}{t} dt$$

$$63. F(x) = \int_x^{3x} \frac{1}{t} dt$$

Area In Exercises 67–70, find the area of the region bounded by the graphs of the equations. Use a graphing utility to graph the region and verify your result.

$$67. y = \frac{x^2 + 4}{x}, x = 1, x = 4, y = 0$$

359. [T] The population of Toledo, Ohio, in 2000 was approximately 500,000. Assume the population is increasing at a rate of 5% per year.

- a. Write the exponential function that relates the total population as a function of t .
- b. Use a. to determine the rate at which the population is increasing in t years.
- c. Use b. to determine the rate at which the population is increasing in 10 years.

360. [T] An isotope of the element erbium has a half-life of approximately 12 hours. Initially there are 9 grams of the isotope present.

- a. Write the exponential function that relates the amount of substance remaining as a function of t , measured in hours.
- b. Use a. to determine the rate at which the substance is decaying in t hours.
- c. Use b. to determine the rate of decay at $t = 4$ hours.