Assignment 1

Name

Show all your work on separate paper.
Please do not try to fit your work into the margin of this page.

Find the slope of the graphs of the following equations: 1.

$4y + 10 = 3x - 8$

2. $8x + 3y = 14$

Find the roots of the following:

3. $5x^2 + 9x - 2 = 0$

4. Show that $\frac{\sin \theta \cot \theta}{\sqrt{1-\sin^2 \theta}} = 1$ for $-\frac{n}{2} \leq \theta \leq \frac{n}{2}$

5. Show that $\cos \theta \sin(\frac{n}{2} + \theta) - \sin \theta \cos(\frac{n}{2} + \theta) = 1$ (use the formulas for the sums of angles)

For numbers 6 and 7, do not use a calculator. 6.

Find $[(0.001)^6]^{-1/3}$

7. Express $\log(x^{2s})^3$ in terms of log x

x	log x	x	log x
1	0.00	5	0.70
2	0.30	7	0.85
3	0.48	10	1.00

For the following questions, make use of the log table above to evaluate the logs. Do not use the log function of your calculator. Show the steps to get your answer. For example, to calculate log $\sqrt{10}$ (Review Problem 16 on page 246) you would write:

$$\log \sqrt{10} = \log((10)^{1/2}) = (1/2) \log 10 = 0.5$$

8. log 350

9. $\log 15^{5/2}$

10. log 81

Assignment 2 Name

Show all your work on separate paper.
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Find the following limits, if they exist. If there is no limit or if the limit is ±∞ then say so.

1. $\lim_{s\to 3} \frac{s^2+s-12}{s-3}$

2. $\lim_{s\to\infty} \frac{1}{s-1}$

3. $\lim_{s\to\infty} \frac{4s^3+s}{5s^2-s^3}$

Questions 4 & 5: An object moves so that its position is given by $S = at^4 + bt^2 + ct + d$ from time 0 to time T where *a, b, c,* and *d* are constants.

4. Write an expression for the *average* velocity of the particle from $0 < t < T$ in terms of T and the given constants.

5. Write an expression for the *instantaneous* velocity of the particle at $t = T$ in terms of T and the given constants.

Find the derivative of each of the following functions with respect to its appropriate variable.

6. $y = (x+ 8x^3)^{-2}$

7. $f = \cos\frac{\sqrt{2}}{8}$

8. $y = \cos(e^{2s})$

9. $v = t^3 \ln 2t$

10. Find $\frac{d}{ds}(x^3 - e^{-2s})$

Name

Question 11 – 15: For the function $y = 4x^2 — 3x + 7$

11. What is the first derivative of the function?

12. Determine where the local maximum or minimum occurs.

13. Determine the value of the local maximum or minimum.

14. What is the second derivative of the function?

15. Is the value found in 13. a maximum or minimum?

Assignment 3 (Challenge Assignment)

Name

Show all your work on separate paper.
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Evaluate the following indefinite integrals. Do not forget to include the constants of integration. Most of these integrations require the change of variable method.

1. $\int \cos 3x \, dx$

2. $\int \frac{ds}{(s+2)^2}$

3. $\int \cos^2 8 \sin 8 \, d8$

Evaluate the following definite integrals.

4. $\int_{-3}^{+3} (e^s + e^{-s}) \, dx$

5. $\int_{-0}^{+5} \frac{x \, dx}{\sqrt{4+ x^2}}$

6. $\int_{0}^{g/2} \sin 8 \cos 8 \, d8$

7. $\int_{0}^{7} (3+ 2x^2 + x^3) \, dx$

Solve the following word problems. You may have to use intermediate equations for area or volume to make all terms agree before evaluating the definite integral.

8. Bob leaves for a trip at time $t = 0$ and drives with the speed described in the function below. Calculate the distance in miles Bob travels after 2 hours of this motion.

   ( ) ( ) $\overline{1}$

   v t = 60 mph — $_2$ t

9. Shauna starts painting at noon. She can paint $(140 – kt)$ square feet per hour, where t is the number of hours since she started painting and k is a constant accounting for the fact that Shauna slows down as she gets tired. If Shauna paints 100 square feet between 2pm and 3pm, what is k?

10. A water tank in the shape of a cone (point on top) is filled with water at a constant rate of 0.227 m^3 per minute. The tank's base has a radius of 2.0 m and a height of 5.0 m. How much time in minutes will it take to increase the water level from 1.0 m high to 4.0 m high?