Name: _____ **Exam 2 - Form B**

Math 162, Intro to Math Methods and Applications – Crawford **09 November 2016**

- You may use the given formula sheet. Books or other notes (in any form) are not allowed.
- You may use a calculator, but you must show work for credit.
- ***Show all your work*** – partial credit may be given for written work.
- Clearly indicate your answers.
- Good Luck!

Calculator Number: ☐

	Score
1	/5
2	/10
3	/5
4	/10
5	/12
6	/12
7	/10
8	/12
9	/12
10	/5
11	/10
Total	/100

1. (5 pts). Find the sum of the first 98 terms of an arithmetic sequence with first term 6 and common difference $\frac{1}{2}$.

2. (10 pts). Solve the following equations for x.

(a). $\ln(3x - 4) - \ln 2 = \ln 10$

(b). $9600 = 120(1.03)^x$

3. (5 pts). If \$3200 is invested for 6 months at an annual *simple* interest rate of 4%, what is the future value after 6 months?

4. (10 pts). What is the future value if \$5,000 is invested for 4 years at 3%

(a). Compounded quarterly?

(b). Compounded continuously?

5. (12 pts). An individual deposits \$200 at the end of each month into an account that earns 7.2%, compounded monthly.

(a). How much will be in the account at the end of 5 years?

(b). If the individual wants \$25,000 in the account at the end of 5 years, how big should the monthly payments be?

6. (12 pts). Develop an amortization schedule for a loan of \$10,000 with interest at 8.5%, compounded annually, if it is to be repaid in 3 years by making 3 annual payments of equal size.

Period	Payment	Interest	Balance Reduction	Unpaid Balance
	-	-	-	10000.00
1				
2				
3				

7. (10 pts). Find the following limits, if they exist. [Show work for credit.]

(a). $\lim_{x \to -1} \dfrac{9 + x^2}{-2x + 5}$

(b). $\lim_{x \to 4} \dfrac{x^2 - x - 12}{x^2 - 4x}$

8. (12 pts). Given $f(x) = 2 - 6x^2$, **use the limit definition** $\lim_{h\to 0} \dfrac{f(x+h) - f(x)}{h}$, to show that the derivative $f'(x)$ is $-12x$. **To help with this process complete the following steps:**

(a). **Step 1.** Write down $f(x)$.

(b). **Step 2.** Find and simplify $f(x + h)$.

(c). **Step 3.** Find and simplify $\dfrac{f(x+h) - f(x)}{h}$. [Clearly show all algebraic steps.]

(d). **Step 4.** Take the limit as $h \to 0$ of $\dfrac{f(x+h) - f(x)}{h}$.

For the remainder of the review sheet, use the DERIVATIVE FORMULAS, not the limit definition!

9. (12 pts). Given $f(x) = 2x^3 - 4x^2 - 5x - 4$,

(a). Find the derivative of $f(x)$.

(b). Find the equation of the tangent line to $f(x)$ at $x = 3$.

10. (5 pts). Find the derivative of $g(x) = \frac{5}{x^4} + 3\sqrt{x}$

11. (10 pts). The profit function for producing x units is given by $P(x) = 100x - 0.2x^2 - 5000$ in dollars. Find and interpret the marginal profit for $x = 200$ units.