Name:_____

Math M119 Section 22611 *Practice Exam 3* *April 15, 2010*

Follow the instructions for each question and show enough of your work so that I can follow your thought process. If I can't read your work or answer, you will receive little or no credit!

For problems 1-10, evaluate the definite or indefinite integral.

1. $\int (3x^8 - 6x^5 + 8x^2 - 1)\ dx$

2. $\int \frac{e}{z}\ dz$

3. $\int_{-3}^{3} 6e^{5r}\ dr$

4. $\int_{2}^{6} \left(\ln(e)v + \ln(1)\frac{1}{v^2}\right)\ dv$

5. $\int \left(w^2 - \frac{1}{\sqrt[3]{w}} \right) \, dw$

6. $\int_0^{\ln 8} e^x \, dx$

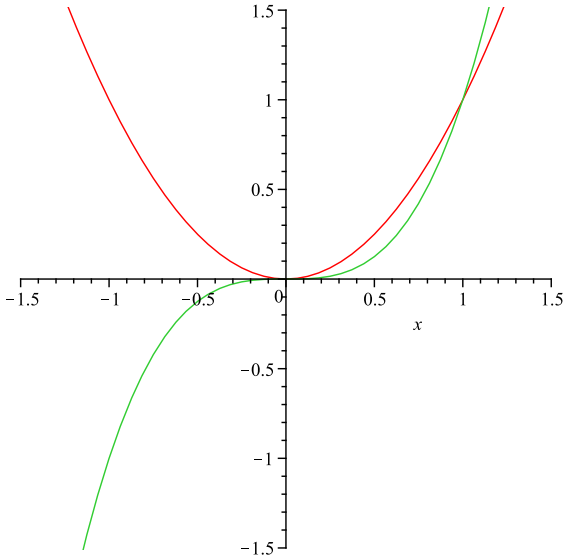
7. $\int \left(\sqrt[3]{t} + \frac{1}{t^4} \right) \, dt$

8. $\int_0^{\frac{1}{e}} e \, ds$

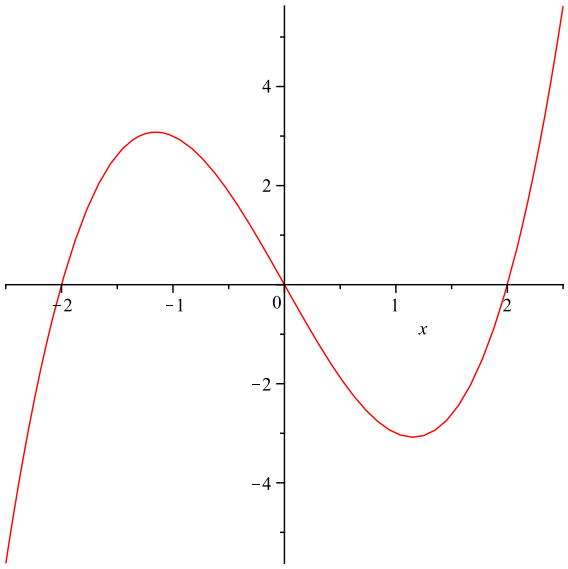
9. $\int_{-2}^{2} (3x^2 - 6)\ dx$

10. $\int \left(10x^9 - \frac{6}{x^2\sqrt{x}}\right)\ dx$

11. Find the area of the region bounded by the curves $y = x^2$ and $y = x^3$. Below is a graph for your convenience.



12. Find the (total) area of the region bounded by the curve $y = x(x^2 - 4)$ and the x-axis Below is a graph for your convenience.



13. Find the present value of an investment over 6 years period if there is a continuous money stream of \$4000 per year and the current interest rate is 8% compounded continuously.

14. At a time $t = 0$, a forest has 5000 acres of trees. A fire blazes over the forest and it grows at a rate of $5\sqrt[4]{t}$ acres per hour, where t is the number of hours since the fire started. How many acres of trees are left 36 hours later?

15. The water from a swimming pool is being pumped out of the pool at a rate of $50(1-e^{-0.1t})$ liters per minute, where t is the number of minutes since the pump started pumping. If the swimming pool initially contains 300,000 liters of water, how much water is left in the pool after 2 hours?

16. Suppose that $f(t) = e^{3t} - t^3$. Find an antidervative of $f(t)$. Call the antidervative $F(t)$.

17. Find the area under the curve $y = x - x^2$ between $x = 0$ and $x = 1$.

18. For Cap'n Jack Sparrow's Cannonball Co., the total cost in dollars to produce q cannonballs is $C(q)$. Fixed costs are \$20,000. The marginal cost is $C'(q) = 0.0002q^3 - 1.5q + 100$. Find the total variable cost to produce 60 cannonballs.

19. The planet Pandora is inhabited by the Na'vi. The population of Pandora is growing at a rate of $e^{.5t}$ Na'vi per year, where t is the number of years since the earthlings were expelled from the planet. If there were 50,000 Na'vi living on Pandora at the time of the expulsion of the earthlings, what is the population of Pandora 25 years later?