Math 132 Exam 3 Practice Test

- Exam 3 will be 18 questions (16 MC and 2 HG).
- Exam 3 will cover sections 7.3, 7.4, 7.5, 7.8, 4.4, 8.1, 8.2, 11.1, 11.2.
- You can download the formula sheet from the course homepage.

1. Find the best substitution for the integral

$$\int \left(3x^2 + 6x + 15\right)^{-3/2}\, dx$$

For your subsitution, what is $\sin 2\theta$?

2. Do long division:

$$\frac{2x^6 - x^5 + x^2 + 3x - 1}{x^5 - 1}$$

3. Find the correct partial fractions form for

$$\frac{x^5 + 2x + 1}{(x+1)^2(x^2+2x+5)^2}$$

4. Use partial fractions.

$$\int \frac{x^2 - x}{(x^2+2)(x-2)}\, dx$$

5. Find the limits.

   (a) $\lim_{x\to\infty} (1+2x)^{3x}$

   (b) $\lim_{n\to\infty} \left(1 + \frac{2}{n}\right)^{3n}$.

   (c) $\lim_{x\to 0} x \cdot (\ln x)^2$

6. Converge or diverge?

   (a) $\int_{-\infty}^{\infty} x\, e^{-x^2}\, dx$

   (b) $\int_{-\infty}^{\infty} x\, e^{x^2}\, dx$

   (c) $\int_{0}^{\infty} \frac{1}{x^5+1}\, dx.$

   (d) $\int_{\pi}^{8} \frac{1}{(x-\pi)^{2/5}}\, dx$

7. Set up an integral for arc length of $y = \arctan x$ on the interval $0 \leq x \leq 1$.

8. Take the curve $y = \arctan x$ on the interval $0 \leq x \leq 1$. Rotate this about the axis $x = 2$ and set up a surface area integral.

9. Find a curve with arc length given by:

$$L = \int_1^4 \sqrt{1 + \left(\frac{2x}{2 + x^2}\right)^2}\, dx$$

10. Find the sum, if possible.

$$\sum_{n=4}^{\infty} \frac{-6}{n^2 - n - 2}$$

11. Find the sum.

$$\sum_{n=2}^{\infty} \frac{5 \cdot 2^n 3^{2n}}{13 \cdot 5^{2n}}$$

12. Find the sum.

$$\sum_{n=5}^{\infty} \frac{5 \cdot 2^n 3^{3n}}{13 \cdot 5^{2n}}$$

13. Go back and compute all integrals, if possible. If impossible, justify why they are not possible to compute.