Chapter 8 Test No Calculators February 13, 2012 Name

1. **Evaluate** $\lim_{x \to 0^+} \cot(3x) \sin^{-1}\left(\frac{2x}{5}\right)$

2. **Evaluate** $\lim_{x \to 0^+} \frac{2e^{3x} - e^{-x}}{3x}$

3. **Evaluate** $\lim_{x \to 1} \frac{3 - 3x + 3\ln x}{\cos(2\pi x) - 1}$

4. **Evaluate** $\lim_{x \to \infty} \left(1 + \frac{1}{2x}\right)^{6x}$

5. A circular plate of radius 3 feet is partially submerged in water, to a height 2 feet above the center of the plate. If the water has a specific weight of $62.5 \frac{\text{lbs}}{\text{ft}^3}$ write an integral representing the force of the fluid on one side of the plate. Do not evaluate this integral.

6. It's rumored that, for his lecture tomorrow, DeRuiter will wear a cape and be suspended from the ceiling (that's one strange dude!). Assume that he weighs 190 pounds, and the cable suspending him weighs 3 pounds per linear foot. If the winch (or pulley) is suspended from the ceiling at a point 10 feet above the ground, find the work done in lifting him to a point 6 feet above the ground.

7. Evaluate $\int_0^{\infty} (\cos x)\left(2^{-x}\right)\, dx$

8. Evaluate $\int_{-\infty}^{0} \frac{3}{x^2 - 5x + 4}\, dx$

9. Evaluate $\int_{0}^{1} \frac{2x + 3}{\sqrt{1 - x^2}}\, dx$

10. Use the Direct Comparison Test or the Limit Comparison Test to determine if the following integral Converges or Diverges. Be sure to choose a related, simpler, p – value integral for comparison. $\int_{0}^{3} \frac{2 + x}{x^{\frac{9}{5}}}\, dx$

11. **Evaluate** $\int_{-3}^{0} \frac{1}{(x+1)^{\frac{5}{3}}}\,dx$

12. **Evaluate** $\int \frac{2x^3 - x^2 + 2x - 4}{x^4 + x^2}\,dx$