Math 141
Exam 2
March 2, 2016

Name_____

*no calculators or smart phones anywhere!
*show all relevant work to receive full credit
*any evidence of academic dishonesty = 0 grade
*only pencils, pens = - 5 from grade
*late for exam= - 5 from grade

If needed $\sin 2u = 2\sin u \cos u$

1. Find the indefinite integral: $$\int \frac{1}{\sqrt{x^2+4}}\,dx$$

2. Find the indefinite integral: $$\int \frac{x^2}{\sqrt{4-x^2}}\,dx$$

3. Find the partial fraction decomposition: $\dfrac{x^2+x+2}{x^2(x-2)}$

4. Find the partial fraction decomposition: $\dfrac{4x^2-5x+5}{(x-1)(x^2+1)}$

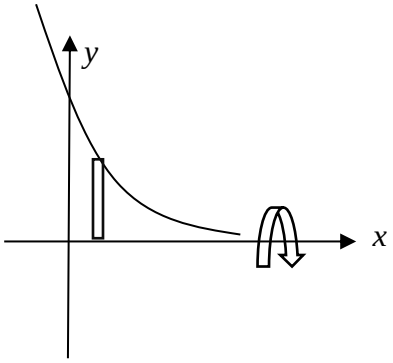
5. Find the limit, if it exists. $$\lim_{x\to 0}\left(\frac{e^{2x}-\cos x-2x}{x^2}\right)$$

6. Find the limit, if it exists. $$\lim_{x\to 0^+}(x\ln x)$$

7. Determine if the improper integral converges or diverges. If convergent find its value.

$$\int_{2}^{4} \frac{1}{\sqrt{16-x^2}}\,dx$$

8. Determine if the improper integral converges or diverges. If convergent, find its value.

$$\int_{-\infty}^{0} \frac{e^x}{1+e^x}\,dx$$

Bonus. If finite, find the volume of the solid generated by rotating the region bounded by the graphs of $y = e^{-2x}$, and the x-axis for $x \geq 0$ about the x-axis If the volume is not finite, support your conclusion.