Name:

Math 2

Practice Final Exam

1. Find the derivative of the function $f(x) = \int_2^{x^2} \cot(t)dt$.

2. Find $\int_1^2 x^4 dx$.

3. Let $F(x) = e^{x^2}$. Evaluate $\int_{-2}^1 F'(x)dx$.

4. Let $F(x) = \int \sin(x)\cos(x)dx$. Find the formula for $F(x)$ given that $F(\frac{\pi}{2}) = 2$.

5. Find $\int \frac{\sin(x)}{1+\cos^2(x)}dx$.

6. Find the area between the curves $y = x^2 - 2$ and $y = x$.

7. Use disks to find the volume of the solid obtained by rotating about the x-axis the region bounded by $y = 1 + \sqrt{x}$, $x = 4$, $x = 0$ and $y = 0$.

8. Use washers to find the volume of the solid obtained by rotating about the line $y = -1$ the region bounded by $y = 1 + \sqrt{x}$, $x = 4$, $x = 0$ and $y = 0$.

9. Use cylindrical shells to find the volume of the solid obtained by rotating about the y-axis the region bounded by $y = e^x$, $x = 5$,$x = 0$ and $y = 0$.

10. A spring has natural length 10 cm. If a 30 N force is required to keep it stretched to a length of 15 cm, how much work is required to stretch it from 10 cm to 13 cm?

11. Find the average value of the function $h(x) = \frac{2}{x^2-1}$ on the interval $[3, 4]$.

12. Use integration by parts to find $\int (\ln(x))^2 dx$.

13. Find $\int \sec^4(x)\tan^4(x)dx$.

14. Use trigonometric substitution to find $\int \frac{x^3}{\sqrt{1+x^2}}dx$.

15. Use partial fractions to find $\int \frac{3x+2}{x^3-4x^2+4x}dx$.

16. Find $\int \sin^2(x)dx$.

15. Find $\int \frac{x-1}{x^2-6x+5}dx$.