MATH 2460 EXAM 1

NAME_____ **GRADE** _____-OUT OF **15 PTS**

Answer the following questions correctly for a full credit. **NO DECIMAL**.

1. (**2pts**) Find the volume of the solid formed by revolving the graph of $y = \sqrt{4 - x^2}$ about the $x-$axis. (**Show** your work clearly)

2. (**1pt**) **Choose ONE** of the following questions:(Either (a) OR (b) and clearly **show** your work!)

   (a) Evaluate $\dfrac{d}{dx}\displaystyle\int_{x^2}^{3} \sin(t^2)\, dt$

   (b) Find $F'(x)$ when $F(x) = \displaystyle\int_{x}^{x^2+4} \tan^2(t)\, dt$

3. (**2pts**) **Choose ONE** of the following questions:(Either (a) OR (b) and clearly **show** your work)

Consider the region R_1 which is bounded by the curve $y = \sqrt{x}$ and the lines $x = 2$ and $y = 0$ to answer the following either question (2pts).

(a) Use the disk/washer method to **set up** the integral that gives the volume of the solid formed by revolving the region R_1 about:

i. x–axis ii. y–axis iii. line $x = 2$ iv. line $x = 4$

(b) Use the shell method to **set up** the integral that gives the volume of the solid formed by revolving the region R_1 about:

i. x–axis ii. y–axis iii. line $x = 2$ iv. line $x = 4$

4. (**1pt**) Find the area of the region bounded by $y = \sin x$ and $y = \cos x$ from $x = \pi/4$ to $x = 5\pi/4$.

5. (**2pts**) Find the volume of the solid generated by rotating the region bounded by $y = x^2 + 1,\ y = 0,\ x = 0,\ x = 1$ about the y–axis using:

   (a) the disk/washer (b) shell method. Which one is preferable?

6. (**1pt**) Evaluate $\int_1^2 \frac{1}{x}\, dx$

7. (**1pt**) Find the indefinite integral $\int 2x \cos(x^2)\, dx$

8. (**3pts**) Use the Trapezoidal Rule and Simpson's Rule to approximate the value of the definite integral for $n = 2$. Round your answers to *four decimal places* and compare the results with the exact value of the definite integral. $\int_0^2 \sqrt{x}\, dx$ (**show** your work!)

   (a) Trapezoidal Rule

   (b) Simpson's Rule

   (c) Exact value

9. (**1pt**) Find the general solution of the differential equation and check the result by differentiation. (Use C for the constant of integration.) $\dfrac{dr}{d\theta} = 2\pi$.

10. (**1pt**) Solve the differential equation. $f'(x) = x^2 + 3,\ f(1) = 0$