Math 182 Quiz 3 Version A

1. A cylindrical hole of radius x is bored through a sphere of radius R in such a way that the axis of the hole passes through the center of the sphere. Find the value of x that maximizes the complete surface area of the remaining solid.

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2. State the Fundamental Theorem of Calculus Part II.

3. State the definition of $\sinh t$ in terms of exponential functions.

4. Use the quadratic formula and logarithms to solve for $t = \sinh^{-1}(s)$.

5. Solve the following indefinite integrals:

(i) $\displaystyle\int x\sqrt{2x+7}\,dx$

(ii) $\displaystyle\int x\ln(2x)\,dx$

(iii) $\displaystyle\int \frac{1}{x^2+9}\,dx$

(iv) $\displaystyle\int \sqrt{9-x^2}\,dx$

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6. Find the length of the curve given by $y = \frac{1}{3}\sqrt{x}(3 - x)$ between $x = 0$ and $x = 3$.

7. Find the area of the surface of revolution generated by revolving the curve $y = x^2$ between $x = 0$ and $x = 2$ about the y-axis.