

1. The Laplace Transform Form $F(s)$ is defined as; (20 pt.)

$$F(s) = e^{-2s} \cdot \frac{s^3 + 2s^2 - 2s - 1}{2s^4 + 2s^3 + 2s^2 - 2s - 4}$$

Please find out the function of $f(t)$ =?

2. Please prove that the volume (V) and surface area (A) of a sphere with radius R equal to (20 pt.)

$$V = \frac{4}{3}\pi R^3 \quad \text{and} \quad A = 4\pi R^2$$

3. Please calculate the following Jacobian Coefficients between (X, Y, Z) coordinate and Spherical Coordinate (r, θ, Φ).

(a) $J = \left| \frac{\partial(X, Y, Z)}{\partial(r, \theta, \Phi)} \right|$ (10 pt.)

(b) $J = \left| \frac{\partial(r, \theta, \Phi)}{\partial(X, Y, Z)} \right|$ (10 pt.)

4. Assume that the density function $p(x)$ is defined as

$$p(x) = C \cdot e^{-\frac{(x+2)^2}{16}}$$

- (a) find out C ? (5 pt.)
 (b) find out the Mean value = ? (5 pt.)
 (c) the probability of $P(X \leq -2)$ = ? (10 pt.)

5. Assuming the function $f(x)$;

$$f(x) = x^2 e^{-2x^2}$$

- (a) find out the Taylors series at $x=0$ and it's series presentation. (10 pt.)
 (b) based on the answer of (a) to find out the R.O.C. (5 pt.)
 (c) based on the answer of (a) to find out the Interval of convergence. (5 pt.)

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