

Worksheet 9

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1. Find the Taylor series of $\ln(x + \sqrt{1 + x^2})$ at $x = 0$.
2. Determine the first three nonzero terms in the Taylor series of $\tan(x)$ at $x = 0$.
3. Let $f(x) = e^{x^2}$. Determine $f^{(6)}(0)$ and $f^{(13)}(0)$.
4. Find the Taylor expansion at $x = 0$ for

$$\int \frac{1}{1 - x^2} dx.$$

5. Find an infinite series that converges to the value of

$$\int_0^1 e^{-x^2} dx.$$

6. Compute the expected value, variance and standard deviation of the random variable X with probability table

X	-1	0	1	2
probability	1/8	1/8	3/8	3/8

7. Consider a circle with radius 1.
 - (a) What percentage of the points lies within 1/2 unit of center.
 - (b) Let c be a constant with $0 < c < 1$. What percentage of the points lies within c units of the center?