9. [12 points] For each statement below, circle TRUE if the statement is *always* true; otherwise, circle FALSE. There is no partial credit on this page.

a. [2 points] If the power series $\sum C_n x^n$ converges at $x = 1$, then it converges at $x = -1$.

True   [False]

b. [2 points] Consider the point (x_0, y_0) given in Cartesian coordinates and its polar coordinates equivalent (r_0, θ_0). If $\frac{y_0}{x_0} = 1$, then $\theta_0 = \frac{\pi}{4}$.

True   [False]

c. [2 points] $\frac{d}{dx} \left(\int_x^2 \cos(\sin(t^2)) dt \right) = \cos(\sin(x^2))$.

True   [False]

d. [2 points] Suppse $h(x)$ is a continuous function for $x > 0$. If $\int_1^\infty h(x) dx$ converges then for constant $0 < a < 1$, $\int_1^\infty h(\frac{x}{a}) dx$ also converges.

[True]   False

e. [2 points] If $p(x)$ is a probability density function, then the units of $\int_{-\infty}^\infty x p(x) dx$ are the same as the units of x.

[True]   False

f. [2 points] The function $P(x) = (x-1) - \frac{1}{3!}(x-1)^3$ is the third degree Taylor polynomial for $f(x) = \sin(\pi x)$ about $x = 1$.

True   [False]