

1. [14 points] Indicate if each of the following is true or false by circling the correct answer. Justify your answer.

a. [2 points] If $\int_0^\infty f(x)dx$ is divergent then $\int_1^\infty f(x)dx$ is also divergent.

True False

b. [2 points] If the median of a density function $p(t)$ is 0, then $p(t)$ is an even function.

True False

c. [4 points] A curve is parametrized by the functions $x(t) = 1 - t^2$ and $y(t) = t^4 + 3t^2$ for $0 \leq t \leq 1$. The concavity of the graph of the parametric curve is positive for $0 < t < 1$.

True False

d. [2 points] In polar coordinates, the coordinates $(2, \frac{\pi}{3})$ and $(-2, \frac{7\pi}{3})$ represent the same point.

True False

e. [2 points] If $P(t)$ is a cumulative distribution function then $\int_{-\infty}^\infty P(t)dt$ converges.

True False

f. [2 points] The solutions to the differential equation $\frac{dy}{dx} = 1 + y^2 + 3x^2$ are increasing at every point.

True False