10. [8 points] Each of the following statement is either False (there are counter-examples to the statement), True, or True if a condition holds. For each, circle the correct characterization (obviously, a True statement is also True if the condition holds; circle “True” in this case, not “True if . . .”). No explanations are necessary.

(a) [2 points of 8] \( y = 3x^2 \) is a solution to \( xy' = 2y - b \)

True \hspace{1cm} False \hspace{1cm} True if \( b = 0 \)

(b) [2 points of 8] \( \int_{-1}^{1} \frac{1}{1+ kx^2} \, dx \) is an improper integral.

True \hspace{1cm} False \hspace{1cm} True if \( k \leq -1 \)

(c) [2 points of 8] If \( F'(x) = x \sin(e^x) \), then \( F(x) = \int_{0}^{\infty} t \sin(e^t) \, dt \).

True \hspace{1cm} False \hspace{1cm} True if \( F(0) = 0 \)

(d) [2 points of 8] \( F(t) = \begin{cases} 
0, & t < 0 \\
t/a, & 0 \leq t < a \\
1, & t \geq a 
\end{cases} \) could be a cumulative distribution function.

True \hspace{1cm} False \hspace{1cm} True if \( a = 1 \)