

8. True or false? Write out the full word “true” or “false” and provide a brief justification (2 points each).

(a) $\mu = 2$ is a bifurcation point for the equation $y' = y^5 + \mu y^4 + y^3$.

(b) There is exactly one differentiable function $y(t)$ defined near $t = 1$ whose graph passes through the point $(1, 2)$ and such that $y(t)y'(t)$ and $1 + y(t) \sin(t)$ are actually the same functions of t .

(c) There is a matrix \mathbf{A} with the following eigenvalues/eigenvectors:

$$\lambda_1 = 2, \mathbf{x}_1 = \begin{pmatrix} -20 \\ 25 \end{pmatrix}; \quad \lambda_2 = 65, \mathbf{x}_2 = \begin{pmatrix} 40 \\ -50 \end{pmatrix}.$$

(d) There is some continuous function $f(y)$ for which $y' = f(y)$ has only two equilibria, both unstable.