

Name: KEY

Show all work, clearly and legibly, to receive full credit. Correct spelling, organization of your solution, and proper use of mathematical notation all count. YOU MAY NOT USE A CALCULATOR ON THIS QUIZ. No notes, books, or other additional resources are permitted. Good luck!

- 1.) (4 pts.) Compute $f'(x)$ if $f(x) = 2^x + x^2 + 2 - 2 \cos x$.

$$f'(x) = 2^x \ln 2 + 2x + 2 \sin x$$

- 2.) (4 pts.) Explain this step from our algebraic demonstration that the derivative of e^x is e^x :

$$\lim_{h \rightarrow 0} \frac{e^{(x+h)} - e^x}{h} = \lim_{h \rightarrow 0} \frac{e^x e^h - e^x}{h}$$

$$e^{(x+h)} = e^x e^h \quad \text{because of the exponent rule}$$

(Any reasonable explanation is OK.)

- 3.) (2 pts.) What is $\sin \frac{\pi}{2}$? (Your answer should be a number.)

$$\boxed{1}$$