

NAME: \_\_\_\_\_

(1) Evaluate  $\lim_{x \rightarrow \infty} x^{-3} e^x$

(2) Evaluate  $\lim_{x \rightarrow \infty} (e^x + x)^{1/x}$

(3) Find the global maximum and minimum values of the function  $y = x + \cos x$  on the interval  $[0, 2\pi]$ . Give a precise reason why your answer is correct. You must use calculus for this problem (providing a graph is not an acceptable answer).

(4) A motel has 200 rooms. If the manager charges \$60 per room per night, all the rooms will be rented. For each \$5 increase, one less room will be rented. How much rent should be charged to maximize revenue? Make sure that you prove your answer is a global maximum.