AMS 11A **Study Guide 4** ECON 11A

Optimization

1. Find the critical points and critical values of the following functions.

a. $f(x) = 3x^2 - 4x + 2$

b. $g(t) = 2t^3 - 9t^2 - 24t + 7$

c. $y = 5xe^{-0.125x^2}$

d. $w = \dfrac{9u}{4 + 5u} - u$

2. Use the ***first derivative test*** to classify the critical values that you found in 1c. and 1d. as relative minimum values, relative maximum values or neither.

3. Use the ***second derivative test*** to classify the critical values that you found in 1a. and 1.b. as relative minimum values, relative maximum values or neither.

4. Find the absolute maximum and minimum values of function $f(x) = 2x^3 - 3x^2 - 12x + 11$ on the interval $[0, 10]$. Justify your claim.

5. Find the *absolute minimum* value of the function $c = 0.1q + 15 + \dfrac{100}{q}$ in the interval $(0, \infty)$. Justify your claim.

6. Consider the function $v = u^2 e^{-5u}$

a. Does v have an absolute *maximum* value in the interval $(0, \infty)$? If so, find it and justify your claim. If not, explain why not.

b. Does v have an absolute *minimum* value in the interval $(0, \infty)$? If so, find it and justify your claim. If not, explain why not.

c. Does v have an absolute *maximum* value in the interval $(-\infty, \infty)$? If so, find it and justify your claim. If not, explain why not.

d. Does v have an absolute *minimum* value in the interval $(-\infty, \infty)$? If so, find it and justify your claim. If not, explain why not.