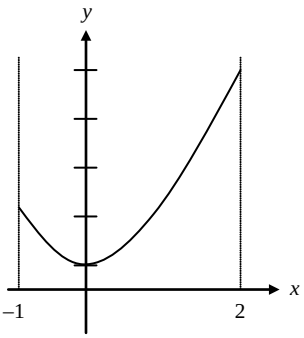
AP Calculus
4.1 Worksheet

All work must be shown in this course for full credit. Unsupported answers may receive NO credit.

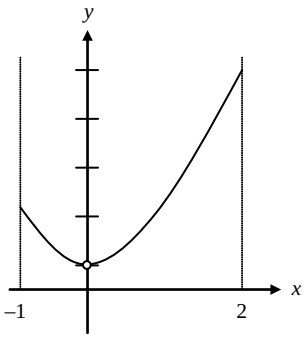
1. State the *hypothesis* of the Extreme Value Theorem.

2. Using the graphs provided, find the minimum and maximum values on the given interval. If there is no maximum or minimum value, explain which part of the hypothesis of the Extreme Value Theorem is not satisfied.

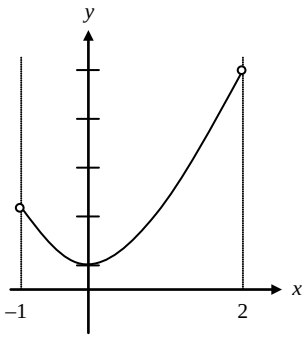
(a) [–1, 2]



(b) [–1, 2]



(c) (–1, 2)



3. When looking for extrema, where do you find the candidates?

Explain why each of the statements in questions 4 – 6 are false.

4. If $f'(5) = 0$, then there is a maximum or a minimum at $x = 5$.

5. If $x = 2$ is a critical number, then $f'(2) = 0$.

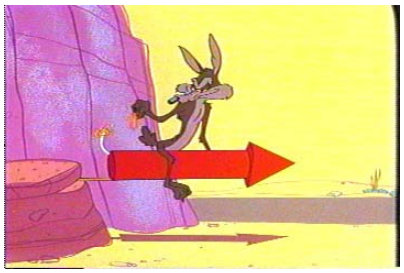
6. An extrema occurs at every critical number.

7. Find the extrema of $h(\theta) = 2\sin\theta - \cos(2\theta)$ for $0 \le \theta \le 2\pi$. Use your graphing calculator to investigate first.

8. Wile E. is after Road Runner again! This time he's got it figured out. Sitting on his ACME rocket he hides behind a hill anxiously awaiting the arrival that "beeping" bird. In his excitement to light the rocket he tips the rocket up. Instead of thrusting himself parallel to the ground where he can catch the Road Runner, he sends himself widely into the air following a path given by function

$$h(t) = .1t^3 - 1.3t^2 + 4.2t + 2,$$

where *h* is the height of the rocket after *t* seconds. The rocket fuel lasts for 10 seconds. At that point, Wile E. Coyote stops suddenly and falls straight down to the ground. What is the highest point reached by Wile E. Coyote?



9. Complete the following problems from the textbook: 4.1 pages 193 – 195 #5 – 10, 12, 13, 16, 17, 21, 23, 26, 44, 48
4. 4 page 226 #2, 6, 9