

**22M:025 Worksheet #3 (5 Points)**

The following questions 1-8 are all True/False. Please circle the correct answers at the bottom. You will receive one point for every right answer beyond five, so you must get at least six questions right to receive any credit.

1. Let  $f(x) = (x - 2)^2(x^2 + 1)^3 + 5$ . Then  $3 + \sqrt{5}$  is a critical point of  $f(x)$ .
2. Let  $f(x) = (x - 2)^2(x^2 + 1)^3 + 5$ . Then 2 is a critical point of  $f(x)$ .
3. Let  $f(x) = -\frac{1}{2} \ln(x^2) + x^6$ . Then  $f(x)$  has one critical point.
4. Let  $f(x) = -\frac{1}{2} \ln(x^2) + x^6$ . Then  $f(x)$  is always concave up.
5. Let  $f(x) = (x - 10)^{2000}$ . Then 10 is both a critical point and inflection point of  $f(x)$ .
6. Let  $f(x) = (x - 10)^{2000}$ . Then 10 is an absolute min of  $f(x)$ .
7. Suppose for some twice differentiable function  $f(x)$  on  $[0, 4]$  that:  $f(0) = -10$ ,  $f(4) = 10$ , the only critical point of  $f(x)$  is 2 and  $f''(2) = -200$ . Then  $(2, f(2))$  is a local min of  $f(x)$ .
8. Suppose for some twice differentiable function  $f(x)$  on  $[0, 4]$  that:  $f(0) = -10$ ,  $f(4) = 10$ , the only critical point of  $f(x)$  is 2 and  $f''(2) = -200$ . Then  $(2, f(2))$  is an absolute max of  $f(x)$ .

Short Answer:

9. Provide an example of a twice differentiable function  $f(x)$  on  $[0, 4]$  such that:  $f(0) = 100$ ,  $f(4) = 100$ , the only critical point of  $f(x)$  is 2 and  $f''(2) = 200$ . Find the absolute min of  $f(x)$ .

10. Provide an example of a twice differentiable function  $f(x)$  on  $[0, 4]$  such that:  $f(0) = 100$ ,  $f(4) = 100$ , the only critical point of  $f(x)$  is 2 and  $f''(2) = -200$ . Find the absolute max of  $f(x)$ .

1. True / False	2. True / False	3. True / False	4. True / False
5. True / False	6. True / False	7. True / False	8. True / False

Short Answer:

9.

10.