

Classroom Voting Questions: Calculus I

4.3 Optimization

1. **True or False:** If $f(x)$ is continuous on a closed interval, then it is enough to look at the points where $f'(x) = 0$ in order to find its global maxima and minima.
2. **True or False:** A function defined on all points of a closed interval always has a global maximum and a global minimum.
3. Let f be a continuous function on the closed interval $0 \leq x \leq 1$. There exists a positive number A so that the graph of f can be drawn inside the rectangle $0 \leq x \leq 1$, $-A \leq y \leq A$.

The above statement is:

- (a) Always true.
 - (b) Sometimes true.
 - (c) Not enough information.
4. Let $f(x) = x^2$. **True or False:** f has an upper bound on the interval $(0, 2)$.
 5. Let $f(x) = x^2$. **True or False:** f has a global maximum on the interval $(0, 2)$.
 6. Let $f(x) = x^2$. **True or False:** f has a global minimum on the interval $(0, 2)$.
 7. Let $f(x) = x^2$. **True or False:** f has a global minimum on any interval $[a, b]$.
 8. Consider $f(x) = -3x^2 + 12x + 7$ on the interval $-2 \leq x \leq 4$. Where does this function have its global maximum value?
 - (a) $x = -2$
 - (b) $x = 0$
 - (c) $x = 2$
 - (d) $x = 4$

9. Consider $f(x) = -3x^2 + 12x + 7$ on the interval $-2 \leq x \leq 4$. Where does this function have its global minimum value?

(a) $x = -2$

(b) $x = 0$

(c) $x = 2$

(d) $x = 4$