Mathematics 122

Quiz 19   Name:___Key_____

You must show your work to get full credit.

1. (a) What does it mean for $x = x_0$ to be a critical point of $f(x)$.

$f'(x_0) = 0$ or $f'(x_0)$ does not exist

(b) What are the critical points of $f(x) = x^2 e^{-x}$?

$f'(x) = 2x e^{-x} + x^2 e^{-x}(-1)$

$\quad = (2x - x^2) e^{-x}$

$\quad = x(2-x) e^{-x} = 0$

Implies $x = 0$ or $x = 2$

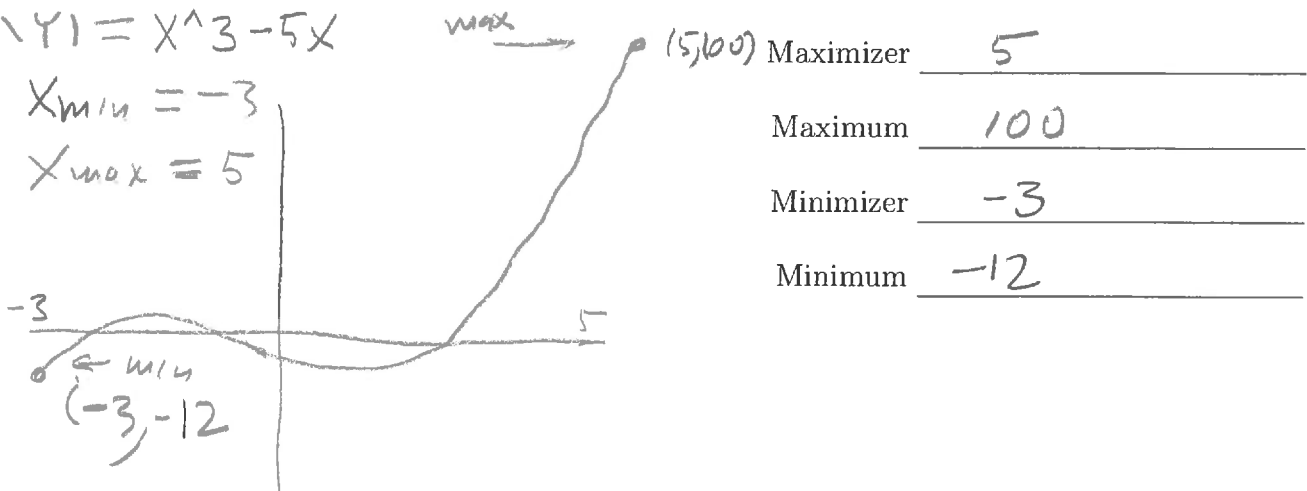The critical points are ___0,2___

2. For the function

$$Af(x) = x^3 - 5x$$

with $-3 \le x \le 5$ what are (and say what you did on calculator)

$\backslash Y1 = X^\wedge 3 - 5X$

$X_{min} = -3$

$X_{max} = 5$

Maximizer ___5___

Maximum ___100___

Minimizer ___-3___

Minimum ___-12___

From graph we see minimum is at the left end point and the maximum is at the right end point.
At left endpoint do 2nd CALC 1: value X = -3 to get Y = -12
At right endpoint do 2nd CALC 1: value X = 5 to get Y = 100