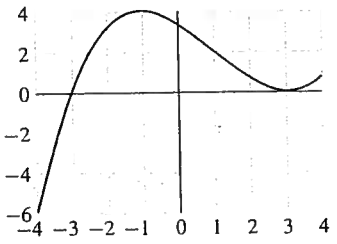
Name: KEY

Show all work, clearly and legibly, to receive full credit. Correct spelling, organization of your solution, and proper use of mathematical notation all count. You may use a stand-alone graphing calculator, but not any internet-based calculators. No notes, books, or other additional resources are permitted. Good luck!

1.) (4 pts.) The graph of f' is shown below. Note: **This is not the graph of f.** Use the graph of f' to answer the question: Where does f have a local minimum? Explain how you know this from the graph of f'.



At $x=-3$. This is due to the First Derivative Test:

for $x<-3$, $f'<0$, and for $x>-3$, $f'>0$, so at $x=-3$, f has a local minimum

2.) (4 pts.) Let $f(x)=\sin x$.

a.) For $x=1.38$ and $x=1.42$, compute $f(x)$.

$\sin 1.38 = .98185$

$\sin 1.42 = .98865$

b.) Use your answers from part (a) to show that $f'(1.4)$ is approximately 0.17. (Notice you are given the estimate, and are being asked to show the steps that justify the estimate.)

$$\frac{.98865 - .98185}{1.42 - 1.38} = 0.17$$

3.) (2 pts.) Simplify by writing an equivalent expression having no parentheses: $-(3xy)^2$.

$-9x^2y^2$