

The following questions should help you prepare for the two short answer questions that will be offered on the first exam. To be sure you will get full credit, you must show clear legible work to support your answer. This is intended just to give a sample; the actual questions may be taken from other material in the course. Sample solutions are provided in a different file.

1. Find the **average rate of change** of $f(x) = \sqrt{3x+1}$ from $x=2$ to $x=8$.

2. For what value of b is the function $f(x)$ **continuous** at $x=3$?

$$f(x) = \begin{cases} x^2 + b & x \leq 3 \\ bx + 5 & x > 3 \end{cases}$$

3. Use the **limit definition of the derivative** to find $f'(x)$ for $f(x) = 3x^2 + x - 5$. (You must use the limit definition to receive credit.)

4. Suppose a **linear function** f satisfies $f(4) = 5$ and $f(-2) = 3$. Find $f'(2)$.