

Review Problems

September 9, 2016

1. (Fall 2002, Exam 1, #4) Let

$$f(x) = \begin{cases} x + c & x \leq 3 \\ cx^2 - 2 & x > 3 \end{cases}$$

For what value of c , if any, is the function continuous at $x = 3$? Why?

2. (Fall 2005, Exam 1, #5) Let $h(x) = \begin{cases} \frac{1}{x}, & 0 < x < 1 \\ x, & 1 < x \end{cases}$. Which of the following are true?

I. $\lim_{x \rightarrow 1^+} h(x)$ exists

II. $\lim_{x \rightarrow 1^-} h(x)$ exists

III. $\lim_{x \rightarrow 1} h(x)$ exists

IV. h is continuous at $x = 1$

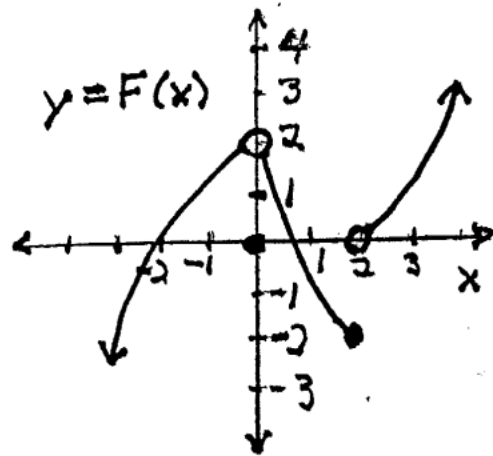
3. (Fall 2006, Exam 1, #10) If f and g are continuous at $x = 2$ with $g(x) = 3$ and $\lim_{x \rightarrow 2} \frac{2f(x) - 3g(x)}{2g(x) - f(x)} = 7$, then find $f(2)$.

4. (Fall 2009, Exam 1, #13) For the function $F(x)$ pictured, which of the following statements are true?

I. $\lim_{x \rightarrow 0} F(x) = 2$

II. $\lim_{x \rightarrow 2^-} F(x) = 0$

III. F is continuous at $x = 0$



5. (Fall 2011, Exam 1, #10) Let $G(x) = \begin{cases} 1 - x & x < 0 \\ x + x^2 & 0 \leq x < 1. \\ 2 - x & x \geq 1 \end{cases}$. Where (if anywhere) is G discontinuous?

6. (Fall 2011, Exam 1, #11) Which of the following statements are true?

I. If $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x)$, then f is continuous at a .

II. If f is continuous at b , then $f(b)$ does not have to be defined.

III. The function $g(x) = \sqrt{1 - x^2}$ is continuous only on $(-1, 1)$.

7. (Fall 2011, Exam 1, #14) Compute

$$\lim_{x \rightarrow 2} e^{\left(\frac{x^2 + 1}{2x + 1} \right)}$$

8. (Fall 2011, Exam 1, #8) Compute $\lim_{x \rightarrow 2^-} \frac{x^2 - x - 2}{(x - 2)^2}$.