

MATH 251 (PHILLIPS): WRITTEN HOMEWORK 6 PART 1

This homework sheet is due in class on Monday 10 February 2025 (week 6), in class. Write answers on a separate piece of 8.5 by 11 inch paper, well organized and well labelled, with each solution starting on the left margin of the page. Or, print a 2-sides copy of this page and write on it.

All the requirements in the sheet on general instructions for homework apply. In particular, show your work (unlike WeBWorK), give exact answers (not decimal approximations), and **use correct notation**. (See the course web pages on notation.) Some of the grade will be based on correctness of notation in the work shown.

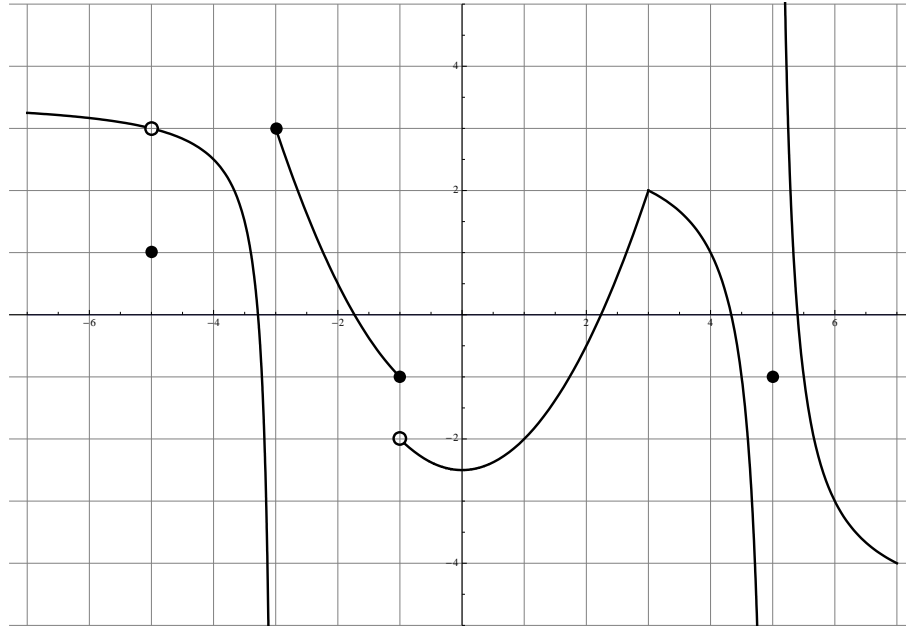
Point values as indicated, total 30 points.

1. (15 points.) If $f(x) = \frac{1}{x-2}$, compute the derivative $f'(3)$ *directly from the definition*. (For one point, check your answer using the differentiation formula, but no other credit will be given for just using the formula.)

(Problem 2 is on the back.)

Date: 3 February 2025.

2. (5 points/part) For the function $y = g(x)$ graphed below, answer the following questions about limits, using ∞ or $-\infty$ when appropriate:



(a) Does $\lim_{x \rightarrow 5^+} g(x)$ exist, or is it ∞ or $-\infty$? If so, what is it, or which of ∞ or $-\infty$ is it? If not, why not?

(b) Does $\lim_{x \rightarrow -3} g(x)$ exist, or is it ∞ or $-\infty$? If so, what is it, or which of ∞ or $-\infty$ is it? If not, why not?

(c) Is g continuous at $x = 3$? Why or why not?