

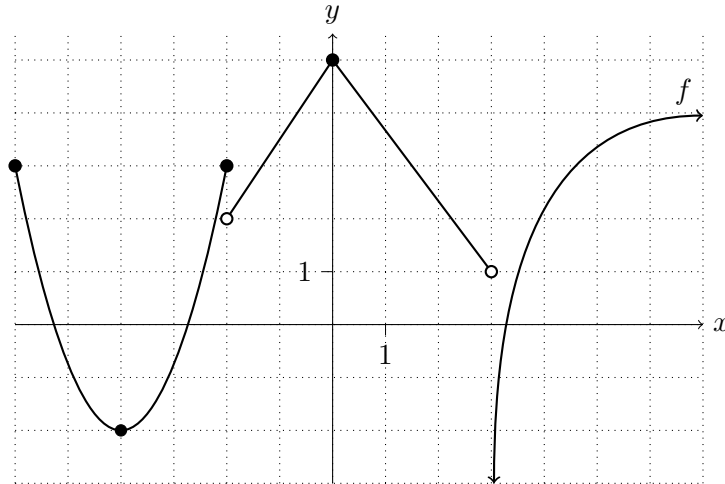
Math 108-01  
 Summer 2024  
 Dr. Lily Yen  
 Lisa Lajeunesse

# Quiz 4

Show all your work

Name: \_\_\_\_\_  
 Number: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Score: \_\_\_\_/10

**Problem 1:** The graph of  $y = f(x)$  is shown. Use the graph to answer the questions. Use the symbols  $\infty$ ,  $-\infty$ , and DNE where appropriate.



a.  $f(-2) =$  3

d.  $\lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h} =$   $-\frac{4}{3}$

b.  $\lim_{x \rightarrow -2^+} \frac{f(x) - f(-2)}{x + 2} =$   $-\infty$

e.  $\lim_{x \rightarrow -4} \frac{f(x) + 2}{x + 4} =$  0

c.  $\lim_{x \rightarrow -2} \frac{f(x) - f(-2)}{x + 2} =$  DNE

Score: \_\_\_\_/5

**Problem 2:** Use the limit definition of the derivative to find the derivative of  $f(x) = \frac{1}{x+3}$  at  $x = 2$ .

$$\begin{aligned}
 f'(2) &= \lim_{h \rightarrow 0} \frac{f(2+h) - f(2)}{h} = \lim_{h \rightarrow 0} \frac{\frac{1}{5+h} - \frac{1}{5}}{h} = \lim_{h \rightarrow 0} \frac{\frac{5}{5(5+h)} - \frac{5+h}{5(5+h)}}{h} \\
 &= \lim_{h \rightarrow 0} \frac{\frac{-h}{5(5+h)}}{h} = \lim_{h \rightarrow 0} \frac{-1}{5(5+h)} = \frac{-1}{25}
 \end{aligned}$$

Score: \_\_\_\_/5