

Math 1300  
Fall 2025  
Quiz 2

Name: Champ

1. (2 points) Consider the function

$$g(x) = \begin{cases} x^2 - 6x + 13, & \text{if } x \leq 2, \\ 5x + k, & \text{if } x > 2. \end{cases}$$

What value of  $k$  would make  $g$  continuous?

(a) -8

☒ (b) -5

(c) -2

(d) 0

(e) 3

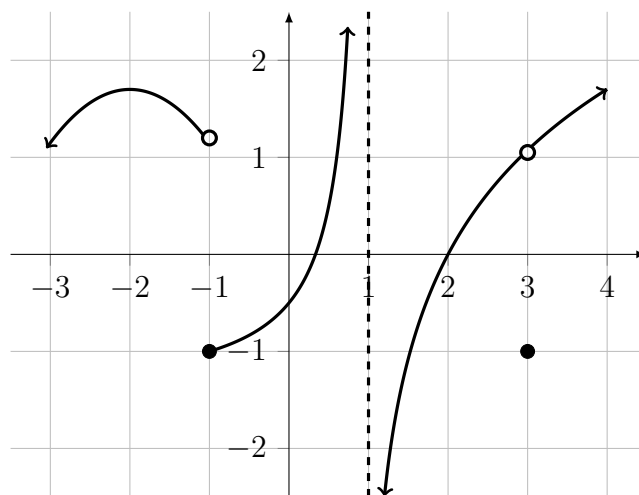
We need  $\lim_{x \rightarrow 2} g(x) = g(2) = 5$

Note:  $\lim_{x \rightarrow 2^-} g(x) = (2)^2 - 6(2) + 13 = 5 \checkmark$

Solve for  $k$ :  $\lim_{x \rightarrow 2^+} g(x) = 5(2) + k = 10 + k$

$\Rightarrow k = -5$

2. (2 points) Use the following graph of the function  $f$  to answer the question below.



At  $x = -1$ , the function  $f$

(a) is continuous.

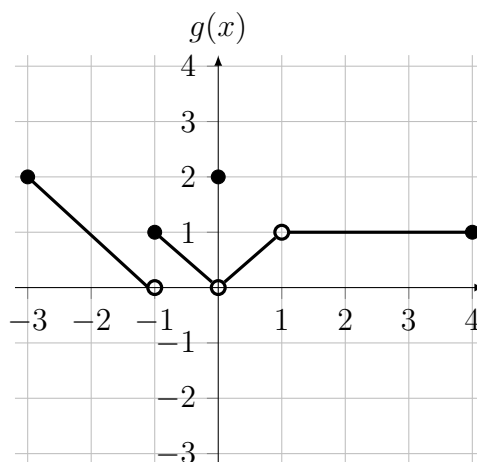
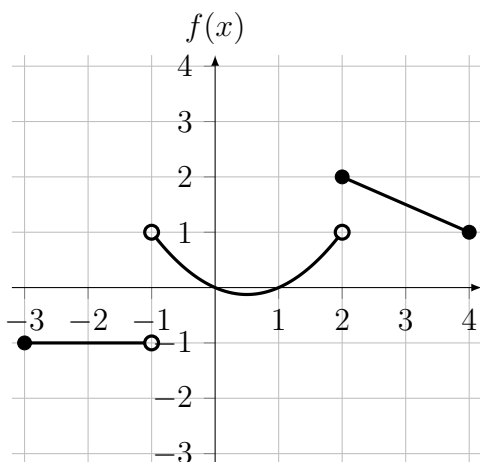
(b) is undefined.

(c) has an infinite discontinuity.

(d) has a removable discontinuity.

☒ (e) has a jump discontinuity.

3. (6 points) Use the following graphs of the functions  $f(x)$  and  $g(x)$  to answer the questions below:



- (a) Evaluate the following limit, if it exists. Otherwise, write DNE.

$$\lim_{x \rightarrow -1^+} (f(x) + g(x))$$

$$\begin{aligned} \lim_{x \rightarrow -1^+} f(x) + \lim_{x \rightarrow -1^+} g(x) \\ 1 + 1 = 2 \end{aligned}$$

Answer:

2

- (b) Evaluate the following limit, if it exists. Otherwise, write DNE.

$$\lim_{x \rightarrow 1} 3g(x)$$

$$\begin{aligned} 3 \cdot \lim_{x \rightarrow 1} g(x) \\ 3 \cdot 1 = 3 \end{aligned}$$

Answer:

3

Wacky

Limit !!!

- (c) Evaluate the following limit, if it exists. Otherwise, write DNE.

$$\lim_{x \rightarrow -1} (f(x))^2$$

$$\begin{aligned} \lim_{x \rightarrow -1^-} f(x) \cdot \lim_{x \rightarrow -1^-} f(x) = -1 \cdot -1 = 1 \\ \lim_{x \rightarrow -1^+} f(x) \cdot \lim_{x \rightarrow -1^+} f(x) = 1 \cdot 1 = 1 \end{aligned}$$

Answer:

1

$$\begin{aligned} \lim_{x \rightarrow -1^-} f(x) \cdot \lim_{x \rightarrow -1^+} f(x) = -1 \cdot 1 = -1 \\ \lim_{x \rightarrow -1^+} f(x) \cdot \lim_{x \rightarrow -1^-} f(x) = 1 \cdot -1 = -1 \end{aligned}$$