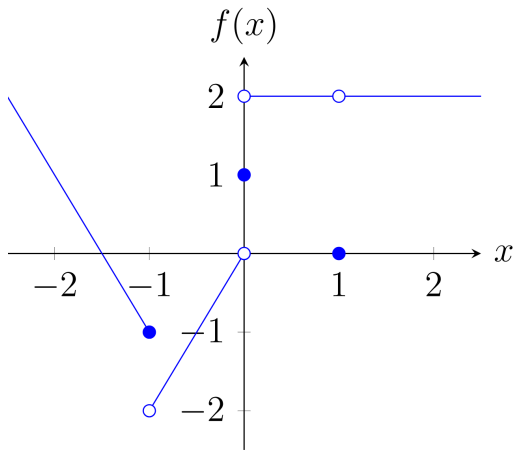




### WEEK-IN-REVIEW 1 (1.3, 1.4)

**Problem 1.** Answer the following questions based on the graph of  $f(x)$  below:



(1) Use the definition of continuity to show that  $f$  is continuous at  $x = -2$ .

(2) Why is  $f$  not continuous at  $x = -1$ ?

(3) Why is  $f$  not continuous at  $x = 0$ ?

(4) Why is  $f$  not continuous at  $x = 1$ ?

**Problem 2.** Find the Domain of the following functions and use that information to determine where the function is not continuous.

(1) State the Rules of Domains

$$(2) f(x) = \frac{\sqrt{6x^2 + 11x - 7}}{x^2 - 5x + 6}$$

$$(3) f(x) = \frac{\sqrt{3x - 2}}{6x^2 + 8x - 30}$$

$$(4) f(x) = \frac{e^{5-x}}{\sqrt{x-4}}$$

$$(5) f(x) = e^{\left(\frac{x+1}{5x^2-10x}\right)}$$

$$(6) f(x) = \frac{\log_7(x-12)}{\sqrt{x+5}}$$

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$$(7) f(x) = \frac{7x^2 + 11x^3}{\ln(x + 8)}$$

$$(8) f(x) = \frac{x^2 + 4x - 21}{x^2 + 10x + 25}$$

$$(9) f(x) = \frac{\sqrt[5]{x^3 - 2x} - \sqrt[6]{x + 10}}{3^{4-x^2}}$$

$$(10) f(x) = \frac{x + 2}{(x + 12)(x + 2)}$$

$$(11) f(x) = \frac{\log_2(x + 3)}{11 + \sqrt{x + 5}}$$

**Problem 3.** Find any vertical asymptotes and holes for the function

$$f(x) = \frac{5(x - a)(x - b)^2(x - c)}{x^2(x - a)^2(x - b)}$$

**Problem 4.** For what value(s) of  $x$  is the piecewise function  $f(x)$  given below not continuous?

$$f(x) = \begin{cases} 3x + 1 & \text{if } x < -2 \\ \frac{x^2 - 5}{x - 1} & \text{if } -2 \leq x \leq 3 \\ \frac{x^3 - 25}{x - 2} & \text{if } x > 3 \end{cases}$$

**Problem 5.** Find the value of  $A$  so that the piecewise function  $f(x)$  given below is continuous.

$$f(x) = \begin{cases} \frac{x^2 - x - 20}{x + 4} & x < -4 \\ Ax^3 - 2e^{x+4} + 8 & x \geq -4 \end{cases}$$

**Problem 6.** Find any holes and asymptotes for the given functions. Use limit notation to describe infinite and end point behavior.

$$(1) f(x) = \frac{x^2 - 8x + 16}{x^2 - 4x}$$

$$(2) f(x) = ax^2 - bx^5 + cx^3 + dx - 15 \text{ where } a, b, c, d \text{ are constants and } > 0.$$



**Problem 7.** Find any horizontal asymptotes for the functions below. If there are none, use limit notation to describe the end point behavior.

$$(1) f(x) = \frac{2x^3 + x^2 - 1}{5x^3 - 7x + 2}$$

$$(2) f(x) = \frac{4 + 3e^x}{3 + e^{-x}}$$

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$$(3) f(x) = \frac{3e^x + e^{-x}}{e^x - 4e^{-x}}$$

$$(4) f(x) = \frac{e^{2x} - 7e^{-3x}}{6e^{3x} - 2e^{-3x}}$$