MA 16010 Lesson 3: Finding Limits Graphically

Graphically, we will look at the portion of the curve of $f(x)$ near $x = c$ and see what the function value, y, approaches as x gets closer to c from the left or the right, respectively.

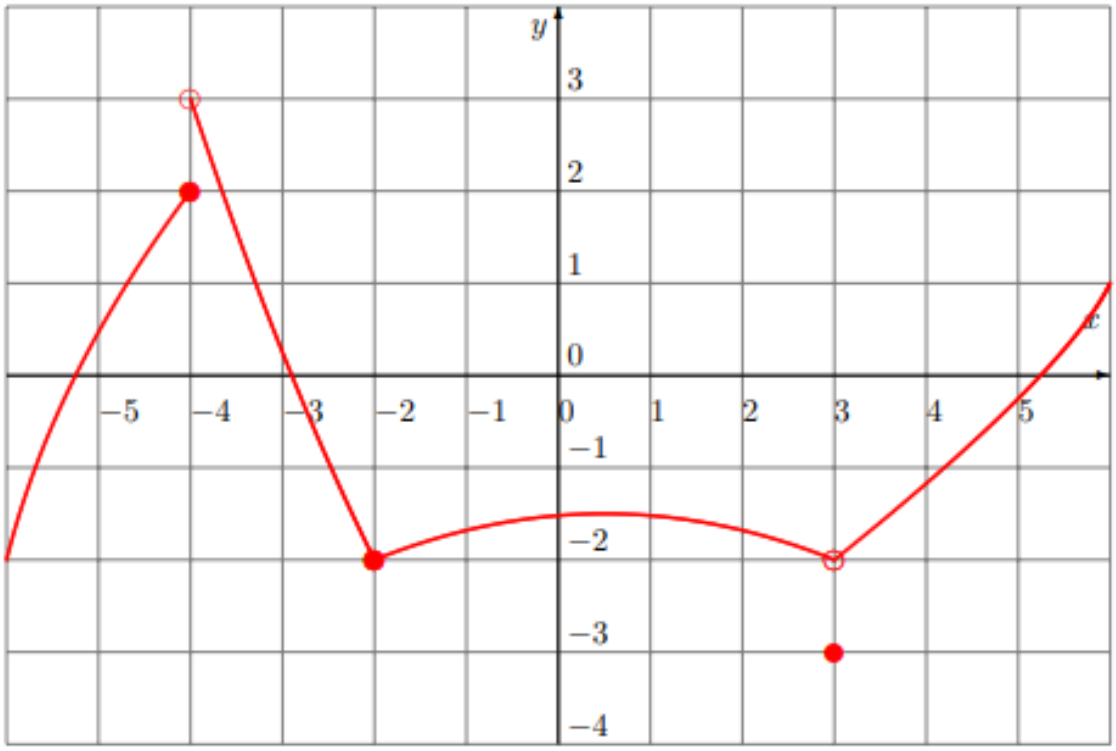
If $\lim_{x \to c^-} f(x) = \lim_{x \to c^+} f(x)$,

$$\boxed{\lim_{x \to c^-} f(x) = \lim_{x \to c^+} f(x) = \lim_{x \to c} f(x)} \quad (*)$$

Note this doesn't imply that $(*) = f(c)$.

Example 3 (From Worksheet)

3. Consider the following function defined by its graph:



Find the following limits:

A) $\lim_{x\to -4^-} f(x) =$ 2

B) $\lim_{x\to -4^+} f(x) =$ 3

C) $\lim_{x\to -4} f(x) =$ DNE

D) $f(-4) =$ 2

E) $\lim_{x\to -2^-} f(x) =$ −2

F) $\lim_{x\to -2^+} f(x) =$ −2

G) $\lim_{x\to -2} f(x) =$ −2

H) $f(-2) =$ −2

I) $\lim_{x\to 3^-} f(x) =$ −2

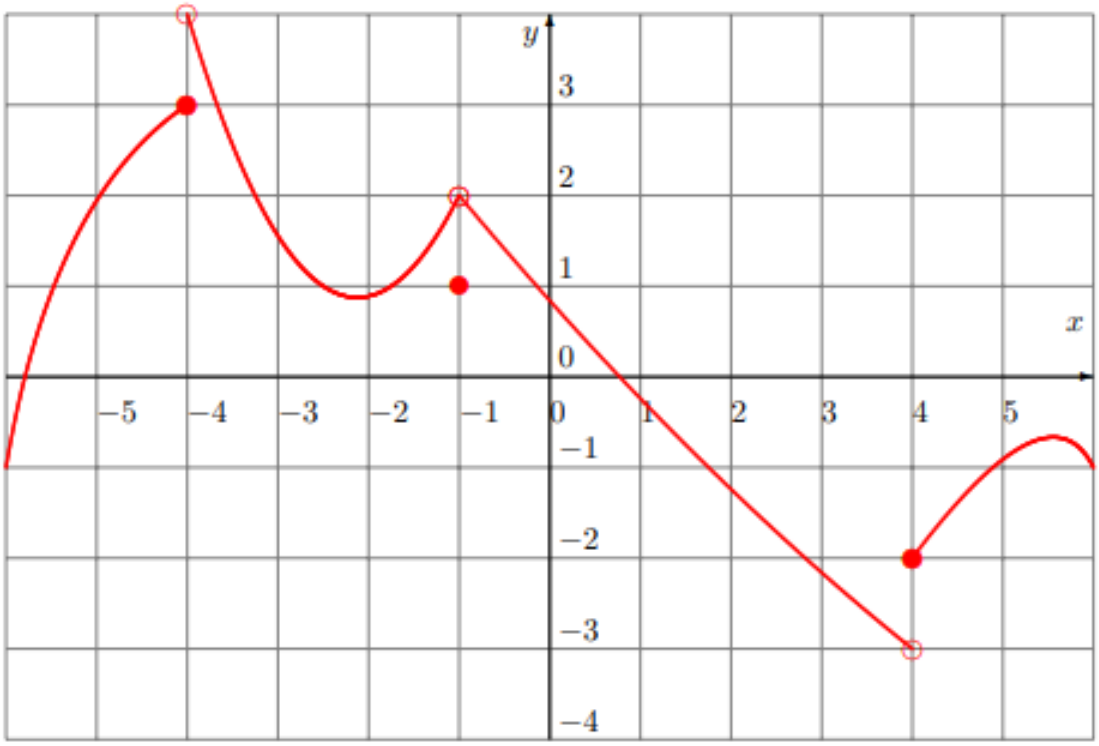
J) $\lim_{x\to 3^+} f(x) =$ −2

K) $\lim_{x\to 3} f(x) =$ −2

L) $f(3) =$ −3

Example 1 (From Worksheet)

1. Consider the following function defined by its graph:



Find the following limits:

A) $\lim_{x\to -4^-} f(x) =$ 3

B) $\lim_{x\to -4^+} f(x) =$ 4

C) $\lim_{x\to -4} f(x) =$ DNE

D) $f(-4) =$ 3

E) $\lim_{x\to -1^-} f(x) =$ 2

F) $\lim_{x\to -1^+} f(x) =$ 2

G) $\lim_{x\to -1} f(x) =$ 2

H) $f(-1) =$ 1

I) $\lim_{x\to 4^-} f(x) =$ −3

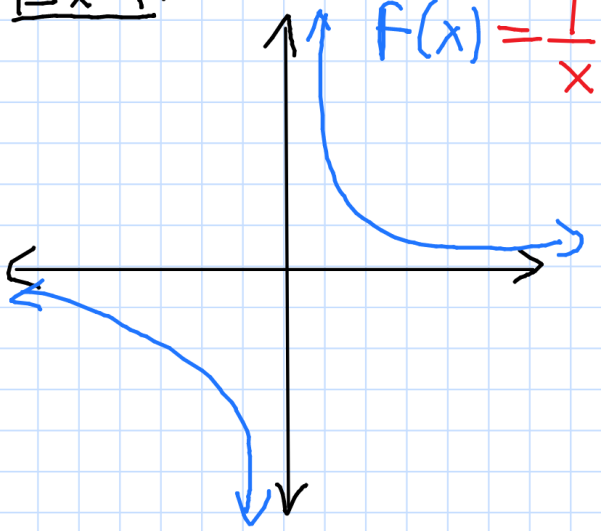
J) $\lim_{x\to 4^+} f(x) =$ −2

K) $\lim_{x\to 4} f(x) =$ DNE

L) $f(4) =$ −2

Lesson 3: Finding Limits Graphically

Ex 1:



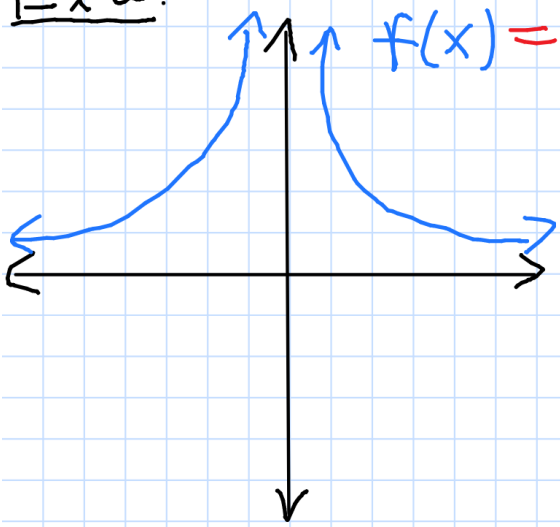
(a) $\lim_{x \to 0^-} f(x) =$ $-\infty$

(b) $\lim_{x \to 0^+} f(x) =$ ∞

(c) $\lim_{x \to 0} f(x) =$ DNE

(d) $f(0) =$ undefined

Ex 2:



(a) $\lim_{x \to 0^-} f(x) =$ ∞

(b) $\lim_{x \to 0^+} f(x) =$ ∞

(c) $\lim_{x \to 0} f(x) =$ ∞

(d) $f(0) =$ undefined