## Determining Limits Visually:

Your goal is to determine the y-value that the graph is trying to reach.

- If there is a hole, the limit DOES exist, and is the y-value of that hole.

- If there is a vertical asymptote, the limit may be ±∞, or may be DNE; you have to look to find out.

- If there is a jump, you must look at the one-sided limits, and again, the limit may be DNE.
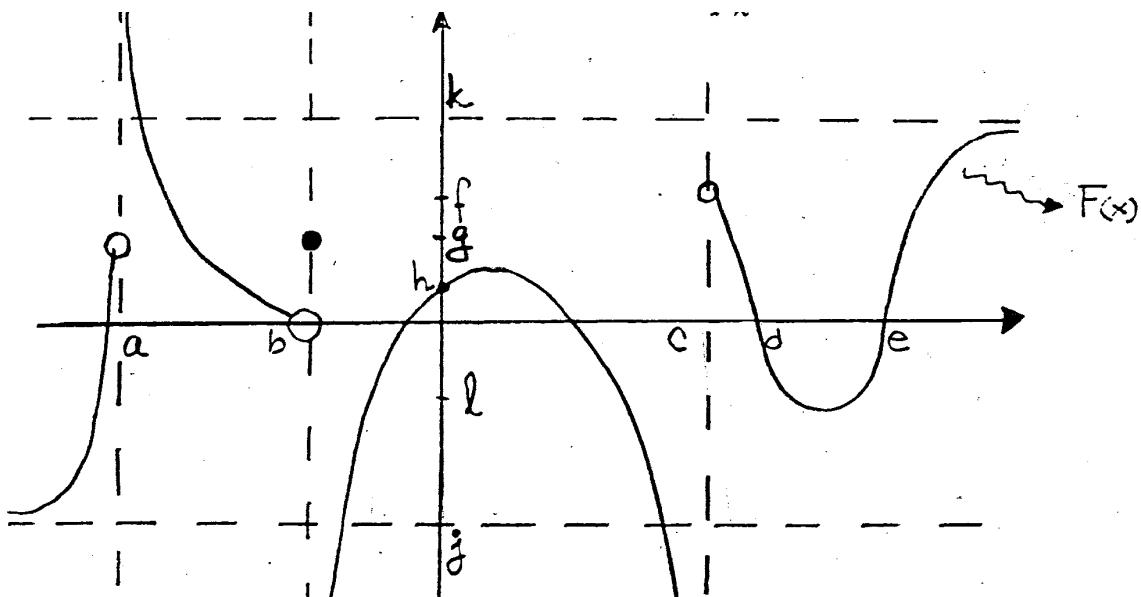
1. $\lim\limits_{x \to \infty} F(x) =$

2. $\lim\limits_{x \to -\infty} F(x) =$

3. $\lim\limits_{x \to a^+} F(x) =$

4. $\lim\limits_{x \to a^-} F(x) =$

5. $\lim\limits_{x \to a} F(x) =$

6. $\lim\limits_{x \to 0} F(x) =$

7. $\lim\limits_{x \to b^+} F(x) =$

8. $\lim\limits_{x \to b^-} F(x) =$

9. $\lim\limits_{x \to b} F(x) =$

10. $\lim\limits_{x \to c} F(x) =$

11. $\lim\limits_{x \to d} F(x) =$

12. $\lim\limits_{x \to e} F(x) =$

13. $F(e) =$

14. $F(0) =$

15. $F(b) =$

More examples:

For the function f graphed to the right, find

(a) $\lim\limits_{x \to 2^-} f(x)$

(b) $\lim\limits_{x \to 2^+} f(x)$

(c) $\lim\limits_{x \to 2} f(x)$

(d) $f(2)$

(e) $\lim\limits_{x \to -\infty} f(x)$

(f) $\lim\limits_{x \to +\infty} f(x)$.
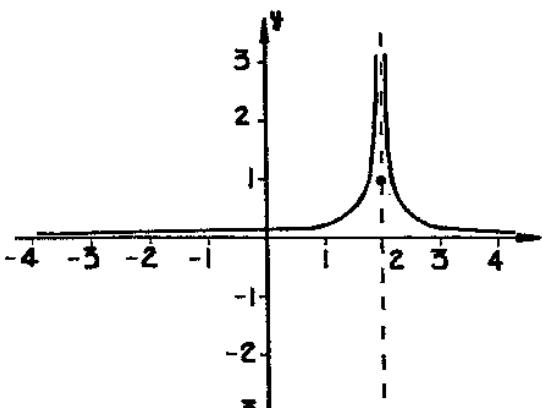
For the function f graphed to the right, find

(a) $\lim\limits_{x \to -1^-} f(x)$

(b) $\lim\limits_{x \to -1^+} f(x)$

(c) $\lim\limits_{x \to -1} f(x)$

(d) $f(-1)$
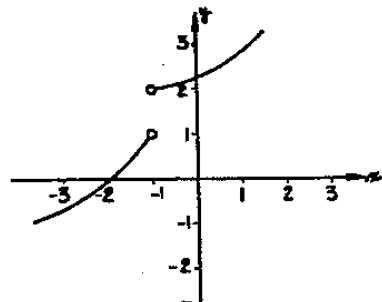
(e) $\lim\limits_{x \to +\infty} f(x)$

(f) $\lim\limits_{x \to -\infty} f(x)$.

For the function f graphed to the right, find

(a) $\lim\limits_{x \to 2^-} f(x)$

(b) $\lim\limits_{x \to 2^+} f(x)$

(c) $\lim\limits_{x \to 2} f(x)$

(d) $f(2)$

(e) $\lim\limits_{x \to 0^+} f(x)$

(f) $\lim\limits_{x \to +\infty} f(x)$.
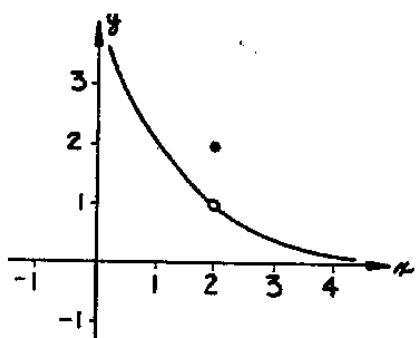
Homework for Visual Limits

For the function f graphed to the right, find
(a) $\lim\limits_{x \to 1^-} f(x)$
(b) $\lim\limits_{x \to 1^+} f(x)$
(c) $\lim\limits_{x \to 1} f(x)$
(d) $f(1)$
(e) $\lim\limits_{x \to +\infty} f(x)$
(f) $\lim\limits_{x \to -\infty} f(x)$.
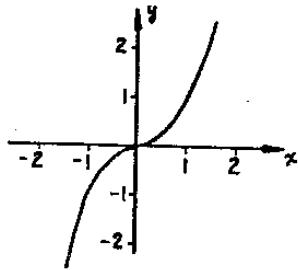
For the function ϕ graphed to the right, find
(a) $\lim\limits_{x \to \pi/2^-} \phi(x)$
(b) $\lim\limits_{x \to \pi/2^+} \phi(x)$
(c) $\lim\limits_{x \to \pi/2} \phi(x)$
(d) $\phi(\pi/2)$
(e) Can you identify this function?
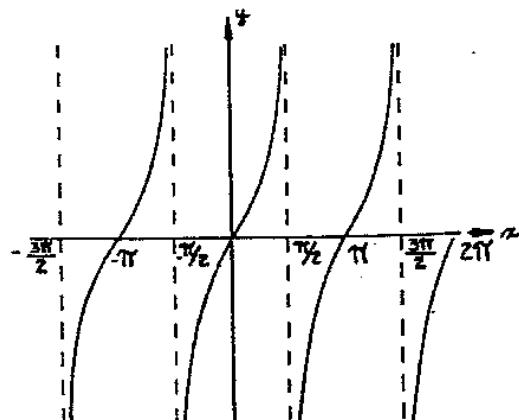
For the function f graphed to the right, find
(a) $\lim\limits_{x \to 0^-} f(x)$
(b) $\lim\limits_{x \to 0^+} f(x)$
(c) $\lim\limits_{x \to 0} f(x)$
(d) $f(0)$
(e) $\lim\limits_{x \to -\infty} f(x)$
(f) $\lim\limits_{x \to +\infty} f(x)$.
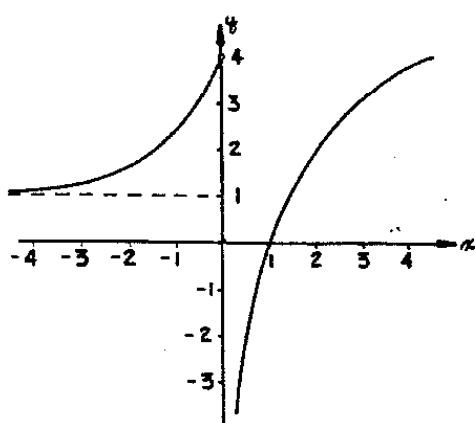
For the function g graphed to the right, find

(a) $\lim\limits_{x \to -2^-} g(x)$

(b) $\lim\limits_{x \to -2^+} g(x)$

(c) $\lim\limits_{x \to -2} g(x)$

(d) $g(-2)$

(e) $\lim\limits_{x \to +\infty} g(x)$

(f) $\lim\limits_{x \to -\infty} g(x)$.
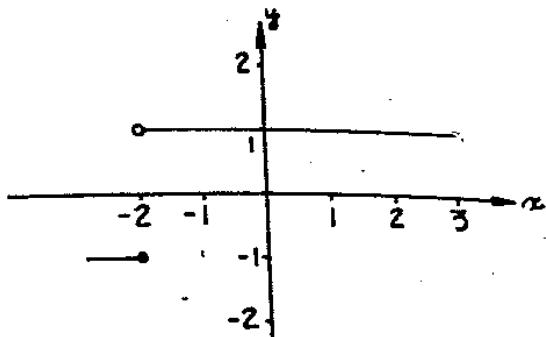
For the function f graphed to the right, find

(a) $\lim\limits_{x \to -1^-} f(x)$

(b) $\lim\limits_{x \to -1^+} f(x)$

(c) $\lim\limits_{x \to -1} f(x)$

(d) $f(-1)$

(e) $\lim\limits_{x \to +\infty} f(x)$

(f) $\lim\limits_{x \to -\infty} f(x)$.
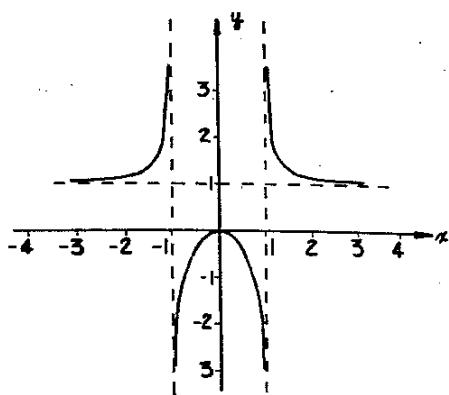
For the function h graphed to the right, find

(a) $h(-3)$

(b) $h(2)$

(c) $\lim\limits_{x \to -1^-} h(x)$

(d) $\lim\limits_{x \to -1^+} h(x)$

(e) $\lim\limits_{x \to -1} h(x)$

(f) $f(-1)$.