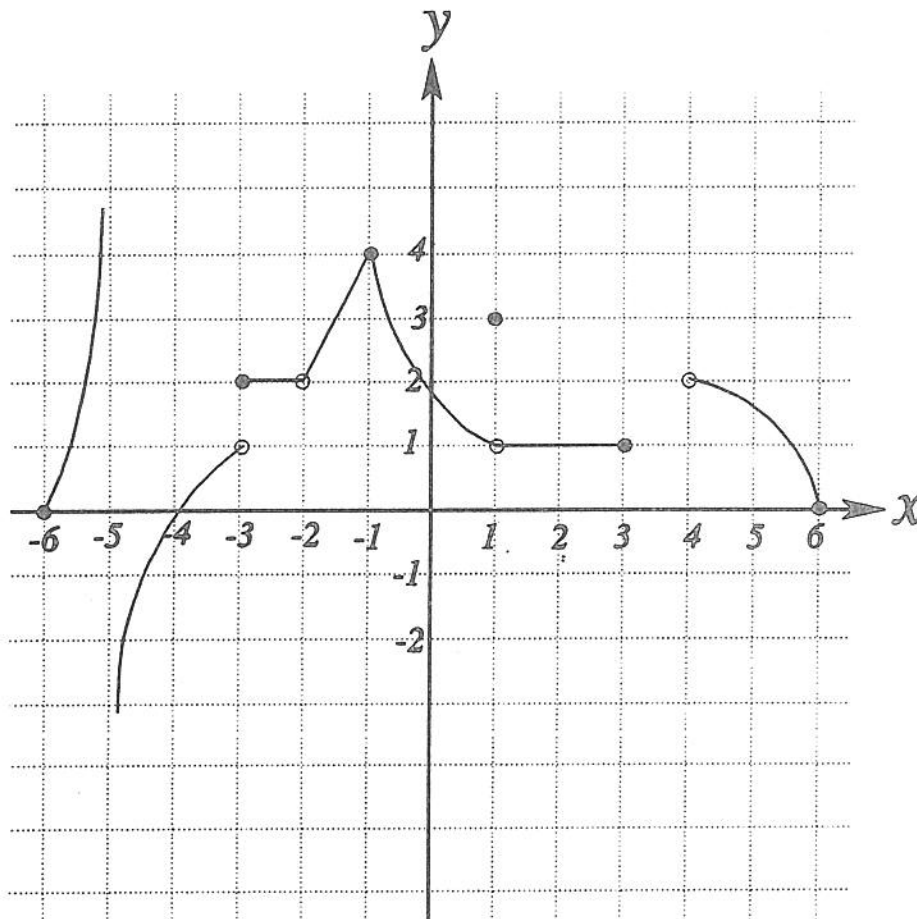# FINDING LIMITS GRAPHICALLY
## AN INTRODUCTION

L. Lewis

Consider a function $y = f(x)$ graphed below:



Find each limit if it exists, and find each function value, if possible.

1.  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) $f(-1) =$

2.  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) $f(1) =$

3.  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) $f(-2) =$

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

    b) $\lim\limits_{x \to -3^-} f(x) =$

    c) $\lim\limits_{x \to -3} f(x) =$

    d) $f(-3) =$

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

    b) $\lim\limits_{x \to 3^-} f(x) =$

    c) $\lim\limits_{x \to 3} f(x) =$

    d) $f(3) =$

6.  a) $\lim\limits_{x \to -5^+} f(x) =$

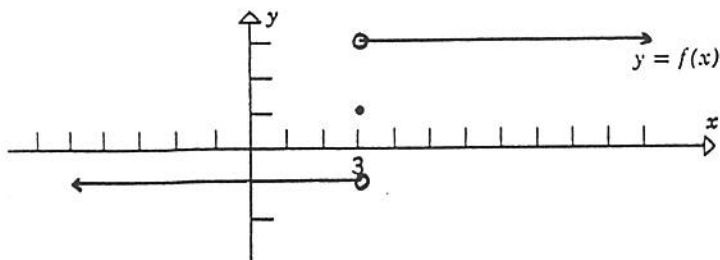    b) $\lim\limits_{x \to -5^-} f(x) =$

    c) $\lim\limits_{x \to -5} f(x) =$

    d) $f(-5) =$
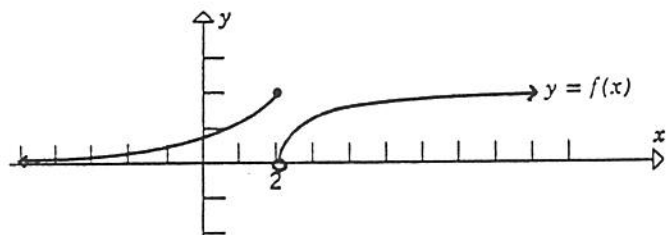
1. For the function $f$ graphed below, find
   (a) $\lim_{x \to 3^-} f(x)$
   (b) $\lim_{x \to 3^+} f(x)$
   (c) $\lim_{x \to 3} f(x)$
   (d) $f(3)$
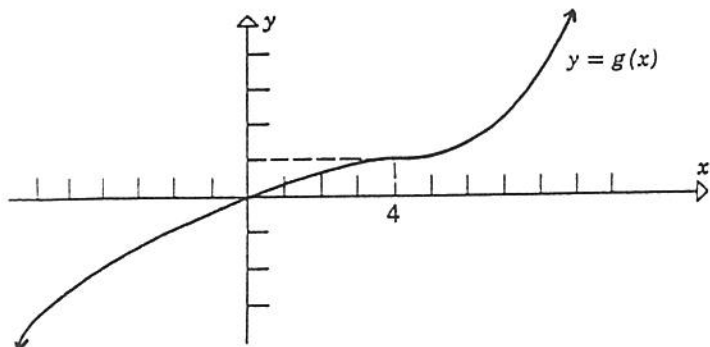   (e) $\lim_{x \to -\infty} f(x)$
   (f) $\lim_{x \to +\infty} f(x)$.



2. For the function $f$ graphed below, find
   (a) $\lim_{x \to 2^-} f(x)$
   (b) $\lim_{x \to 2^+} f(x)$
   (c) $\lim_{x \to 2} f(x)$
   (d) $f(2)$
   (e) $\lim_{x \to -\infty} f(x)$
   (f) $\lim_{x \to +\infty} f(x)$.
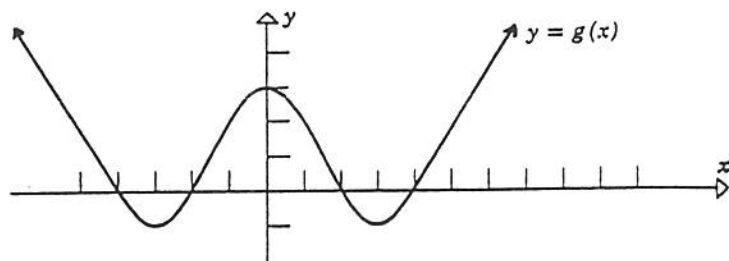


3. For the function $g$ graphed below, find
   (a) $\lim_{x \to 4^-} g(x)$
   (b) $\lim_{x \to 4^+} g(x)$
   (c) $\lim_{x \to 4} g(x)$
   (d) $g(4)$
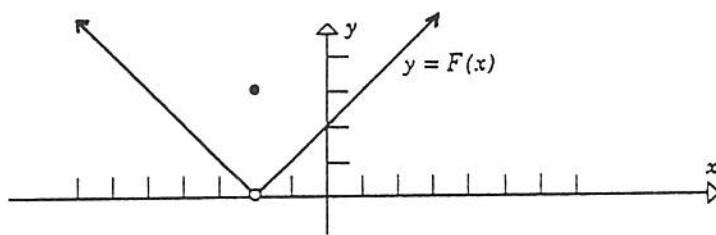   (e) $\lim_{x \to -\infty} g(x)$
   (f) $\lim_{x \to +\infty} g(x)$.



4. For the function $g$ graphed below, find
   (a) $\lim_{x \to 0^-} g(x)$
   (b) $\lim_{x \to 0^+} g(x)$
   (c) $\lim_{x \to 0} g(x)$
   (d) $g(0)$
   (e) $\lim_{x \to -\infty} g(x)$
   (f) $\lim_{x \to +\infty} g(x)$.


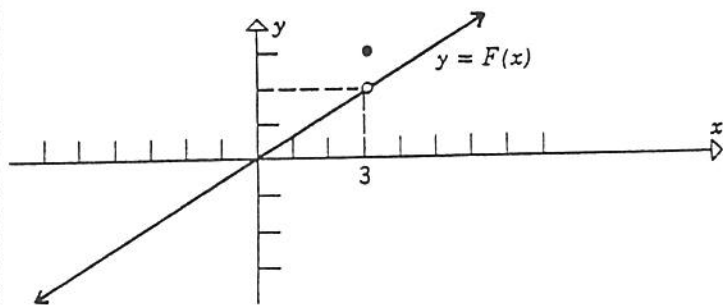
5. For the function $F$ graphed below, find
   (a) $\lim_{x \to -2^-} F(x)$
   (b) $\lim_{x \to -2^+} F(x)$
   (c) $\lim_{x \to -2} F(x)$
   (d) $F(-2)$
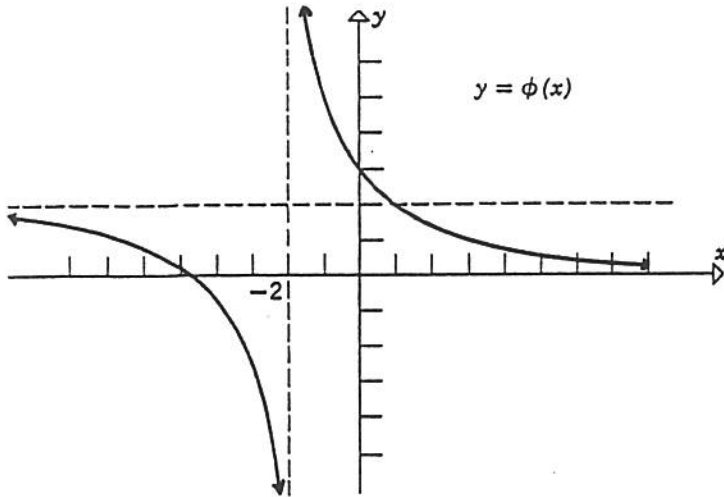   (e) $\lim_{x \to -\infty} F(x)$
   (f) $\lim_{x \to +\infty} F(x)$.



6. For the function $F$ graphed below, find
   (a) $\lim_{x \to 3^-} F(x)$
   (b) $\lim_{x \to 3^+} F(x)$
   (c) $\lim_{x \to 3} F(x)$
   (d) $F(3)$
   (e) $\lim_{x \to -\infty} F(x)$
   (f) $\lim_{x \to +\infty} F(x)$.

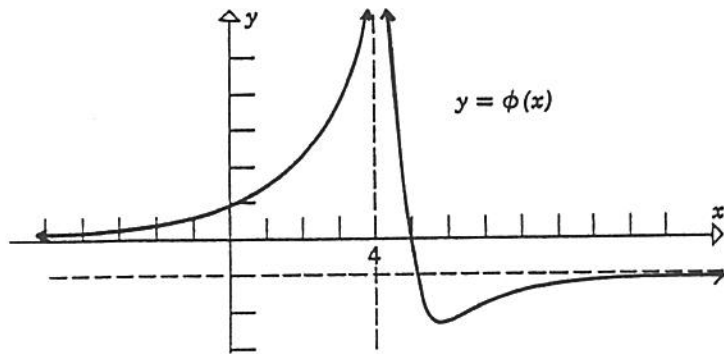7. For the function φ graphed below, find

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

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

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

$y = f(x)$

$y = \phi(x)$

8. For the function φ graphed below, find

   (a) $\lim\limits_{x \to 4^+} \phi(x)$           (b) $\lim\limits_{x \to 4^-} \phi(x)$

   (c) $\lim\limits_{x \to 4} \phi(x)$           (d) $\phi(4)$

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

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

$y = \phi(x)$

$y = f(x)$

9. For the function $f$ graphed below find

   (a) $\lim\limits_{x \to 3^-} f(x)$           (b) $\lim\limits_{x \to 3^+} f(x)$

   (c) $\lim\limits_{x \to 3} f(x)$           (d) $f(3)$

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

11. For the function $G$ graphed below, find

   (a) $\lim\limits_{x \to 0^-} G(x)$           (b) $\lim\limits_{x \to 0^+} G(x)$

   (c) $\lim\limits_{x \to 0} G(x)$           (d) $G(0)$

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

$y = G(x)$