



Mar 26-8:09 AM

3 ways to find limits:

- ① Graph
- ② Algebraically
- ③ Numerically (Tables)

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Finding Limits Numerically (with a table)

7. $\lim_{x \rightarrow 0} \frac{\sin 2x}{x} = 2$

| | | | | | |
|------|--------|--------|--------|---|--------|
| x | -0.1 | -0.01 | -0.001 | 0 | 0.001 |
| f(x) | 1.9867 | 1.9999 | 2 | 2 | 2.0001 |

Does the limit exist?
If so, is the limit reached?
 $\lim_{x \rightarrow c} f(x) = f(c)$

If the limit is reached, we say that f(x) is **continuous** at x=c.

not continuous
limit not reached

x → 5 4.7 4.8 4.9 5 5.1 5.2 5.3

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Finding Limits Numerically - Page 788 (Homework Problems)

3. $\lim_{x \rightarrow 2} (5x + 4) = 14$ reached limit continuous

| | | | | | | | |
|------|------|-------|--------|----|--------|-------|------|
| x | 1.9 | 1.99 | 1.999 | 2 | 2.001 | 2.01 | 2.1 |
| f(x) | 13.5 | 13.95 | 13.995 | 14 | 14.005 | 14.05 | 14.5 |

4. $\lim_{x \rightarrow 1} (2x^2 + x - 4)$

| | | | | | | | |
|------|-----|------|-------|---|-------|------|-----|
| x | 0.9 | 0.99 | 0.999 | 1 | 1.001 | 1.01 | 1.1 |
| f(x) | | | | ? | | | |

5. $\lim_{x \rightarrow 3} \frac{x-3}{x^2-9}$

| | | | | | | | |
|------|-----|------|-------|---|-------|------|-----|
| x | 2.9 | 2.99 | 2.999 | 3 | 3.001 | 3.01 | 3.1 |
| f(x) | | | | ? | | | |

6. $\lim_{x \rightarrow -1} \frac{x+1}{x^2-x-2}$

| | | | | | |
|------|------|-------|--------|----|--------|
| x | -1.1 | -1.01 | -1.001 | -1 | -0.999 |
| f(x) | | | | ? | |

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Properties of Limits - Page 785

| | |
|-----|------------------------------------|
| Let | $\lim_{x \rightarrow c} f(x) = 27$ |
| | $\lim_{x \rightarrow c} g(x) = 12$ |

1) Scalar Multiple: $\lim_{x \rightarrow c} [b \cdot f(x)] = b \lim_{x \rightarrow c} f(x)$
 $b \cdot 27$

2) Sum or Difference: $\lim_{x \rightarrow c} [f(x) + g(x)] = \lim_{x \rightarrow c} f(x) + \lim_{x \rightarrow c} g(x)$
 $27 + 12 = 39$

3) Product: $\lim_{x \rightarrow c} [f(x) \cdot g(x)] = \lim_{x \rightarrow c} f(x) \cdot \lim_{x \rightarrow c} g(x)$
 $27 \cdot 12 = 324$

4) Quotient: $\lim_{x \rightarrow c} \left(\frac{f(x)}{g(x)} \right) = \frac{\lim_{x \rightarrow c} f(x)}{\lim_{x \rightarrow c} g(x)} = \frac{27}{12} = \frac{9}{4}$

5) Power: $\lim_{x \rightarrow c} [f(x)]^n = \left(\lim_{x \rightarrow c} f(x) \right)^n = 27^n$

HOMEWORK

...finding limits with a table

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11.1 (p. p788): 3-6 all, 11-14 all, 47, 48

Feb 29-8:45 AM

Mar 5-2:41 PM