

1.3 Evaluating Limits Analytically

Pages to Read: 59 — 66

Problem's Page: 67

Assigned Problems: 2, 4, 22, 26, 30, 38, 44, 56, 70, 74, 126

1.3.1 Question 2

$$g(x) = \frac{12(\sqrt{x} - 3)}{x - 9}$$

(a) $\lim_{x \rightarrow 4} g(x)$

(b) $\lim_{x \rightarrow 0} g(x)$

1.3.2 Question 4

$$f(t) = t |t - 4|$$

(a) $\lim_{t \rightarrow 4} f(t)$

(b) $\lim_{t \rightarrow -1} f(t)$

1.3.3 Question 22

Find the limit: $\lim_{x \rightarrow 2} \frac{\sqrt{x+2}}{x-4}$

1.3.4 Question 26

Find the limits: $f(x) = 2x^2 - 3x + 1$, $g(x) = \sqrt[3]{x+6}$
(a) $\lim_{x \rightarrow 4} f(x)$, (b) $\lim_{x \rightarrow 21} g(x)$, (c) $\lim_{x \rightarrow 4} g(f(x))$

1.3.5 Question 30

$$\lim_{x \rightarrow 2} \sin \frac{\pi x}{2}$$

1.3.6 Question 38

$$\lim_{x \rightarrow c} f(x) = 3, \lim_{x \rightarrow c} g(x) = 2$$

(a) $\lim_{x \rightarrow c} [5g(x)]$

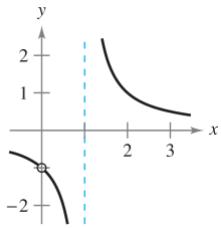
(b) $\lim_{x \rightarrow c} [f(x) + g(x)]$

(c) $\lim_{x \rightarrow c} [f(x)g(x)]$

(d) $\lim_{x \rightarrow c} \frac{f(x)}{g(x)}$

1.3.7 Question 44

$$f(x) = \frac{x}{x^2 - x}$$



1. $\lim_{x \rightarrow 1} f(x)$

2. $\lim_{x \rightarrow 0} f(x)$

1.3.8 Question 56

Find the limit if it exists: $\lim_{x \rightarrow 3} \frac{\sqrt{x+1} - 2}{x - 3}$

1.3.9 Question 70

Determine the limit of the trigonometric function if it exists: $\lim_{x \rightarrow 0} \frac{\tan^2 x}{x}$

1.3.10 Question 74

Determine the limit of the trigonometric function if it exists: $\lim_{x \rightarrow \pi/4} \frac{1 - \tan x}{\sin x - \cos x}$

1.3.11 Question 126*Approximation*

(a) Find $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$

(b) Use your answer to part (a) to derive the approximation $\cos x \approx 1 - \frac{1}{2}x^2$ for x near 0

(c) Use your answer to part (b) to approximate $\cos(0.1)$

(d) Use a calculator to approximate $\cos(0.1)$ to four decimal places. Compare the result with part (c)