1.6b / Practice workbook

Conjugates and Trig Identities

Practice

Problems 1–4 / Show your reasoning

1 What is $\lim_{x\to 7} \dfrac{7-x}{\sqrt{x+2}-3}$?

A. 6
B. -6
C. $-\dfrac{1}{6}$
D. nonexistent

2 What is $\lim\limits_{x\to \frac{\pi}{2}} \dfrac{1-\sin x}{\cos^2 x}$?

A. 0
B. $\dfrac{1}{2}$
C. 2
D. nonexistent

3 Let $f(x) = \dfrac{1-\tan x}{\cos x - \sin x}$. Which of the following is true?

A. $\lim\limits_{x\to \frac{\pi}{4}} f(x) = \sqrt{2}$ and $f\left(\dfrac{\pi}{4}\right) = \sqrt{2}$
B. $x = \dfrac{\pi}{4}$ is a vertical asymptote of the graph of f
C. $\lim\limits_{x\to \frac{\pi}{4}} f(x) = \sqrt{2}$ and $f\left(\dfrac{\pi}{4}\right)$ is undefined
D. $\lim\limits_{x\to \frac{\pi}{4}} f(x) = \dfrac{\sqrt{2}}{2}$

1.6b / AP-style free response

Problem 4 ➤ */ Show the work and the reasons a grader looks for.*

A particle moves along a line. Its position is $s(t) = \sqrt{2t+1}$ meters at time t seconds. For $h \neq 0$, the average velocity of the particle from $t = 4$ to $t = 4 + h$ is $\dfrac{\sqrt{9+2h} - 3}{h}$ meters per second.

(a) Find the average velocity of the particle on $[4, 12]$.

(b) Find $\lim_{h \to 0} \dfrac{\sqrt{9+2h} - 3}{h}$.

(c) Interpret your answer to (b) in context, with units.

1.6b / Answer key

Conjugates and Trig Identities

1 (B)

2 (B)

3 (C)

4 (a) $\frac{1}{4}$ meter per second; (b) $\frac{1}{3}$; (c) At $t = 4$ seconds, the velocity of the particle is $\frac{1}{3}$ meter per second