

THEOREMS ABOUT LIMITS WARMUP/WRAPUP §3.2

Prove or disprove:

- (1) $\lim_{x \rightarrow -1} \sqrt{1 - x^2} = 0$.
- (2) If $f : \mathbb{R} \setminus \{0\} \rightarrow \mathbb{R}$ is a function with $\lim_{x \rightarrow 0} f(x) = 5$, then the sequence $\left\{ f\left(\frac{2}{n}\right)^2 \right\}_{n=1}^{\infty}$ converges to $\frac{4}{25}$.
- (3) If $\lim_{x \rightarrow 1} f(x)$ does not exist, then $\lim_{x \rightarrow 1} (x^2 + f(x))$ also does not exist.
- (4) Let f, g be two functions with domain all real numbers x such that $x \neq 1$. If $\lim_{x \rightarrow 1} f(x)$ and $\lim_{x \rightarrow 1} g(x)$ both exist, then $\lim_{x \rightarrow 1} \frac{f(x)}{g(x)}$ exists.