

Math 140, Section 5

Quiz #1

January 12, 2001

## SOLUTIONS

1. Evaluate  $\lim_{x \rightarrow -2} \frac{\sqrt{2-x} - 2}{x+2}$ .

*Solution.* Multiplying numerator and denominator by the conjugate expression,  $\sqrt{2-x} + 2$ , we obtain

$$\begin{aligned} \frac{\sqrt{2-x} - 2}{x+2} &= \frac{(\sqrt{2-x} - 2)(\sqrt{2-x} + 2)}{(x+2)(\sqrt{2-x} + 2)} = \frac{(2-x) - 4}{(x+2)(\sqrt{2-x} + 2)} \\ &= \frac{-(x+2)}{(x+2)(\sqrt{2-x} + 2)} = \frac{-1}{\sqrt{2-x} + 2}. \end{aligned}$$

Therefore,

$$\lim_{x \rightarrow -2} \frac{\sqrt{2-x} - 2}{x+2} = \lim_{x \rightarrow -2} \frac{-1}{\sqrt{2-x} + 2} = \frac{-1}{\sqrt{2-(-2)} + 2} = -\frac{1}{4}.$$

2. Evaluate  $\lim_{x \rightarrow 1} \frac{x+1}{\sqrt{x}-1}$ .

*Solution.* The limits of the numerator and denominator are

$$\lim_{x \rightarrow 1} x + 1 = 1 + 1 = 2$$

and

$$\lim_{x \rightarrow 1} \sqrt{x} - 1 = \sqrt{1} - 1 = 0$$

respectively. Therefore, the limit of the quotient

$$\lim_{x \rightarrow 1} \frac{x+1}{\sqrt{x}-1}$$

does not exist.