

SOLUTION TO QUIZ 9

Evaluate $\int_{-2}^7 f(x) dx$ where

$$f(x) = \begin{cases} \sqrt{4-x^2} & \text{if } -2 \leq x \leq 0 \\ 2 & \text{if } x > 0 \end{cases} .$$

Solution This definite integral is the area of the shaded region in the figure below. This region consists of a quarter circle on the left and a rectangle on the right, both above the x -axis. Hence this definite integral is the sum of the areas of these two shapes. The circle has radius 2 while the rectangle has width 7 and height 2. Hence

$$\int_{-2}^7 f(x) dx = \int_{-2}^0 f(x) dx + \int_0^7 f(x) dx = \frac{1}{4}\pi(2)^2 + (7)(2) = \pi + 14 .$$

