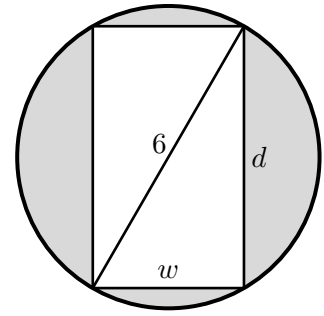


8. [9 points]

A rectangular wooden beam is to be cut from circular tree log of diameter 6 inches, with the rectangular cross section shown in the figure to the right. The strength S of the beam is proportional to the product of the beam's width w in inches and the square of its depth d in inches, so

$$S = kwd^2$$

where $k > 0$ is a constant. Find the dimensions of the beam of maximum strength that can be cut from the log.



Answer: $w =$ _____ and $d =$ _____