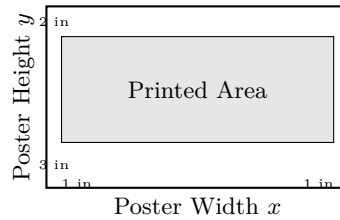


Question 8

A poster is to have an area of 192 in^2 . It must have 1-inch margins on the sides, a 2-inch margin at the top, and a 3-inch margin at the bottom. What dimensions of the poster will allow the largest printed area?



Question 8 - Solution

Let x be poster width and y its height. Then $xy = 192$, and positive printed dimensions require $2 < x < 192/5$.

$$A(x) = (x - 2)(192/x - 5) = 202 - 5x - 384/x.$$

$$A'(x) = -5 + 384/x^2 = 0 \implies x = \sqrt{384/5}.$$

Since $A''(x) = -768/x^3 < 0$, this is the unique maximum.

$x = \sqrt{384/5} \approx 8.76 \text{ in}, \quad y = \sqrt{480} \approx 21.91 \text{ in}.$
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The exact width, rather than its rounded value, is used to compute the height.