

Math 165 Section D
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SOLUTION TO PROBLEM 6 ON PRACTICE FINAL EXAM

If r is the radius of the can and h is the height, then the basic formulas are $V = \pi r^2 h$ (for volume) and $A = \pi r^2 + 2\pi r h$ (for surface area). It follows that $22 = \pi r^2 h$, so $h = 22/(\pi r^2)$. Therefore we have

$$A(r) = \pi r^2 + \frac{44}{r}.$$

Then $A'(r) = 2\pi r - 44r^{-2}$, which is zero when

$$r = \left(\frac{22}{\pi}\right)^{1/3}.$$

By the first derivative test, this number gives a maximum for A . Finally

$$h = \left(\frac{22}{\pi}\right)^{2/3}.$$