



JETS Challenge 117

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Voyage of John Smith

Two years ago marked the 400th anniversary of the first English settlement in the US at Jamestown, VA. According to the captain's log, they crossed the Tropic of Cancer on march 14th, 1607 with three ships. The lead ship was the *Susan Constant* with 70 men and boys commanded by John Smith of Pocahontas fame. The ships keel was 16.8m and the waterline and cross sectional shape can be approximated as a right trapezoid. The beam (width at waterline) was 7.0m and 5.8m across the flat bottom. The draft (depth of ship under water) was 2.95m. A ship's size is defined by the mass of water (in metric tons where 1T=m³ of water) displaced by the volume of the ship below the water line.

The Challenge: Find the displacement (tons) of the Susan Constant.



$$A = \frac{1}{2} (a+b)h$$

$$V = \frac{16.8}{2} (7 + 5.8) 2.95$$

$$V = 317.184 \text{ m}^3$$

$$d = 317 \text{ T}$$

ANSWER:

317 tons

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JETS Challenge problems are generously provided by Dave Meredith, Associate Professor, Penn State University-Fayette