

**Problem of the Week: Week 5 (Sum1): Year 10: Proportion: Compound units**

- convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts

**Medals**

The volume of a medal is  $45 \text{ cm}^3$

The medal is made from copper and tin.

$$\text{volume of copper} : \text{volume of tin} = 22 : 3$$

The density of copper is  $8.96 \text{ g / cm}^3$

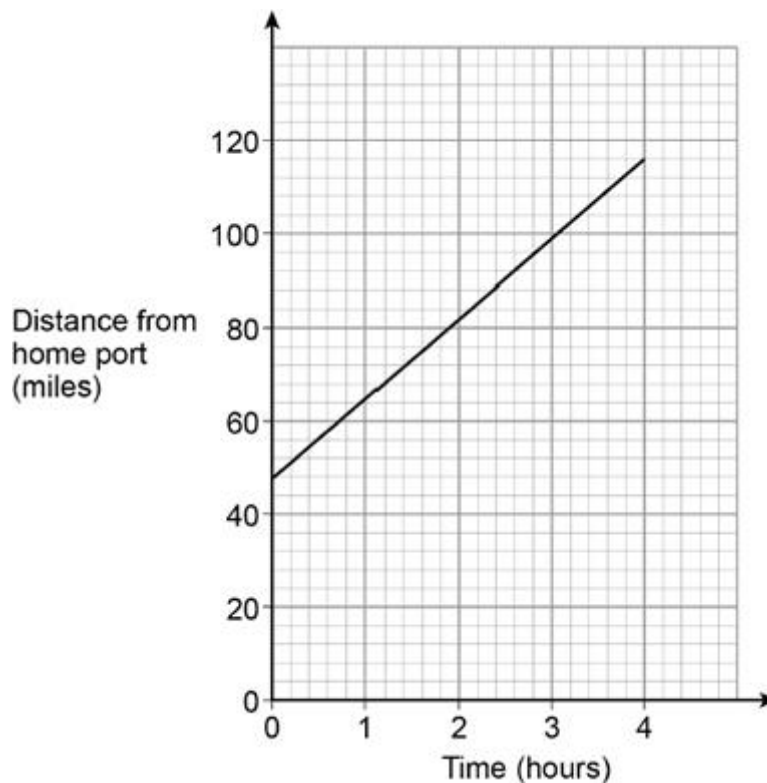
The density of tin is  $7.31 \text{ g / cm}^3$

Work out the mass of the medal.

**Sailing Ship**

A ship is sailing in a straight line from its home port.

The distance-time graph shows 4 hours of the journey.

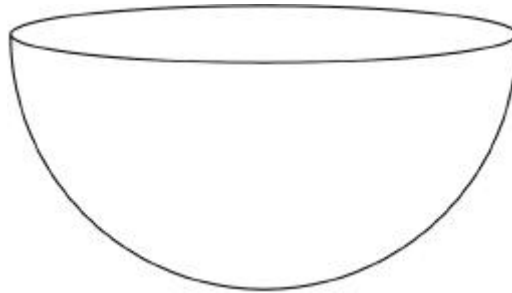


Work out the speed of the ship during these 4 hours.

**Challenge: Filling a hemisphere**

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3 \text{ where } r \text{ is the radius}$$

A container is a hemisphere of radius 30 cm



Sand fills the container at a rate of 4000 cm<sup>3</sup> per minute.

Does it take **less than** a quarter of an hour to fill the container?

You **must** show your working.

**Challenge: Earth's orbit**

The distance from the Earth to the Sun is 93 million miles.

Assume

it takes 365 days for the Earth to travel once around the Sun

the Earth travels in a circle with the Sun at the centre.

Work out the average speed of the Earth in miles per hour.