Problem 0580/42/F/M/20 Q4

A solid metal cone has radius 1.65 cm and slant height 4.70 cm.
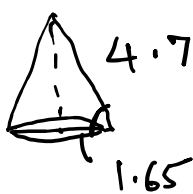
(a) Calculate the **total** surface area of the cone.
[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi r l$.]

$$= \text{area of Base (circle)} + \text{Curved Surface area}$$
$$= \pi \times 1.65^2 + \pi \times 1.65 \times 4.70$$

............**32.9**............ cm² [2]

(b) Find the angle the slant height makes with the base of the cone.

$$\theta = \cos^{-1} \frac{1.65}{4.70}$$

............**69.4**............ [2]

(c) (i) Calculate the volume of the cone.
[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

$$= \frac{1}{3} \times \pi \times 1.65^2 \times \sqrt{4.7^2 - 1.65^2}$$

............**12.5**............ cm³ [4]

(ii) A metal sphere with radius 5 cm is melted down to make cones identical to this one.

Calculate the number of complete identical cones that are made.
[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

$$\text{Volume of sphere} = \frac{4}{3} \times \pi \times 5^3 = 523.6 \text{ cm}^3$$

$$\text{" " Cone} = 12.5$$

$$\text{Number of identical} = \frac{523.6}{12.5}$$
$$\text{Cone}$$

............**41**............ [4]