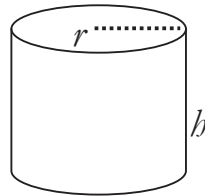




## Avaruuskappaleet

### Lieriö

**Ympyrälieriö**  
pohja ympyrä



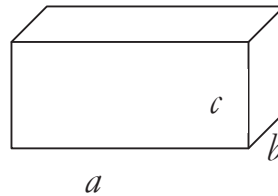
**Vaippa**

$$A = 2\pi r h$$

**Tilavuus**

$$V = \pi r^2 h$$

**Särmiö**  
pohja monikulmio

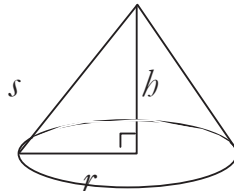


$$A = p h$$

$$V = A_{\text{pohja}} \cdot h$$

### Kartio

**Ympyräkartio**  
pohja ympyrä



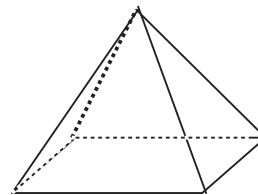
**Vaippa**

$$A = \pi r s$$

**Tilavuus**

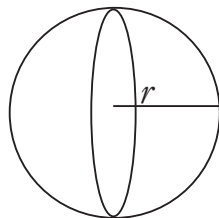
$$V = \frac{\pi r^2 h}{3}$$

**Pyramidi**  
pohja monikulmio



$$V = \frac{A_p \cdot h}{3}$$

### Pallo

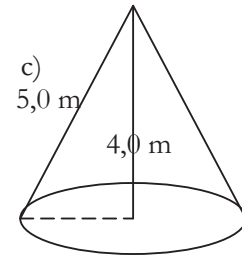
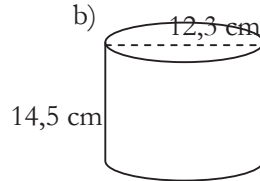
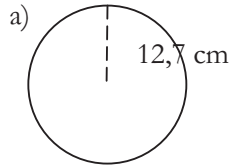


**Vaippa**  $A = 4\pi r^2$

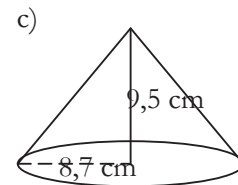
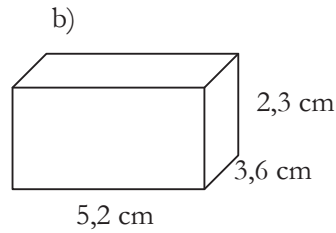
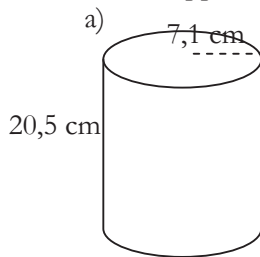
**Tilavuus**  $V = \frac{4}{3}\pi r^3$

**Tehtäviä avaruuskappaleista**

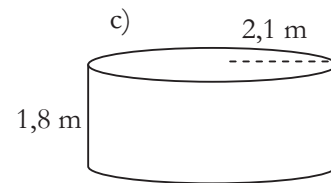
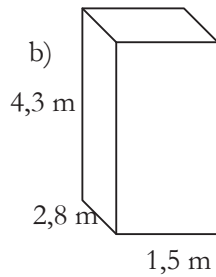
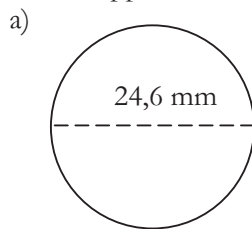
1. Laske kappaleen vaipan ala.



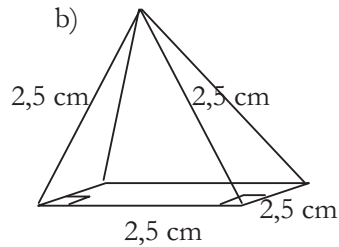
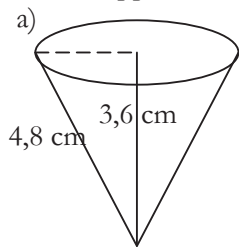
2. Laske kappaleen kokonaispinta-ala.



3. Laske kappaleen tilavuus.



4. Laske kappaleen vaipan ala ja tilavuus.

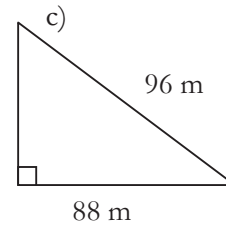
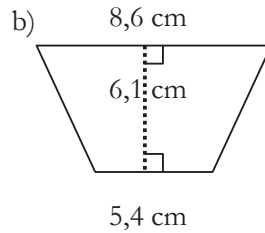
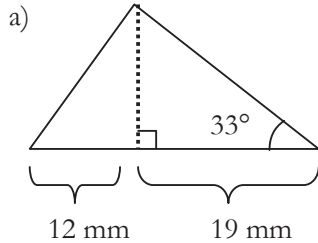


**Vastaukset**

- 
- |    |   |  |                       |
|----|---|--|-----------------------|
| 1. | a) $2030 \text{ cm}^2$                    | b) $560 \text{ cm}^2$                      | c) $47 \text{ m}^2$   |
| 2. | a) $1200 \text{ cm}^2$                    | b) $78 \text{ cm}^2$                       | c) $590 \text{ cm}^2$ |
| 3. | a) $7790 \text{ mm}^3$                    | b) $18 \text{ m}^3$                        | c) $25 \text{ m}^3$   |
| 4. | a) $48 \text{ cm}^2$ ja $38 \text{ cm}^3$ | b) $11 \text{ cm}^2$ ja $3,7 \text{ cm}^3$ |                       |

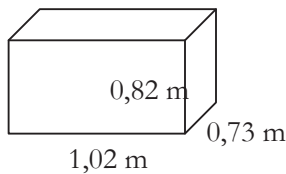
## Tehtäviä pinta-aloista ja tilavuuksista

1. Laske kuvioiden alat.

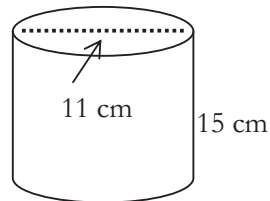


2. Laske tilavuus, kun kappale on

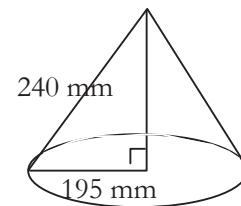
a) suora särmiö



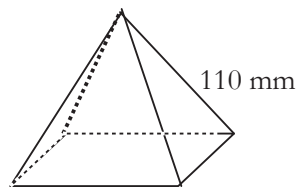
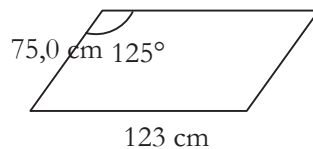
b) suora ympyrälieriö



c) suora ympyräkartio.



3. Laske alla olevan suunnikkaan ala.

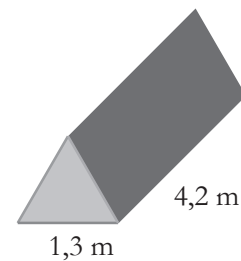


4. Laske yllä olevan suoran, neliöpohjaisen pyramidin tilavuus, kun pohjaneliön sivun pituus on 132 mm.

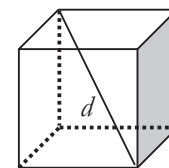
5. a) Laske sen pallon ala ja tilavuus, jonka halkaisija on 32 cm.

b) Laske pallon ala, kun sen tilavuus on  $4500 \text{ cm}^3$ .

6. Suoran särmiön pohja on tasasivuinen kolmio (kuva vieressä), jonka sivun pituus on 1,3 m ja korkeus 4,2 m. Laske särmiön tilavuus.



7. Kuution tilavuus on  $8,00 \text{ dm}^3$ . Laske kuution avaruusläivistäjän pituus  $d$ .



### Vastaukset

- |                          |                       |                        |  |                        |
|--------------------------|-----------------------|------------------------|--|------------------------|
| 1. a) $190 \text{ mm}^2$ | b) $43 \text{ cm}^2$  | c) 17 a                | 5. a) $32 \text{ dm}^2$ ja $17 \text{ dm}^3$ | b) $1300 \text{ cm}^2$ |
| 2. a) $0,61 \text{ m}^3$ | b) $1,4 \text{ dm}^3$ | c) $5,57 \text{ dm}^3$ | 6. $3,1 \text{ m}^3$                         |                        |
| 3. $75,6 \text{ dm}^2$   |                       |                        | 7. $3,46 \text{ dm} = 34,6 \text{ cm}$       |                        |
| 4. $338 \text{ cm}^3$    |                       |                        |  |                        |



# Geometria

