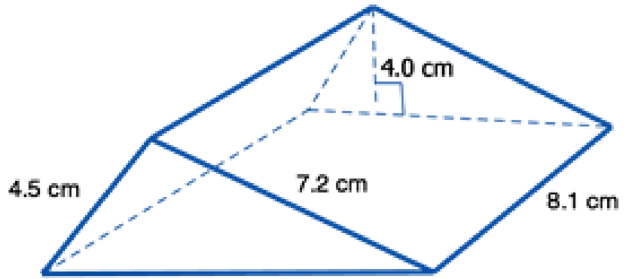
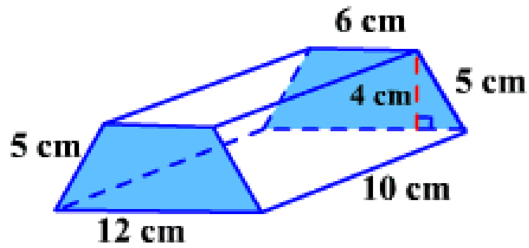
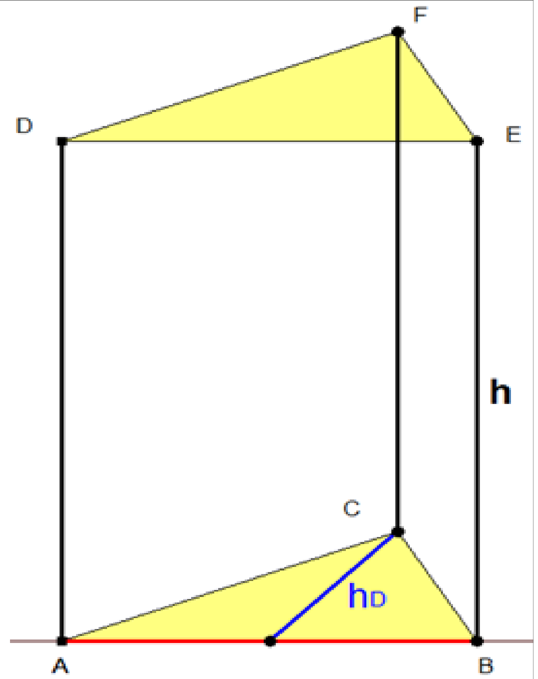
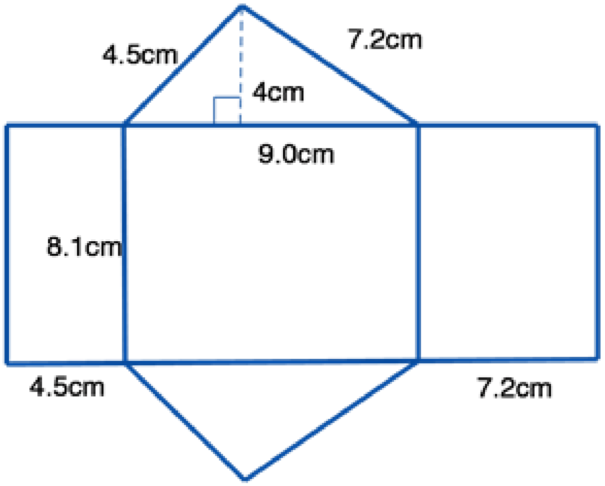
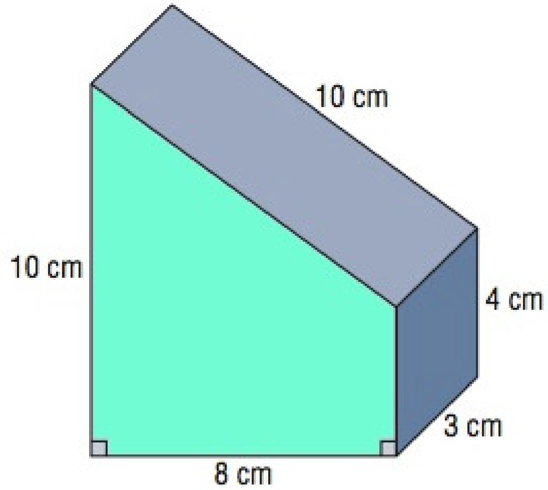
Volumen und Oberflächen von Prismen

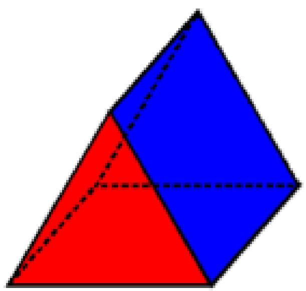


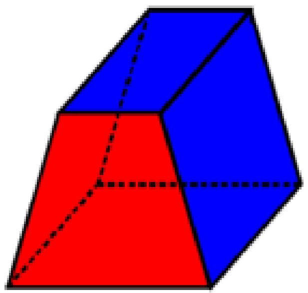


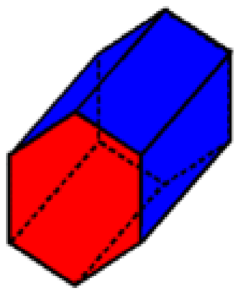


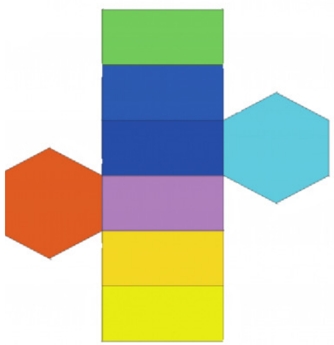


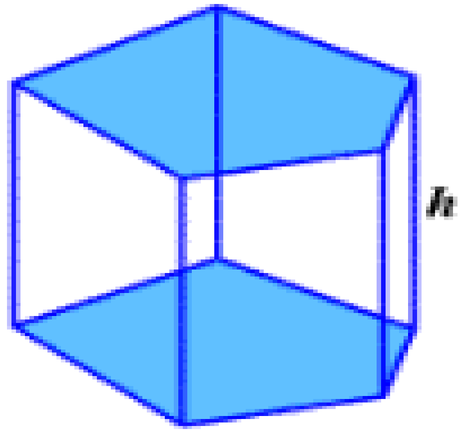




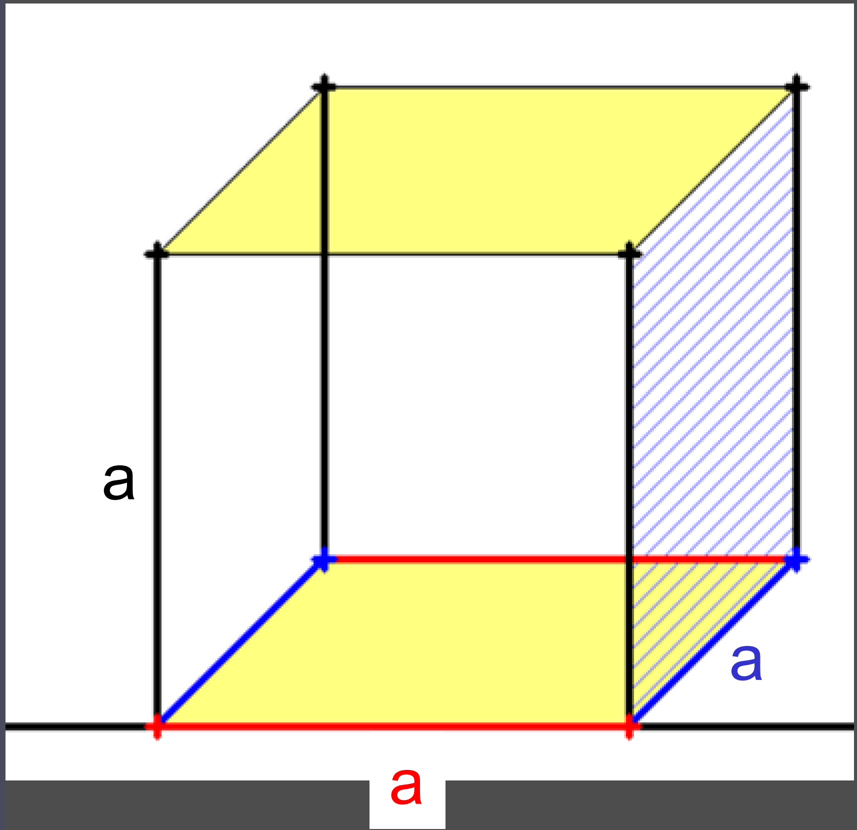






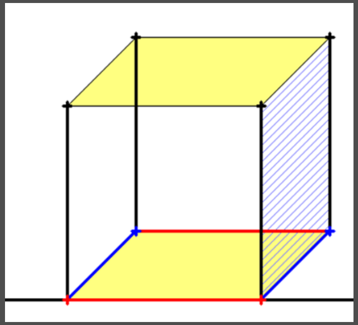


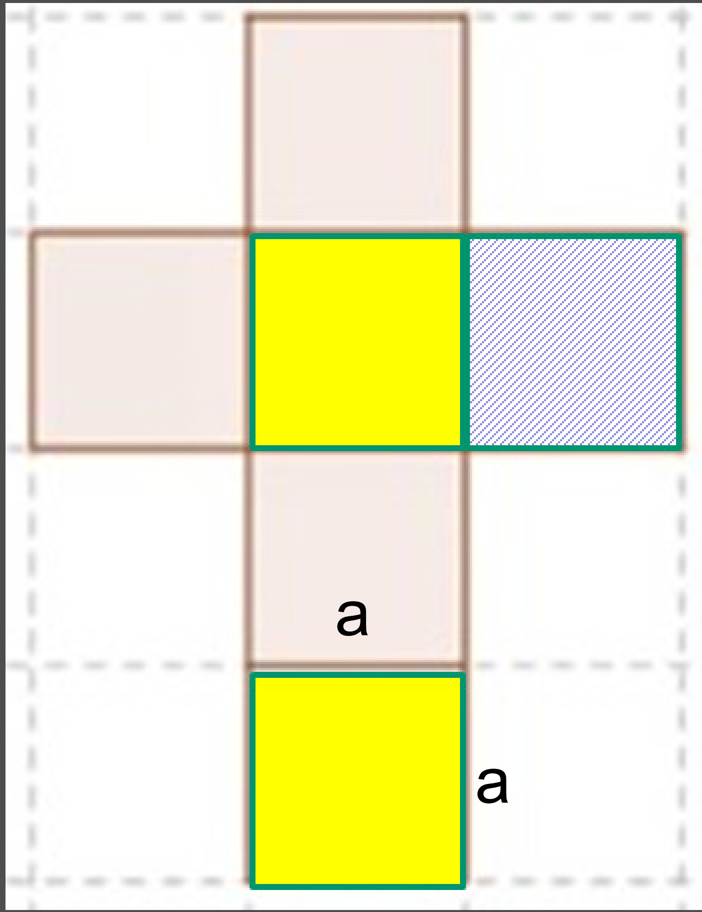
Volumen eines Würfels



$$V = G \cdot h$$
$$= (a \cdot a) \cdot a$$
$$= a^3$$

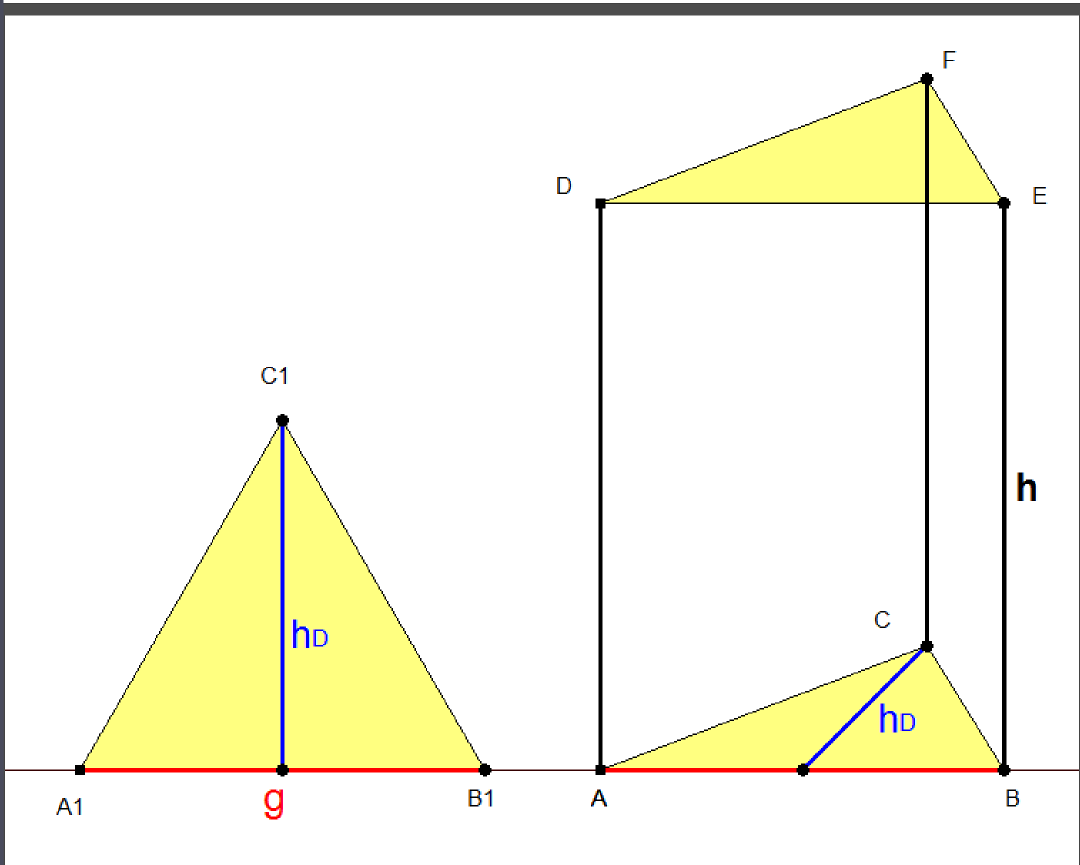
Oberfläche eines Würfels





$$O = 6 \cdot a^2$$

Volumen eines gleichseitigen Dreieck-Prismas

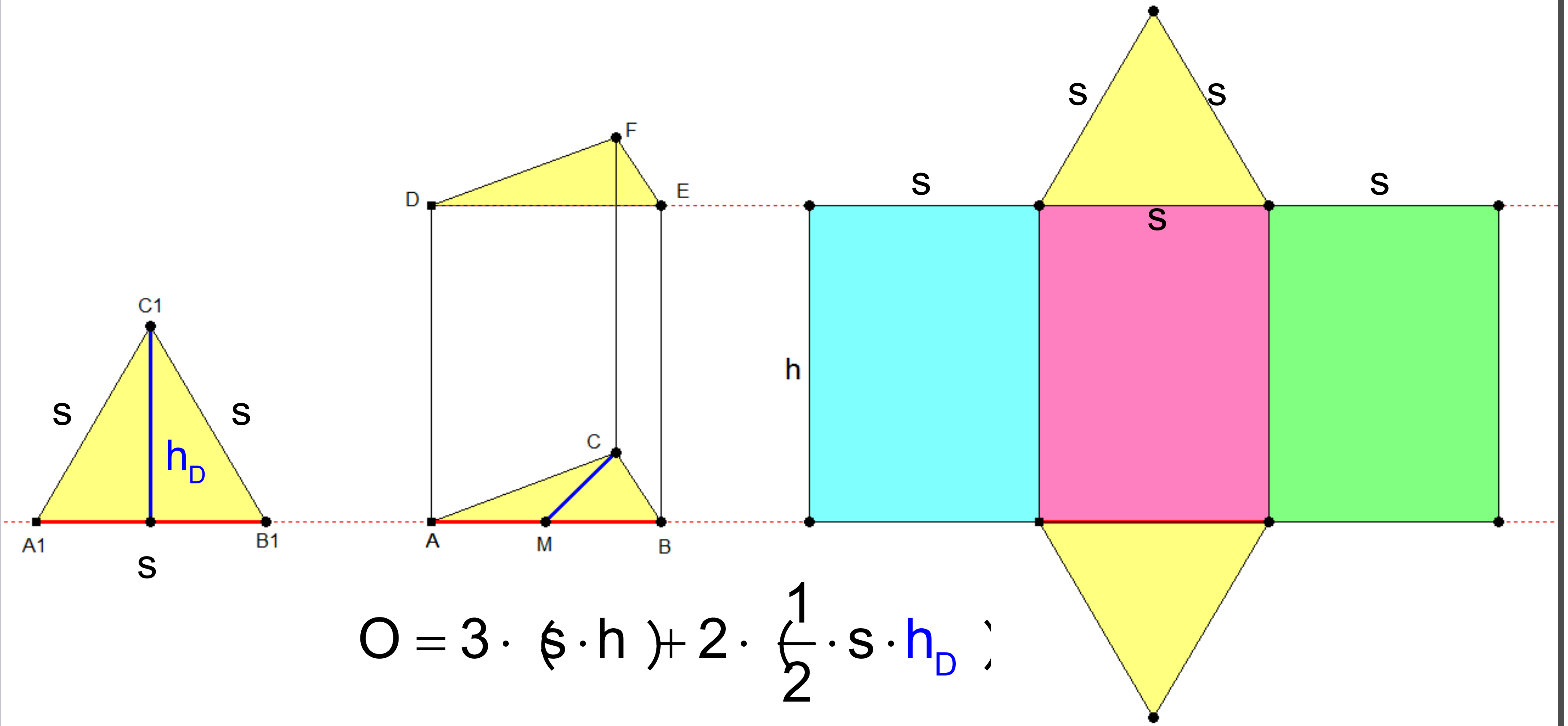


$$V = G \cdot h$$
$$= \left(\frac{1}{2} \cdot g \cdot h_D\right) \cdot h$$

$$G = \frac{1}{2} \cdot g \cdot h_D$$

Aufpassen:
h_D ist die Höhe des Grundflächendreiecks ,
und h ist die Höhe des Prismas!

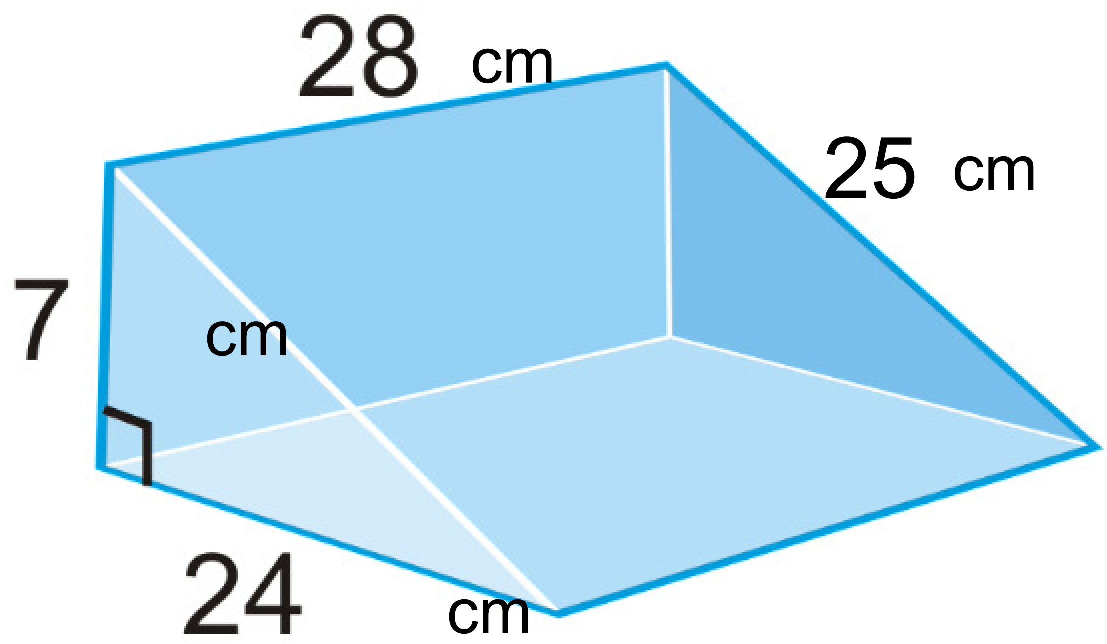
Oberfläche eines gleichseitigen Dreieck-Prismas



$$O = 3 \cdot (s \cdot h) + 2 \cdot \left(\frac{1}{2} \cdot s \cdot h_D\right)$$

$$= 3sh + sh_D$$

Dreieck-Prisma



$$G = \frac{7 \cdot 24}{2} cm^2 = 84 cm^2$$

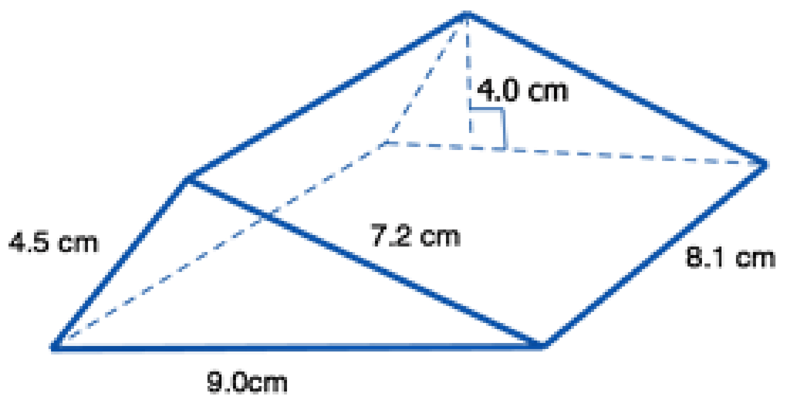
$$V = G \cdot h = 84 cm^2 \cdot 28 cm = 2352 cm^3$$

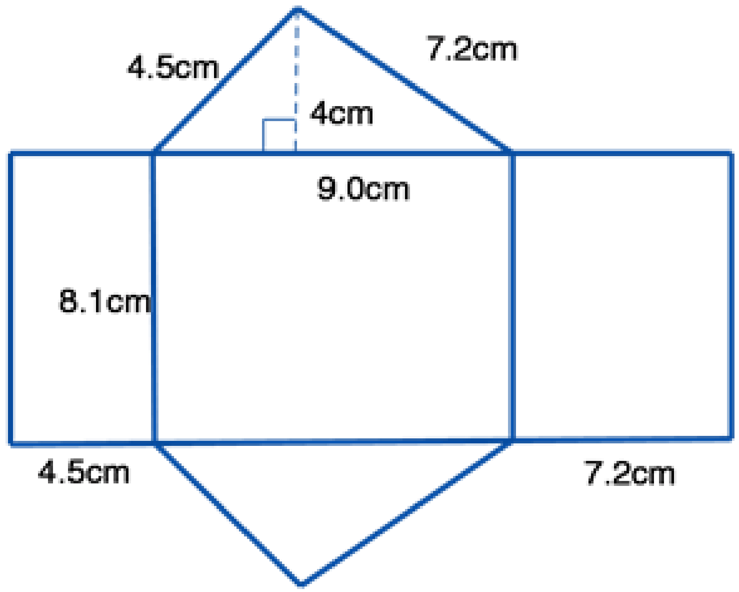
$$O = 2 \cdot 84 cm^2 + (7 \cdot 28 + 25 \cdot 28 + 24 \cdot 28) cm^2$$

$$= 2 \cdot 84 cm^2 + (7 + 25 + 24) 28 \ cm^2$$

$$= 1736 cm^2$$

Dreieck-Prisma



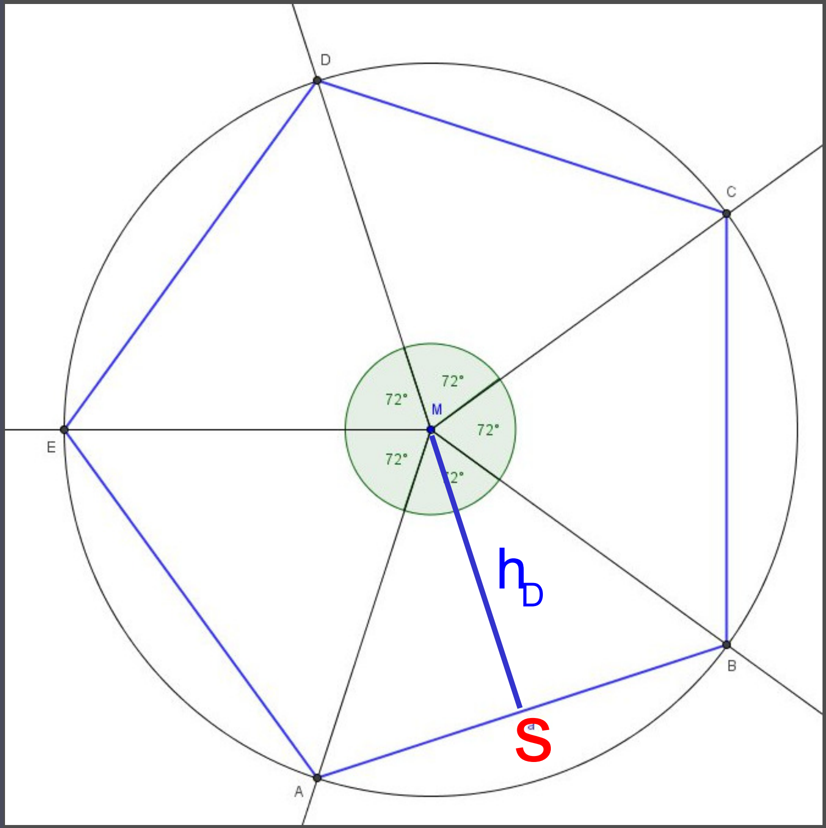


$$G = \frac{9 \cdot 4}{2} cm^2 = 18 cm^2$$

$$V = G \cdot h = 18 cm^2 \cdot 8{,}1 cm = 145{,}8 cm^3$$

$$O = 2 \cdot 18 cm^2 + (9 + 7{,}5 + 4{,}4)\, 8{,}1\ cm^2$$
$$\approx 205{,}3 cm^2$$

Das regelmäßige 5-eck (Pentagon)



$$G = 5 \cdot \left(\frac{1}{2} \cdot s \cdot h_D\right)$$

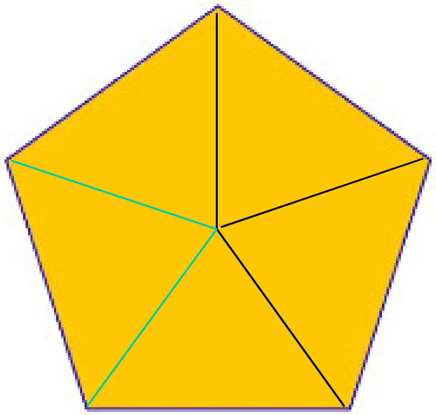
$$h_D \approx 0{,}85 \cdot s$$

In der 9. Klasse werdet ihr lernen, wie man h_D exakt ausrechnen kann.

$$G \approx 5 \cdot \left(\frac{1}{2} \cdot s \cdot 0{,}85 \cdot s\right)$$

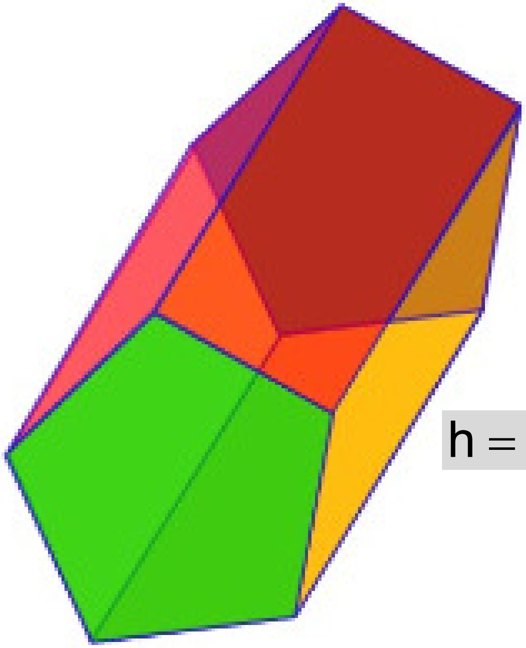
$$\approx 2{,}13 \cdot s^2$$

5-eck-Prisma(Pentagon-Prisma)

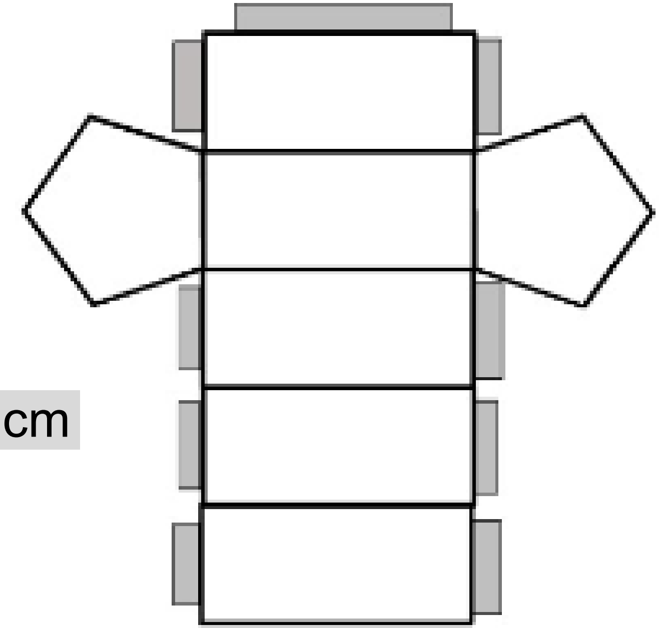


$s = 3cm$

$$G \approx 5 \cdot \left(\frac{1}{2} \cdot s \cdot 0{,}85 \cdot s \right)$$
$$\approx 2{,}13 \cdot s^2$$
$$\approx 19{,}2cm^2$$



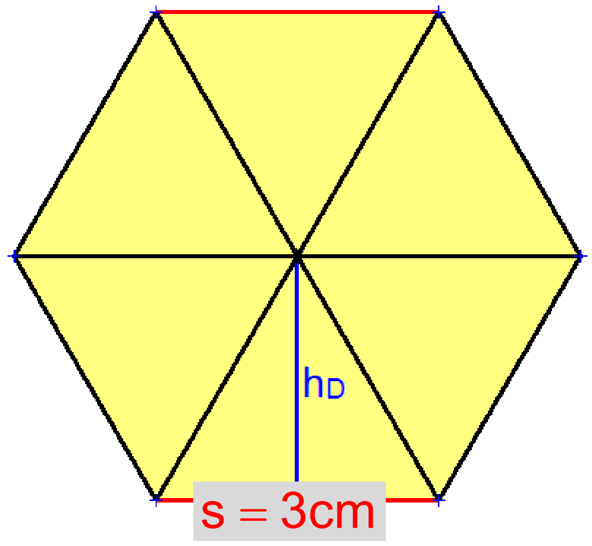
$h = 10cm$

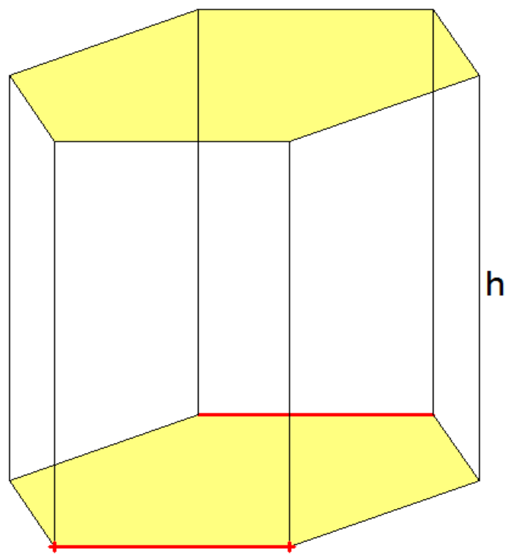


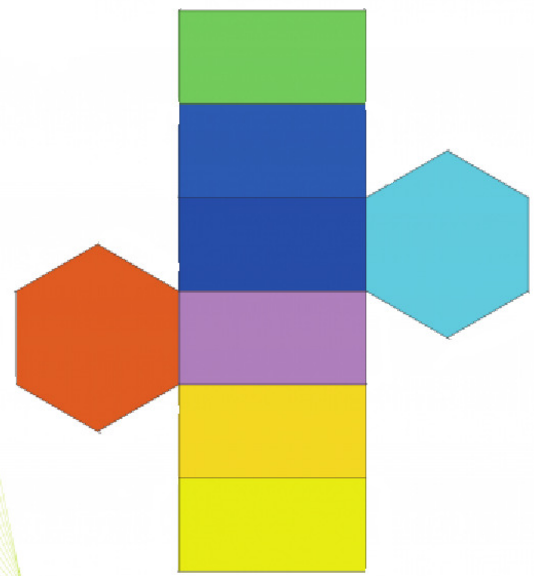
$$V = G \cdot h \approx 192cm^3$$

$$O = 2 \cdot G + (5 \cdot s)h$$
$$\approx 38{,}4cm^2 + 150cm^2 \approx 188{,}4cm^2$$

6-eck-Prisma (Hexagon-Prisma)







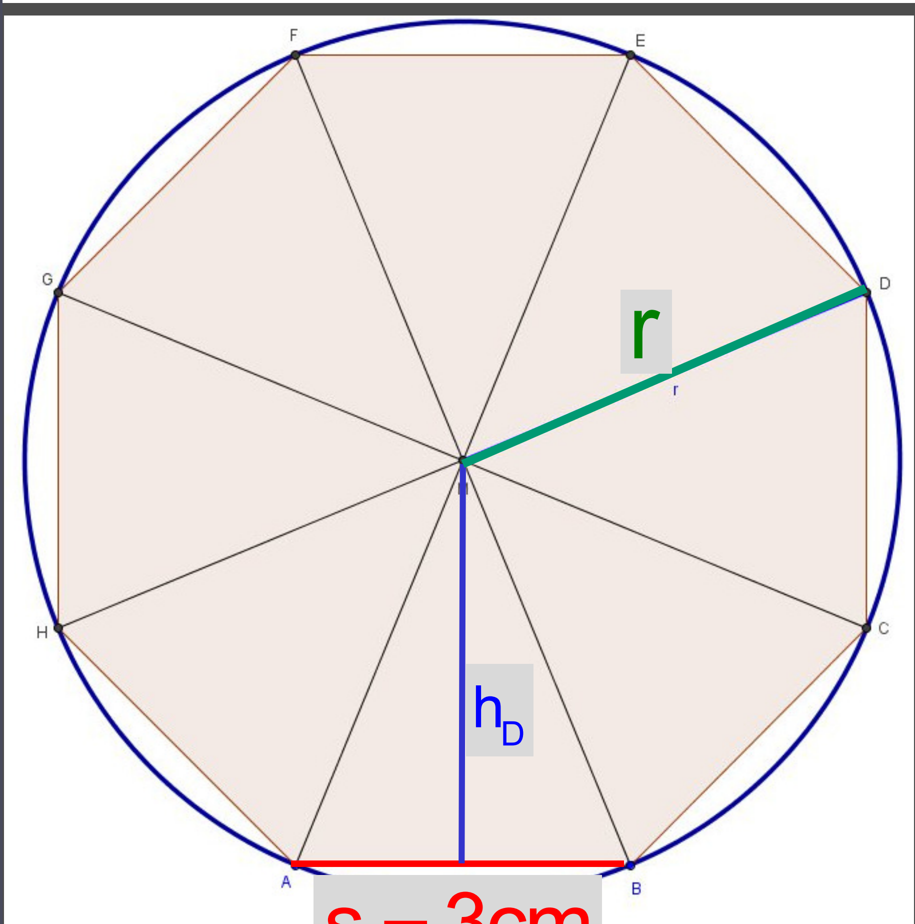
$$h_D \approx 0{,}87 \cdot s$$

$$G \approx 6 \cdot \left(\frac{1}{2} \cdot s \cdot 0{,}87 \cdot s \right)$$
$$\approx 2{,}13 \cdot s^2$$
$$\approx 23{,}5\,cm^2$$

$$V = G \cdot h \approx 235\,cm^3$$

$$O = 2 \cdot G + (6 \cdot s)\,h$$
$$\approx 47\,cm^2 + 180\,cm^2 \approx 227\,cm^2$$

8-eck-Prisma (Oktagon-Prisma)



Zeichne einen Kreis mit r=3,9cm, dann erhältst du ein 8-eck mit $s \approx 3cm$

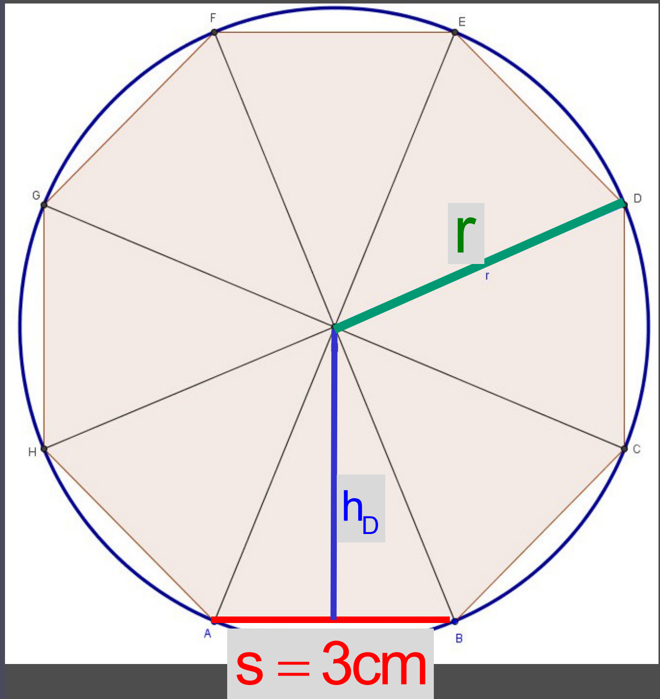
$$h_D \approx 1,4 \cdot s$$

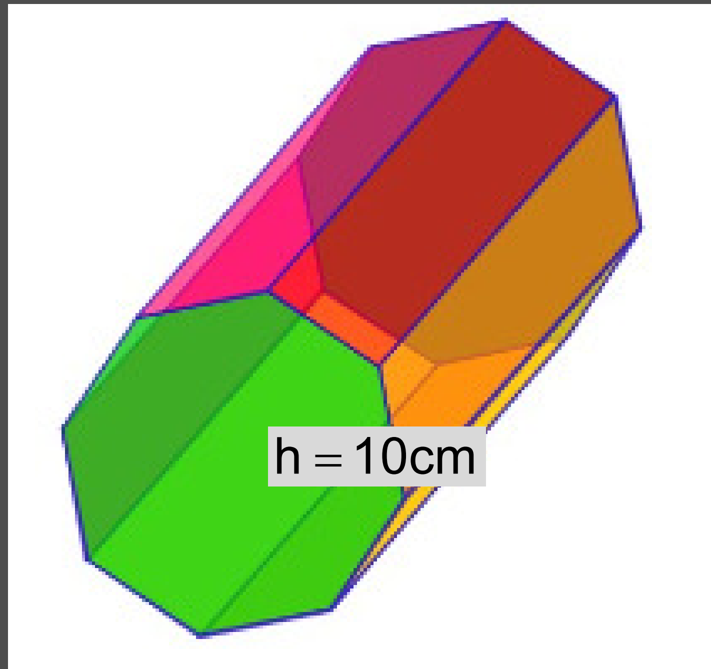
$$G \approx 8 \cdot \left(\frac{1}{2} \cdot s \cdot 1,4 \cdot s \right)$$

$$\approx 5,6 \cdot s^2$$

$$\approx 50,4cm^2$$

8-eck-Prisma (Oktagon-Prisma)





$$G \approx 8 \cdot \left(\frac{1}{2} \cdot s \cdot 1{,}4 \cdot s \right)$$

$$\approx 5{,}6 \cdot s^2$$

$$\approx 50{,}4cm^2$$

$$V = G \cdot h \approx 504cm^3$$

$$O = 2 \cdot G + (8 \cdot s) h$$

$$\approx 100{,}8cm^2 + 240cm^2$$

$$\approx 341cm^2$$