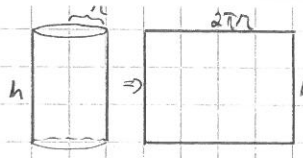


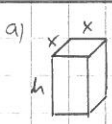
14.14



1° $h = 25 \text{ cm}$, $2\pi r = 30 \text{ cm}$
 $\Rightarrow r = \frac{30 \text{ cm}}{2\pi} \approx 4,7746 \text{ cm}$
 $V = \pi r^2 h = \pi (4,7746 \text{ cm})^2 \cdot 25 \text{ cm}$
 $\approx 1790,49 \text{ cm}^3 \approx 1800 \text{ cm}^3$

2° $h = 30 \text{ cm}$, $2\pi r = 25 \text{ cm}$
 $\Rightarrow r = \frac{25 \text{ cm}}{2\pi} \approx 3,97887 \text{ cm}$
 $V = \pi r^2 h = \pi (3,97887 \text{ cm})^2 \cdot 30 \text{ cm} \approx 1492,08 \text{ cm}^3 \approx 1500 \text{ cm}^3$

14.15

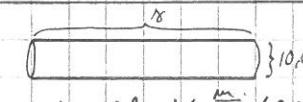


a) $h = 15,0 \text{ cm}$
 $V = x^2 h = 360 \text{ ml} = 0,36 \text{ l} = 0,36 \text{ dm}^3$
 $\Rightarrow x^2 = \frac{0,36 \text{ dm}^3}{15 \text{ dm}} = 0,24 \text{ dm}^2 \quad \sqrt{\quad} \Rightarrow x = 0,489898 \text{ dm}$



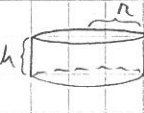
b) $V = \pi r^2 h = 0,36 \text{ dm}^3 \quad | : (\pi h) \quad \sqrt{\quad}$
 $\Rightarrow r = \sqrt{\frac{0,36 \text{ dm}^3}{\pi \cdot 15 \text{ dm}}} \approx 0,276395 \text{ dm}$
 $A = 2\pi r^2 + 2\pi r h = 2\pi \cdot (0,276395 \text{ dm})^2 + 2\pi \cdot 0,276395 \text{ dm} \cdot 15,0 \text{ cm}$
 $\approx 308,496 \text{ cm}^2 \approx 3,10 \text{ cm}^2$

14.16



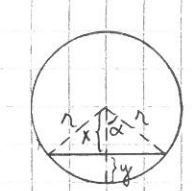
$r = \frac{10,0 \text{ cm}}{2} = 5,0 \text{ cm}$
 $v = 1,6 \frac{\text{m}}{\text{s}}$, $t = 60 \text{ s}$
 $l = vt = 1,6 \frac{\text{m}}{\text{s}} \cdot 60 \text{ s} = 96 \text{ m}$
 $V = \pi r^2 l = \pi (0,50 \text{ dm})^2 \cdot 960 \text{ dm} \approx 753,982 \text{ dm}^3 \approx 750 \text{ l}$

14.17



$2\pi r = 576 \text{ m} \Rightarrow r = \frac{576 \text{ m}}{2\pi} \approx 91,6732 \text{ m}$
 $\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho} = \frac{1500 \text{ kg}}{840 \frac{\text{kg}}{\text{m}^3}} \approx 1,78571 \text{ m}^3$
 $V = \pi r^2 h \Rightarrow h = \frac{V}{\pi r^2} = \frac{1,78571 \text{ m}^3}{\pi (91,6732 \text{ m})^2} \approx 6,7636 \cdot 10^{-5} \text{ m} \approx 0,07 \text{ mm}$

14.20



$r = \frac{44 \text{ cm}}{2} = 22 \text{ cm}$, $y = 8,9 \text{ cm}$
 $\cos \alpha = \frac{x}{r} = \frac{r-y}{r} = \frac{22 \text{ cm} - 8,9 \text{ cm}}{22 \text{ cm}}$
 $\Rightarrow \alpha \approx 53,455^\circ$

$A = A_n - A_d = \frac{2\alpha}{360} \pi r^2 - \frac{1}{2} \cdot r \cdot r \cdot \sin(2\alpha)$
 $= \frac{2 \cdot 53,455^\circ}{360} \pi \cdot (2,2 \text{ dm})^2 - \frac{1}{2} \cdot (2,2 \text{ dm})^2 \cdot \sin(2 \cdot 53,455^\circ)$
 $\approx 2,20018 \text{ dm}^2$

$V = \pi r^2 h \Rightarrow h = \frac{V}{\pi r^2} = \frac{200 \text{ dm}^3}{\pi (2,2 \text{ dm})^2} \approx 13,1533 \text{ dm}$

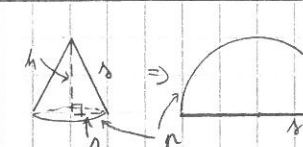
hinnoittelu: $1,32 \frac{\text{e}}{\text{l}} \cdot Ah + 17,99 \text{ e} = 1,32 \frac{\text{e}}{\text{l}} \cdot 2,20018 \text{ dm}^2 \cdot 13,1533 \text{ dm} + 17,99 \text{ e}$
 $= 1,32 \frac{\text{e}}{\text{l}} \cdot 28,9397 \text{ l} + 17,99 \text{ e} = 38,20 \text{ e} + 17,99 \text{ e} = 56,19 \text{ e}$

15.1



b) $h = \sqrt{5,0^2 + 12,0^2} = 13,0$
c) $V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \cdot 5,0^2 \cdot 12,0 = 314,159 \approx 314$
 $A_n = \pi r h = \pi \cdot 5,0 \cdot 13,0 = 204,204 \approx 204$

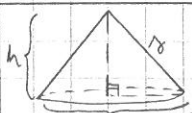
15.7



a) $2r = 20 \Rightarrow r = 10$
 $f = \frac{1}{2} \cdot 2\pi r = 2\pi r$
 $\Rightarrow r = \frac{f}{2} = \frac{10}{2} = 5$

b) $h^2 + r^2 = R^2 \Rightarrow A^2 = 10^2 - 5^2 = 75 \quad \sqrt{\quad} \Rightarrow h = \sqrt{75} = 5\sqrt{3}$
c) $V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \cdot 5^2 \cdot 5\sqrt{3} = \frac{125}{3} \pi \sqrt{3}$

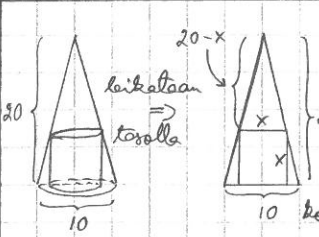
15.12



a) $V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \left(\frac{3 \text{ dm}}{2}\right)^2 \cdot 1,82 \text{ dm}$
 $\approx 4,28827 \text{ dm}^3 \approx 4,3 \text{ l}$

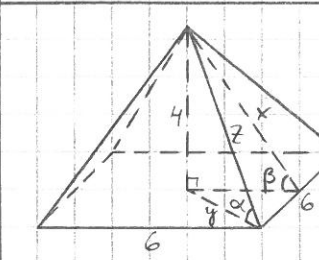
b) $R^2 = A^2 + \left(\frac{f}{2}\right)^2 \Rightarrow R = \sqrt{0,182 \text{ m}}^2 + \left(\frac{0,3 \text{ m}}{2}\right)^2}$
 $\approx 0,23585 \text{ m}$
 $A_n = \pi R f = \pi \cdot 0,23585 \text{ m} \cdot 0,3 \text{ m} \approx 0,1114 \text{ m}^2 \approx 0,11 \text{ m}^2$

15.10



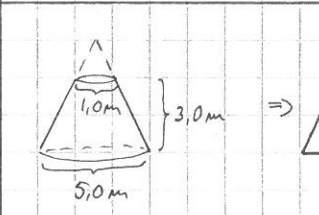
$\Delta \sim \Delta$ (88)
 $\frac{20-x}{x} = \frac{20}{10} = 2 \quad | \cdot x$
 $\Rightarrow 20-x = 2x$
 $\Rightarrow 20 = 3x \Rightarrow x = \frac{20}{3}$
konkurens = polygon halkaväijä = $\frac{20}{3}$

15.14



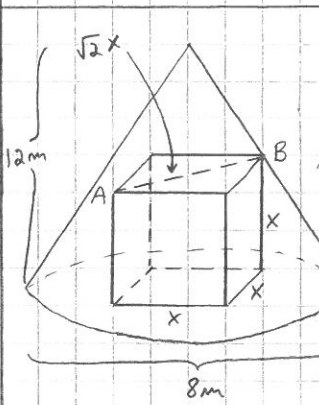
a) $x^2 = 4^2 + 3^2 = 25 \Rightarrow x = 5$
b) $y = \frac{1}{2} \sqrt{6^2 + 6^2} = \frac{1}{2} \sqrt{72}$
 $= \frac{1}{2} \sqrt{36 \cdot 2} = \frac{1}{2} \cdot 6\sqrt{2} = 3\sqrt{2}$
 $z^2 = 4^2 + (3\sqrt{2})^2 = 16 + 9 \cdot 2 = 34$
 $\Rightarrow z = \sqrt{34}$
c) $\tan \alpha = \frac{z}{y} = \frac{z}{3\sqrt{2}} \Rightarrow \alpha = 43,31 \approx 43^\circ$
d) $\tan \beta = \frac{z}{x} = \frac{z}{5} \Rightarrow \beta = 53,130^\circ \approx 53^\circ$

15.16



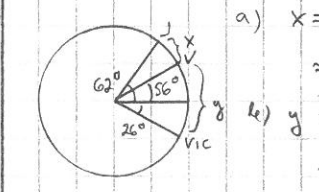
$\Delta \sim \Delta$ (88)
 $\frac{x-3}{x} = \frac{x-3}{5} \quad | \cdot 5$
 $\Rightarrow 5(x-3) = x$
 $\Rightarrow 5x - 15 = x \Rightarrow 4x = 15$
 $\Rightarrow x = \frac{15}{4} = 3,75 \approx 3,86$

15.17



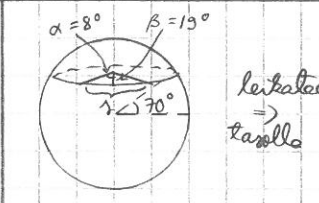
$\Delta \sim \Delta$ (88)
 $\frac{12-x}{\sqrt{2}x} = \frac{12}{8} = \frac{3}{2} \quad | \cdot 2$
 $\Rightarrow 3\sqrt{2}x = 2(12-x) \Rightarrow 3\sqrt{2}x = 24 - 2x$
 $\Rightarrow 3\sqrt{2}x + 2x = 24 \Rightarrow x(3\sqrt{2} + 2) = 24$
 $\Rightarrow x = \frac{24}{3\sqrt{2} + 2} \approx 3,8445 \text{ (m)}$
 $V = x^3 \approx 56,8236 \text{ m}^3 \approx 57 \text{ m}^3$

16.1



a) $x = \frac{\alpha}{360} 2\pi R = \frac{62^\circ - 56^\circ}{360} \cdot 40.000 \text{ km}$
 $\approx 666,667 \text{ km} \approx 670 \text{ km}$
b) $y = \frac{\beta}{360} 2\pi R = \frac{56^\circ + 26^\circ}{360} \cdot 40.000 \text{ km}$
 $\approx 911,111 \text{ km} \approx 910 \text{ km}$

16.2



$\cos 70^\circ = \frac{r}{R} \Rightarrow r = R \cos 70^\circ$

$\alpha = \frac{\alpha + \beta}{360} \cdot 2\pi R = \frac{\alpha + \beta}{360} 2\pi R \cos 70^\circ$
 $= \frac{8^\circ + 19^\circ}{360} \cdot 40.000 \text{ km} \cdot \cos 70^\circ$
 $\approx 1026,673 \approx 1030 \text{ km}$