

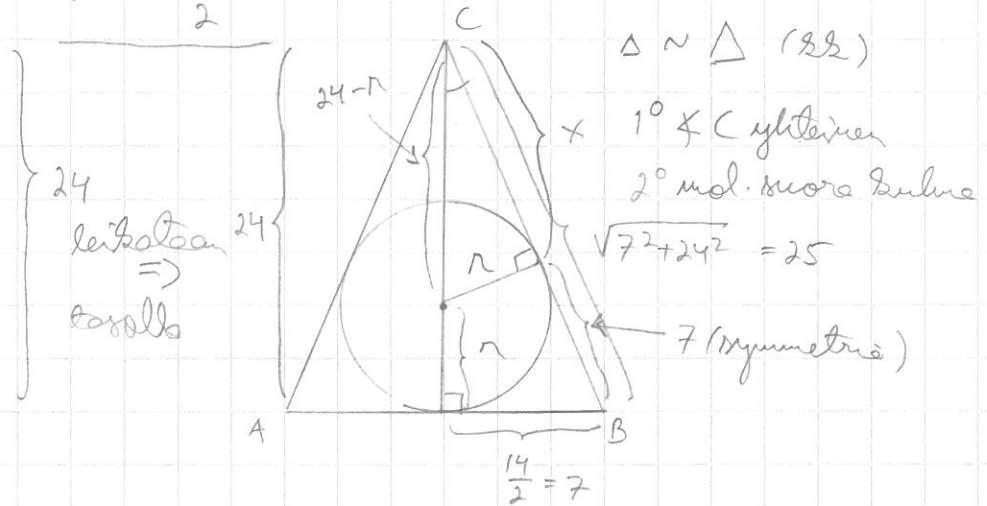
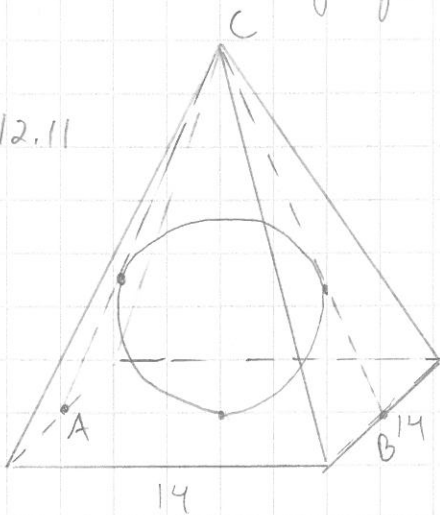
12.4 a) geogelera

b) pienempi pallo: $r = \frac{a}{2}$

kuutiön akselisuhteita: $\sqrt{a^2 + a^2 + a^2} = \sqrt{3a^2} = \sqrt{3}a = 2R$

isompi pallo: $R = \frac{\sqrt{3}a}{2}$

12.11



$$\frac{25}{7} = \frac{24-r}{r} \quad | \times$$

$$\Leftrightarrow 25r = 7(24-r)$$

$$\Leftrightarrow 25r = 7 \cdot 24 - 7r$$

$$\Leftrightarrow 32r = 7 \cdot 24 \quad | : 32 \quad \Leftrightarrow r = \frac{7 \cdot 24}{32} = \frac{21}{4}$$

$$|TA|: x = 25 - 7 = 18$$

$$\text{Pythagoras: } r^2 + x^2 = (24-r)^2$$

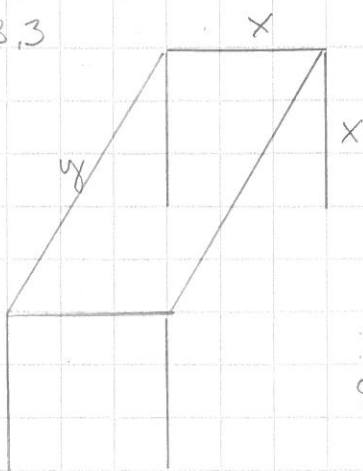
$$\Leftrightarrow r^2 + 18^2 = (24-r)^2$$

$$\Leftrightarrow r^2 + 18^2 = 24^2 - 2 \cdot 24 \cdot r + r^2$$

$$\Leftrightarrow r = \frac{21}{4}$$

13. Ääriarvoesovellus

13.3



$$\text{tilavuus: } V = x^2 y = 48 \quad | : x^2$$

$$\Leftrightarrow y = \frac{48}{x^2}, \quad y > 0 \text{ aina} \Rightarrow x \text{ ille}$$

$$\text{ei ole ylärajaa} \Rightarrow x > 0$$

Pinta-ala summa:

$$f(x) = 6x + 2y = 6x + 2 \cdot \frac{48}{x^2} = 6x + \frac{96}{x^2}$$

f jatkuvaa ja derivoituvaa kun $x > 0$

$$f'(x) = 6 + \frac{0 \cdot x^2 - 96 \cdot 2x}{(x^2)^2} = 6 - \frac{192x}{x^4} = 6 - \frac{192}{x^3} = 0 \quad | \cdot x^3$$

$$\boxed{D_f = f' \cdot g = g' \cdot f}$$