

2089 a) $25^3 \cdot 4^3 = 25 \cdot 25 \cdot 25 \cdot 4 \cdot 4 \cdot 4 = 100 \cdot 100 \cdot 100 = 100^3$
 $= 1000000 = 10^6$

$\left[\text{TAI} \right] 25^3 \cdot 4^3 = (25 \cdot 4)^3 = 100^3 = 1000000 = 10^6$

b) $\frac{14^2}{7^2} = \frac{\cancel{14} \cdot \cancel{14}}{\cancel{7} \cdot \cancel{7}} = \frac{2 \cdot 2}{1 \cdot 1} = 4$

$\left[\text{TAI} \right] \frac{14^2}{7^2} = \left(\frac{14}{7} \right)^2 = 2^2 = 4$

5.10 a) $13900 \cdot 6,022 \cdot 10^{23} \approx \underline{8,37 \cdot 10^{27}}$

b) $\frac{5,52 \cdot 10^{27}}{6,022 \cdot 10^{23}} \approx 9166,39 \approx \underline{9170 \text{ (moolia)}}$

5.21 alusse: 3,0g
 0,5h:n pulkutus: $2 \cdot 3,0g$
 1h:n — — — — — $2^2 \cdot 3,0g$
 1,5h:n — — — — — $2^3 \cdot 3,0g$

a) 10h:n — — — — — $2^{20} \cdot 3,0g \approx \underline{3,1 \cdot 10^6 g} = \underline{3,1 \cdot 10^3 kg}$
 " 20 · 0,5

b) 1 vuorok. — — — — — $2^{2 \cdot 24} \cdot 3,0g \approx \underline{8,4 \cdot 10^{14} g} = \underline{8,4 \cdot 10^{11} kg}$
 " 24h = 2 · 24 · 0,5h

Potenssikaavat:

1. $a^m \cdot a^k = a^{m+k}$	} sama kantoluku
2. $\frac{a^m}{a^k} = a^{m-k} \quad (a \neq 0)$	
3. $(ab)^m = a^m b^m$	} sama eksponentti
4. $\left(\frac{a}{b} \right)^m = \frac{a^m}{b^m} \quad (b \neq 0)$	
5. $(a^m)^k = a^{mk}$	

POTENSsin POTENSsi

2 kpl

Tod. 5. $(a^m)^k = (\underbrace{a \cdot a \cdot \dots \cdot a}_{m \text{ kpl}})^k = (a \cdot a \cdot \dots \cdot a) \cdot (a \cdot a \cdot \dots \cdot a) \dots (a \cdot a \cdot \dots \cdot a)$