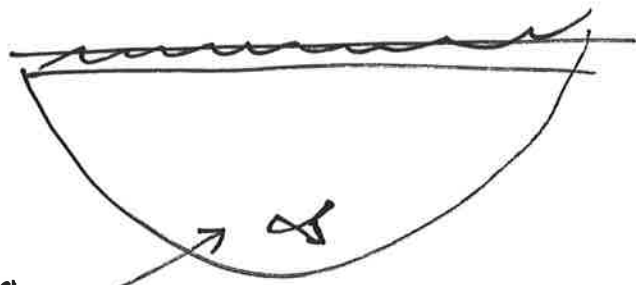


MASSA



4°C

VESI

1000 kg/m³

JÄÄ

920 kg/m³

1 LITRA 4°C VETTÄ ON
MASSALTAAN 1 kg



1 kg

1000 kg = 1 t

0,1 m

MUITA YKSIKÖITÄ

1 oz = 1 UNSSI = 28,35 g

1 lb = 1 POUNNA = 453,6 g
(= 16 oz)

ESIM.

KULLAN HINTA.

50 €/g

$$= 1276 \frac{\text{USD}}{\text{oz}}$$

$$1 \text{ USD} = 0,8591 \text{ €}$$

$$\begin{aligned} 1276 \frac{\text{USD}}{\text{oz}} &= 1276 \frac{\text{USD}}{\text{oz}} \cdot \frac{1 \text{ oz}}{28,35 \text{ g}} \\ &= 45,0089 \frac{\text{USD}}{\text{g}} \cdot \frac{0,8591 \text{ €}}{\text{USD}} \\ &= \underline{\underline{38,66 \text{ €/g}}} \approx \cancel{939 \text{ €/g}} \end{aligned}$$

ESIM.

MIESTEN KUULAN TYÖNTÖ,
KUULAN MASSA?

8 kg

$$16 \text{ lb} = 16 \text{ lb} \cdot \frac{453,6 \text{ g}}{1 \text{ lb}}$$

$$= 7257 \text{ g}$$

$$\approx \underline{\underline{7,26 \text{ kg}}}$$

$$V \approx 1 \text{ l}$$



RAUDAN TIHEYS $\rho = 7,86 \text{ kg/l}$

$$V = \frac{m}{\rho} = \frac{7,26 \text{ kg}}{7,86 \text{ kg/l}} = 0,923 \text{ l} \\ = 923 \text{ cm}^3$$

$$\frac{4\pi r^3}{3} = V \quad || \cdot \frac{3}{4\pi}$$

$$r^3 = \frac{3V}{4\pi} \rightarrow r = \sqrt[3]{\frac{3V}{4\pi}} = \sqrt[3]{\frac{3 \cdot 923}{4\pi}}$$

$$= 6,04 \text{ cm}$$

$$\hookrightarrow 2r = \underline{\underline{12 \text{ cm}}}$$

ESIM. MIESTEN KUULANTYÖNNÖSSÄ
MIKÄ ON KUULAN MASSA?

~~21 kg~~

8 kg

$$\begin{aligned} m &= 16 \text{ lb} = 16 \text{ lb} \cdot 453,6 \frac{\text{g}}{\text{lb}} \\ &= 7257 \text{ g} \\ &\approx \underline{\underline{7,26 \text{ kg}}} \end{aligned}$$

HALKAISINA $4'' = 4 \cdot 2,54 \text{ cm} = 11,6 \text{ cm}$
14 cm

RATK. RAUDAN TIHEYS

$$\rho = 7,86 \text{ kg/L}$$

$$V_{\text{PALLO}} = V = \frac{4\pi \cdot r^3}{3}$$

$$\left(\begin{array}{c} 2\pi r \\ \pi r^2 \\ 4\pi r^2 \end{array} \right)$$

$$\rho = \frac{m}{V} \quad || \cdot V$$

$$\rightarrow m = \rho V$$

$$\begin{aligned} \rightarrow V &= \frac{m}{\rho} = \frac{7,25 \text{ kg}}{7,86 \text{ kg/L}} = 0,923 \text{ L} = 0,923 \text{ dm}^3 \\ &= 923 \text{ cm}^3 \end{aligned}$$

$$\frac{4\pi r^3}{3} = V \quad || \cdot \frac{3}{4\pi}$$

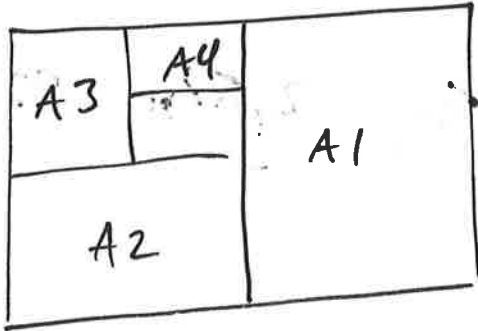
$$r^3 = \frac{3V}{4\pi} \rightarrow r = \sqrt[3]{\frac{3V}{4\pi}}$$

$$r = \sqrt[3]{\frac{3 \cdot 923}{4\pi}} = 6,04 \text{ cm} \Rightarrow 2r = \underline{\underline{12 \text{ cm}}}$$

ESIM. A - JÄRVES TELMA PAPERILLE,

80 g/m²

A0 1 m²



A4 ARKIN MASSA ?

A0 1 m²

A1 1/2

A2 1/4

A3 1/8

A4 1/16 m²

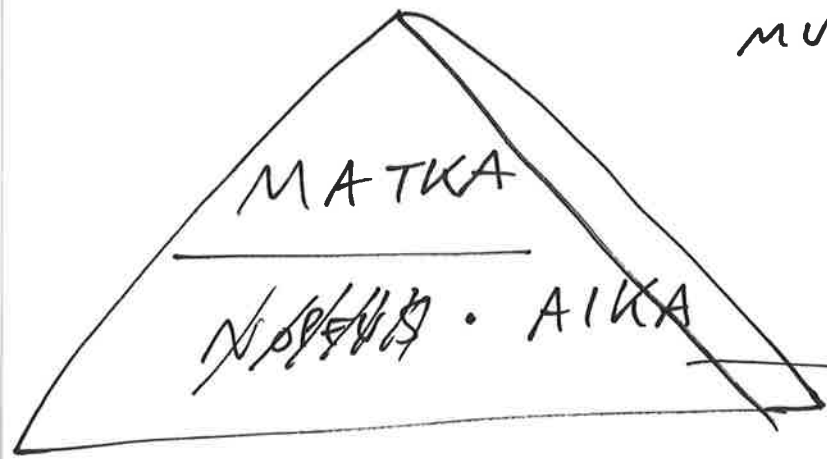
~~ARKIN.~~
80 g

$$m = 80 \text{ g/m}^2 \cdot \frac{1}{16}$$
$$= \underline{\underline{5 \text{ g}}}$$



APUNEUVO: LASKUKAAVAN

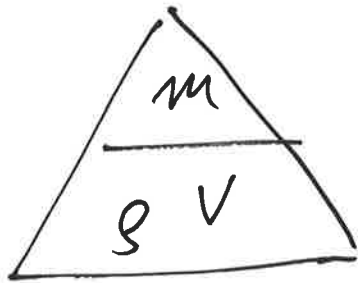
MUISTIKOLMIO



$$\text{MATKA} = \text{NOPEUS} \cdot \text{AIKA}$$

$$\text{NOPEUS} = \frac{\text{MATKA}}{\text{AIKA}}$$

$$\text{AIKA} = \frac{\text{MATKA}}{\text{NOPEUS}}$$



$$\left\{ \begin{array}{l} m = \rho V \\ \rho = \frac{m}{V} \\ V = \frac{m}{\rho} \end{array} \right.$$

WITUN

PUIMURI



$$P = UI$$

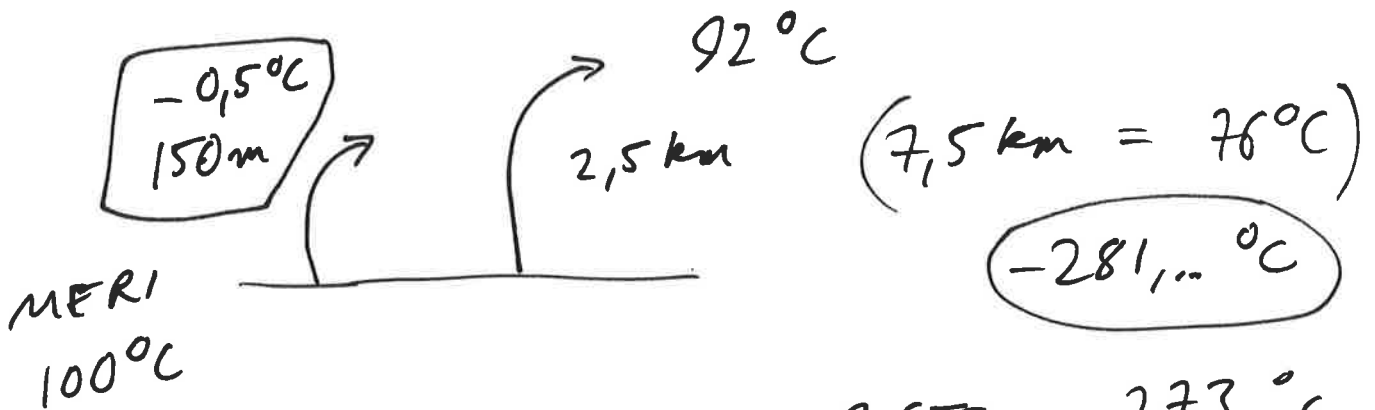
$$U = RI$$

$$W = I \cdot U = P \cdot t$$

LÄMPÖTILA

NORMAALISSA ILMANPAINESSA

0 °C VESI JÄÄTYY
100 °C VESI KIEHUU



ABSOLUUTTINEN NOLLA PISTE -273 °C

-273,15 °C

= 0 K

= 0 KELVINIÄ

↳ 0 °C = 273,15 K

100 °C = 373,15 K

1538 °C = ~~1775~~ K

= 1811 K

0°C 32°F
 100°C 212°F

180° 100°C

$$C^{\circ} = \frac{F^{\circ} - 32}{1.8}$$

1.8

ESIM. PAPERI SYTTYY 451°F

$$= \frac{451 - 32}{1.8} = \underline{\underline{232,8^{\circ}\text{C}}}$$

IHMISEN RUVMIN LÄMPÖ $^{\circ}\text{F}$?

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1.8} \quad \parallel \cdot 1.8$$

$$^{\circ}\text{C} \cdot 1.8 = ^{\circ}\text{F} - 32 \quad \parallel + 32$$

$$^{\circ}\text{C} \cdot 1.8 + 32 = ^{\circ}\text{F}$$

$$37 \cdot 1.8 + 32 = \underline{\underline{98,6^{\circ}\text{F}}}$$

VOIMA [F] 1 N (NEWTON)

0 N VOIMA, JOKA AIHEUTTA
1 kg KAPPALELLE 1 m/s²
KIIHTYVYDEN

ESIM. $t=0$ $v_0=0$ ○ KIVI TIPPUU

$t=1s$ ○ $v = 9,81 \text{ m/s}$

$t=2s$ ○ $v = 2 \cdot 9,81 \text{ m/s}$
 $= 19,6 \text{ m/s}$

$t=3s$ ○ $v = 3 \cdot 9,81 \text{ m/s}$
 $\approx 30 \text{ m/s}$

KIIHTYVYYS $a = \frac{\Delta v}{\Delta t} = \frac{9,81 \text{ m/s}}{1}$

↳ NEWTON 2 $\text{PUTOAMINEN} = 9,81 \text{ m/s}^2 = g$
 $F = ma = mg = 1 \text{ kg} \cdot 9,81 \text{ m/s}^2$
 $= 9,81 \frac{\text{kg} \cdot \text{m}}{\text{s}^2}$
 $= \underline{\underline{9,81 \text{ N}}}$

ESIM. JUHA -MATTIN VAIKUTTAVA
MAAN VETOVOIMA

$$F = mg = 90 \text{ kg} \cdot 9,81 \text{ m/s}^2 \\ = \underline{\underline{883 \text{ N}}}$$

(-16,5 kg)

PAINE $1 \text{ Pa} = \frac{1 \text{ N}}{1 \text{ m}^2}$

$$100\,000 \text{ Pa} = 10^5 \text{ Pa} = 1 \text{ bar}$$

$$1 \text{ PSI} = 1 \text{ POUNDS / SQUARE INCH}$$

$$= \frac{0,4536 \text{ kg}}{(0,0254 \text{ m})^2}$$

$$= 703,081 \frac{\text{kg}}{\text{m}^2} \cdot \frac{9,80665 \text{ N}}{\text{kg}}$$

$$= 6894 \frac{\text{N}}{\text{m}^2}$$

$$= \underline{\underline{6,9 \text{ kPa}}}$$

~~tu~~