2. gyakorlat — Elektrosztatika

1.) $10^{-10}\,m = 6$ ångström (r)

Elemi töltés: $1{,}6 \cdot 10^{-19}\,C$

$$F = k \cdot \frac{Q_1 Q_2}{r^2} = \frac{9 \cdot 10^{9} \cdot 2{,}56 \cdot 10^{-38}}{10^{-20}} = 2{,}3 \cdot 10^{-8}\,N$$

1 kg	gravitációs	erejű	: $9{,}81\,N$
1 g	–	–	: $9{,}8 \cdot 10^{-3}\,N$
1 mg	–	–	: $9{,}8 \cdot 10^{-6}\,N$

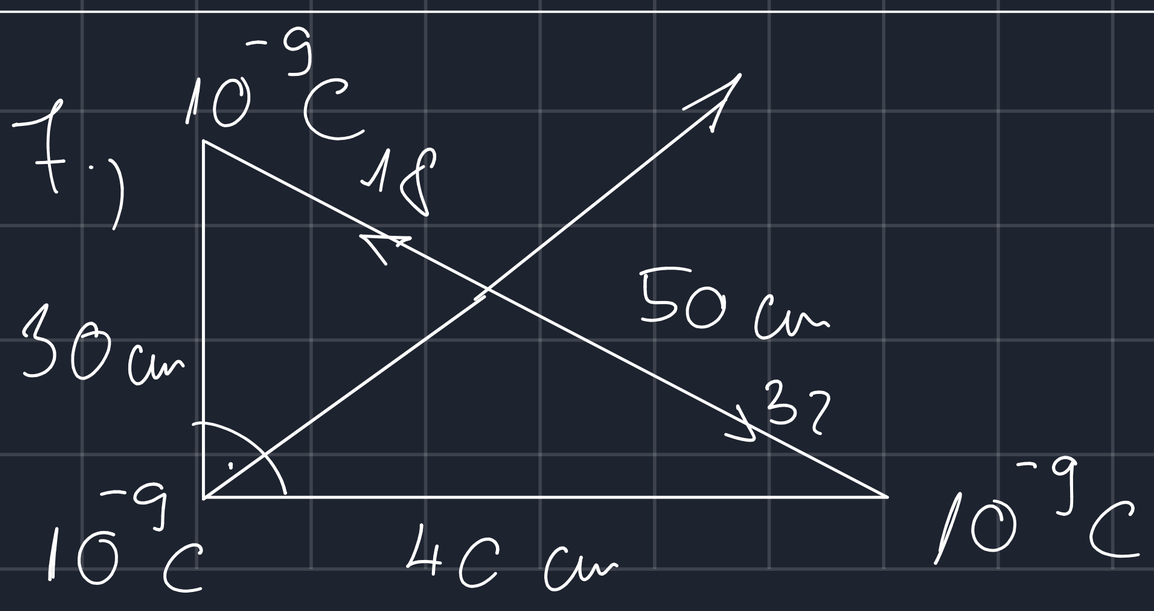
$$\vec{F} = \vec{E} \cdot Q \Longrightarrow \vec{E} = \frac{F}{Q} = 1{,}44 \cdot 10^{11}\,\frac{N}{C}$$

$$\frac{m \cdot v^2}{r} = F = 2{,}3 \cdot 10^{-8}\,N$$

$$m = 9{,}1 \cdot 10^{-31}\,kg$$

$$\sqrt{\frac{F \cdot r}{m}} = v = \sqrt{\frac{2{,}3 \cdot 10^{-8} \cdot 10^{-10}}{9{,}1 \cdot 10^{-31}}} = 1{,}6 \cdot 10^{6}\,\frac{m}{s}$$

7.)



$\frac{4}{5} = 32\,cm$

$\frac{3}{5} = 24\,cm$

$$\frac{k\cdot Q^2}{(0,18)^2} - \frac{k\cdot Q^2}{(0,32)^2} = g\cdot\left(\frac{1}{(0,18)^2} - \frac{1}{(0,32)^2}\right)$$

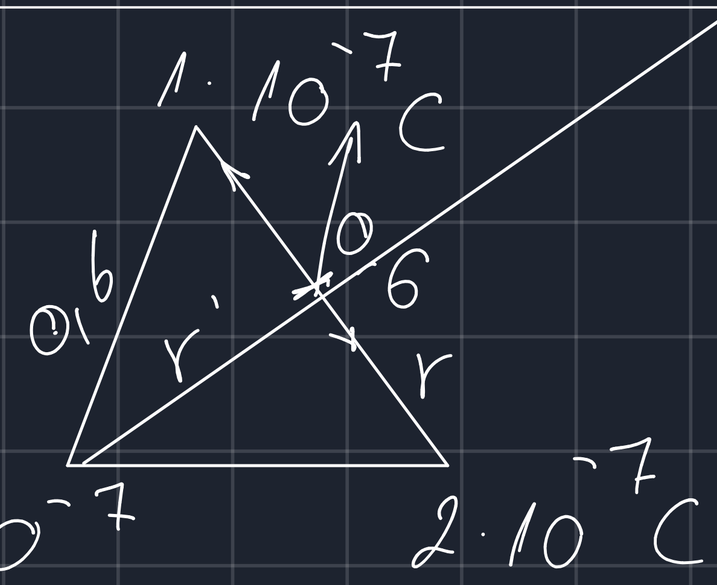
$$1,8\cdot 10^{-8}$$

$$\frac{kQ^2}{(0,23)^2} = \frac{625}{36} = 17,36$$

$$\sqrt{16^2 + 18^2} = \frac{N}{C}$$

Valahol el van csúszva :)

11.)



$$E = \frac{Q}{r^2}\cdot k = 9\cdot 11\cdot 10^{11}\cdot 10^{-7} = 10^4\,\frac{N}{C}$$

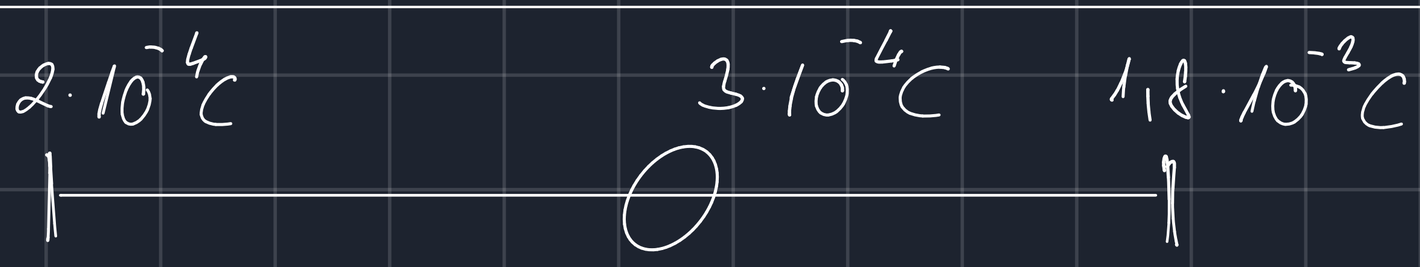
$$r' = \sqrt{3}\cdot 0,3\ m$$

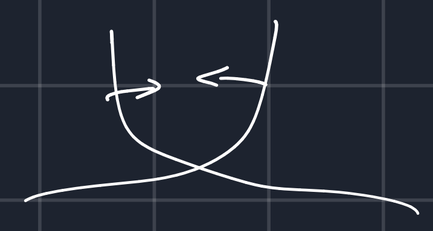
$$r = 0,3\ m$$

$$\frac{10^2\cdot 10^3}{3}\cdot 3\cdot 10^{-7} = 10^4\,\frac{N}{C}$$

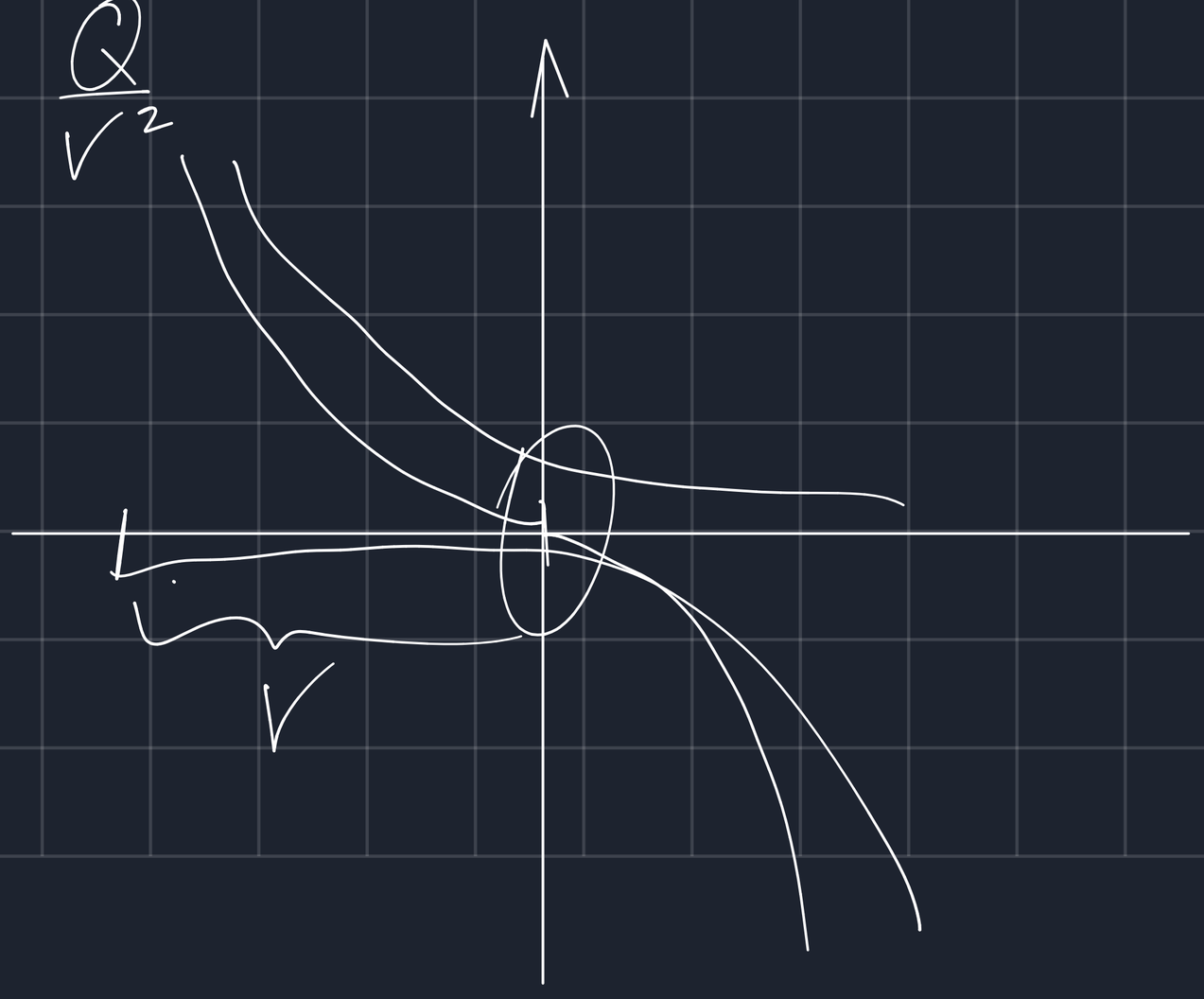
$$\sqrt{2}\cdot 10^4\,\frac{N}{C} = 1,41\cdot 10^4\,\frac{N}{C}$$

23.)





$E \sim \frac{Q}{r^2}$



$$\frac{k\cdot Q_1}{r^2} = \frac{k\cdot Q_2}{(60-r)^2}$$

$$\left.\frac{Q_1}{Q_2} = \frac{r^2}{(60-r)^2}\right\} \Rightarrow \underbrace{\frac{1}{3} = \frac{r}{60-r}}_{r=20}$$