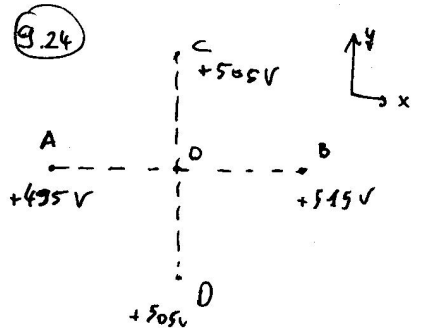
9.24

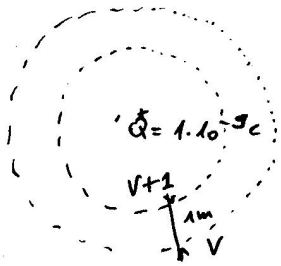


a). E_{nO}, le champ n'a pas de composante en y, car $V_C = V_D$

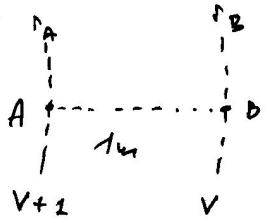
$$E_o = \frac{(V_B - V_A)}{x_B - x_A} = \frac{20\,V}{0{,}012\,m} \simeq 1667\,\frac{V}{m}$$

b). direction : de B vers A ($x < 0$)

9.25



a).



Potentiel en B : $V(B) = k\frac{Q}{r_A + 1} = V$ (1)

Potentiel en A : $V(A) = k\frac{Q}{r_A} = V + 1$ (2)

r_A, r_B : distances à la charge Q

- En comparant (1) et (2) $\quad V = k\frac{Q}{r_A + 1}$ et $V = k\frac{Q}{r_A} - 1$

$$\Rightarrow k\frac{Q}{r_A+1} = k\frac{Q}{r_A} - 1 \quad \Big| \cdot r_A \,/\, \cdot (r_A + 1)$$

$$\Rightarrow k Q r_A = kQ(r_A + 1) - r_A(r_A + 1)$$

$$\Rightarrow 0 = kQr_A + kQ - r_A^2 - r_A - kQr_A$$

$$\Rightarrow -r_A^2 - r_A(1 + kQ - kQ) + kQ = 0$$

$$\Rightarrow -r_A^2 - r_A + kQ = 0$$

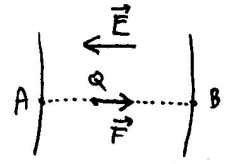
$$\Rightarrow r_A^2 + r_A - kQ = 0 \quad \Rightarrow r_A^{I,II} = \frac{-1 \pm \sqrt{1 + 4kQ}}{2}$$

$kQ = 9$

$$= \frac{-1 \pm \sqrt{37}}{2} \nearrow 2{,}5\,m \;\; \searrow < 0$$

b). $V(B) = k\cdot\frac{Q}{r_A + 1} \simeq \frac{9}{3{,}5} = 3{,}5\,V$

9.26



V_A 5'650 V $\quad$ V_B 7'850 V

$r_A = 2\,m/s$

$r_B = 3\,m/s$

$q = 4.10^{-5}\,C$

$m = 5.10^{-2}\,kg$

Théorème de l'énergie mécanique :

$$W_{\vec{F}_{NC}} = \Delta E_{cin} + \Delta E_{pot} = \frac{1}{2}m(r_B^2 - r_A^2) + q(V_B - V_A)$$

$$= \frac{1}{2}\cdot 5.10^{-2}\cdot(9-4) + 4.10^{-5}\cdot(2200) \simeq 0{,}121\,J$$