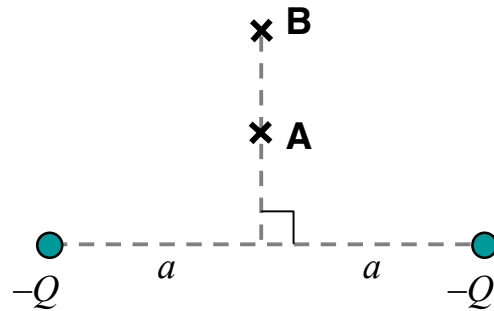


- 1) Two negative charges  $-Q$  of the same magnitude are each located a distance  $a$  from the  $y$ -axis as shown in the diagram below. What is the sign of the potential difference between points A and B? [4]



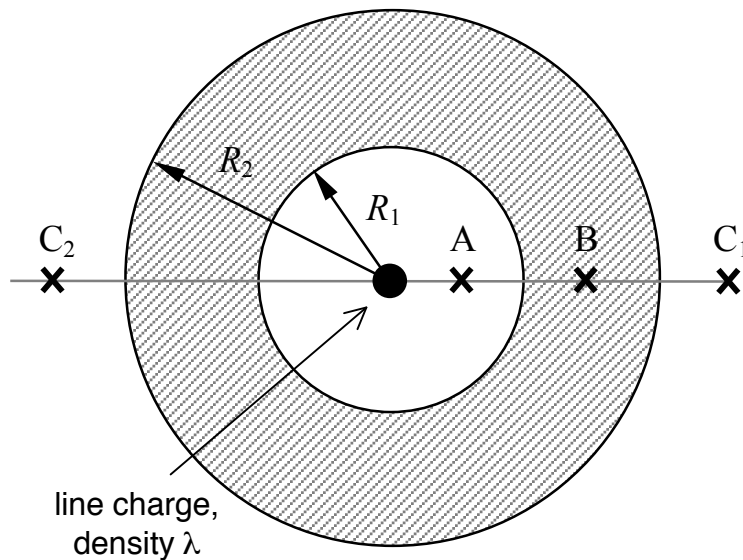
(a)  $V_B - V_A <$

0

(b)  $V_B - V_A = 0$

(c)  $V_B - V_A > 0$

Consider an infinite line, of line charge density  $\lambda$ . Surrounding the line is a conducting, uncharged cylindrical shell of inner radius  $R_1$  and outer radius  $R_2$ . Take the electric potential to be **zero** at the **inner surface** of the cylindrical shell.



$$R_1 = 8 \text{ cm}$$

$$R_2 = 16 \text{ cm}$$

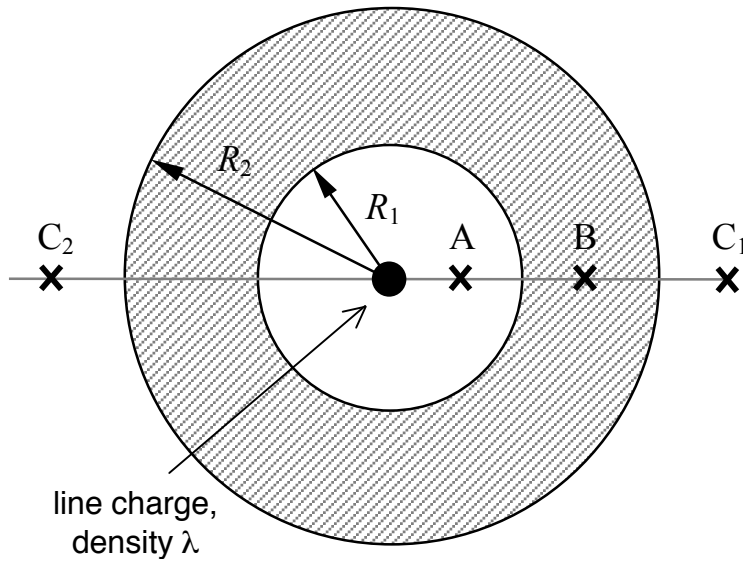
$$\lambda = -3.5 \text{ C/m}$$

$$A = 5 \text{ cm}$$

$$B = 12 \text{ cm}$$

$$C_1 = C_2 = 20 \text{ cm}$$

- 2) What is the electric potential  $V_B$  at point B? [4]



$$\begin{aligned} R_1 &= 8 \text{ cm} \\ R_2 &= 16 \text{ cm} \\ \lambda &= -3.5 \text{ C/m} \\ A &= 5 \text{ cm} \\ B &= 12 \text{ cm} \\ C_1 &= C_2 = 20 \text{ cm} \end{aligned}$$

3) What is the electric potential  $V_A$  at point A? [8]

4) What is the electric potential difference  $V_{C_1} - V_{C_2}$  between points  $C_1$  and  $C_2$ ?  
Provide a brief but clear argument supporting your answer. [4]