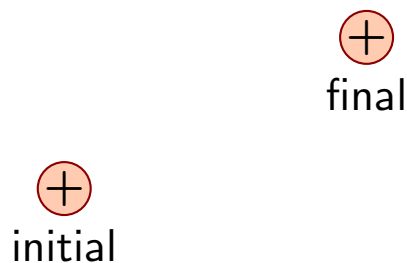# Question 1

A collection of fixed source particles produce an electric potential. Separately, two probe charges are placed in the potential (without altering the source charges). They are each placed at the same initial location and move to the same final location. The first probe particle Zog, has charge $+4.0\,\text{C}$ and the second, Geraldine, has charge $+8.0\,\text{C}$.

$\oplus$
final

$\oplus$
initial

Which of the following is true regarding the change in electric potential (between initial and final locations) for the probe charges?

1. $\Delta V_{\text{Zog}} = \dfrac{1}{4}\Delta V_{\text{Geraldine}}$

2. $\Delta V_{\text{Zog}} = \dfrac{1}{2}\Delta V_{\text{Geraldine}}$

3. $\Delta V_{\text{Zog}} = \Delta V_{\text{Geraldine}}$

4. $\Delta V_{\text{Zog}} = 2\Delta V_{\text{Geraldine}}$

5. $\Delta V_{\text{Zog}} = 4\Delta V_{\text{Geraldine}}$

Question 2

A source charge produces the following electrostatic potential. A probe charge moves along the x axis from the illustrated initial point to the illustrated final point.
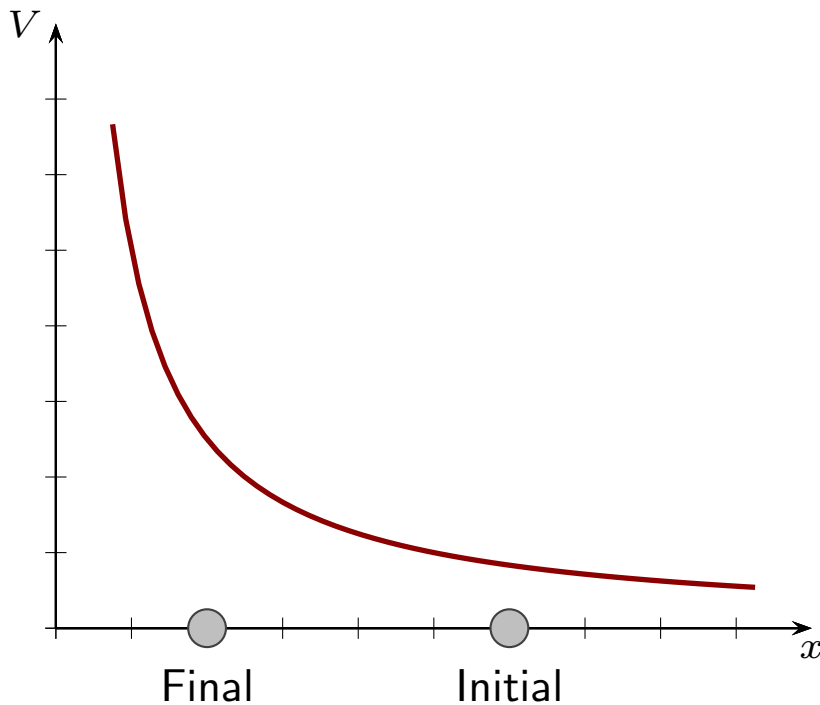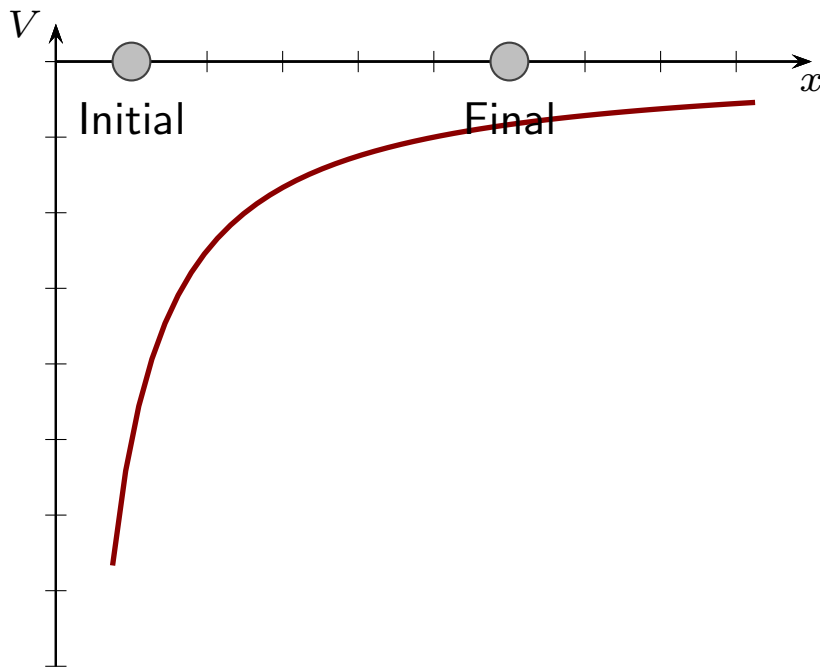

Which of the following is true about the probe's speed during the motion?

1. Speeds up if positive, speeds up if negative.

2. Speeds up if positive, slows down if negative.

3. Slows down if positive, speeds up if negative.

4. Slows down if positive, slows down if negative.

Question 3

A source charge produces the following electrostatic potential. A probe charge moves along the x axis from the illustrated initial point to the illustrated final point.
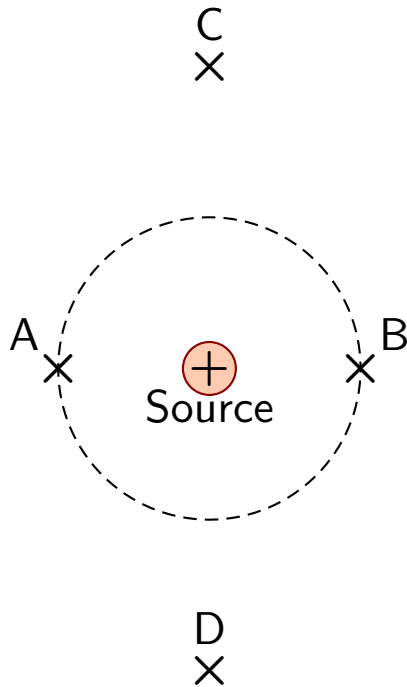

Which of the following is true about the probe's speed during the motion?

1. Speeds up if positive, speeds up if negative.

2. Speeds up if positive, slows down if negative.

3. Slows down if positive, speeds up if negative.

4. Slows down if positive, slows down if negative.

Question 4

A positive source charge produces an electric potential.

C
×

A
×

$\oplus$
Source

B
×

D
×

Which of the following is the correct rank of the electric potential at the various points (a negative potential ranks lower than a positive potential, i.e. $-20\,\text{V} < 10\,\text{V}$)?

1. $V_\text{A} = V_\text{B} = V_\text{C} = V_\text{D}$

2. $V_\text{A} = V_\text{B} < V_\text{C} = V_\text{D}$

3. $V_\text{C} = V_\text{D} < V_\text{A} = V_\text{B}$

4. $V_\text{D} < V_\text{A} = V_\text{B} < V_\text{C}$

5. $V_\text{A} < V_\text{D} = V_\text{C} < V_\text{B}$