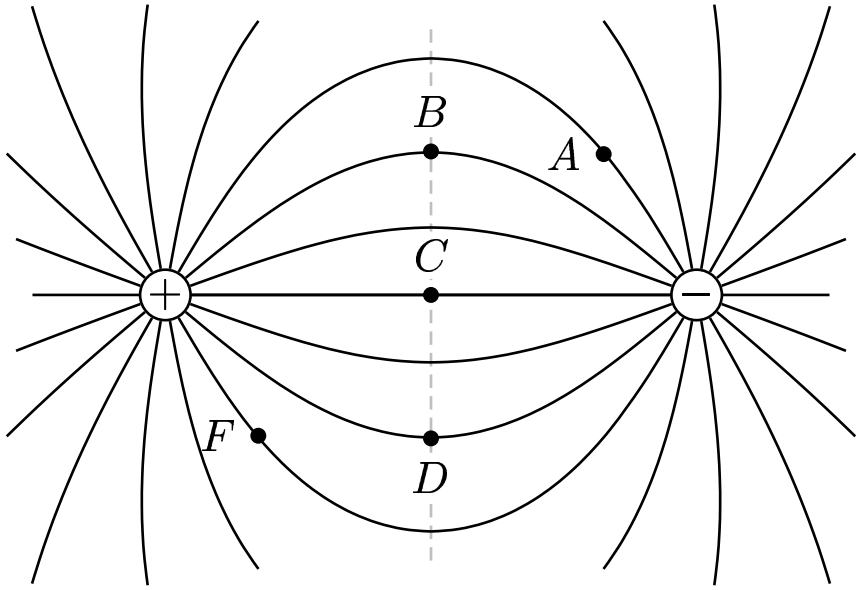
A dipole field pattern is shown in the figure. Consider various relationships between the electric potential V at different points given in the figure.



Which one of the following expressions is correct?

A) $V_B = V_D > V_C$
B) $V_B > V_C < V_D$
C) $V_B = V_D < V_C$
D) $V_A < V_C < V_F$
E) $V_A > V_C > V_F$

For a dipole system, the total potential at any place is the sum of potentials due to one positive point charge and one negative point charge (Superposition Principle).

From symmetry considerations, it is easy to see that the electric field lines are perpendicular to a line which passes through the midpoint C and points B and D.

No work needs to be done to move a positive test charge along the mid-plane because the force and the displacement are perpendicular to each other. Therefore, $V_B = V_C = V_D$

Furthermore, moving along the direction of a electric field line (*i.e.*, moving in the direction from positive charge to negative charge along the electric field line) always lowers the electric potential, because the electric field will do positive work to a positive test charge in order to lower its electric potential energy.

Therefore, $V_A < V_B$ by considering the line going from B to A, and $V_D < V_F$ by considering the line going from F to D. Therefore, $V_A < V_C < V_F$

Answer **D**.