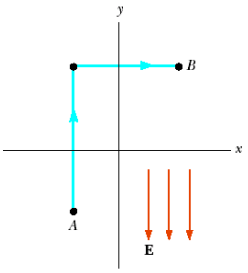
Condition:

Uniform electric field of magnitude E= 325 V/m is directed in the negative y direction in Figure. The coordinates of point A are (-0.200, -0.300) m, and those of point B are (0.400, 0.500) m. Calculate the electric potential difference between A and B.

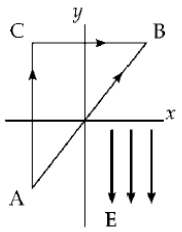
Solution:



$$V_B - V_A = -\int_A^B E * ds = -\int_A^C E * ds - \int_C^B E * ds$$

$$V_B - V_A = (-E\cos 180°)\int_{-0.300}^{0.500} dy - (E\cos 90.0°)\int_{-0.200}^{0.400} dx$$

$$V_B - V_A = (325)(0.800) = +260V$$



Answer: $V_B - V_A = +260V$.