2-13 Take the origin as being the original point of release of the arrow from the bow. Thus we know that $\Delta y = -18$ [m]. Because there is no acceleration in the x direction, we know that the x component of the velocity of the arrow is unchanged during the motion. Thus $v_x = v_{0x} = 55$ [m/s] cos 25° = 49.8 [m/s]. The y component of the final velocity of the arrow, $v_y = -55$ [m/s] sin 25° = -23.2 [m/s] with the – sign signifying that the arrow's velocity is downward. Now we can use the relation $v_y^2 = v_{0y}^2 + 2\,a\Delta y$ Thus $v_{0y} = \sqrt{\{ v_y)^2 - 2 \times (-9.8\ m/s^2) \times (-18\ [m])\}} = \sqrt{\{-23.2\ [m/s])^2 - 2\times(-9.8\ m/s^2) \times (-18\ [m])\}} = 13.6$ m/s. Note we cannot say whether the arrow was fired with an upward component or a downward component to the vertical velocity. The angle with respect to the horizontal is given by $\theta = \tan^{-1} (v_y/v_x) = \tan^{-1}$ (13.6 [m/s]) / (49.8 [m/s]) = 15° with respect to the horizontal. The initial speed $v = \sqrt{\{(v_{0x})^2 + (v_{0y})^2\}} = \sqrt{\{(49.8\ [m/s])^2 + (13.6\ [m/s])^2\}} = 52$ [m/s]. Thus the correct choice is (C).