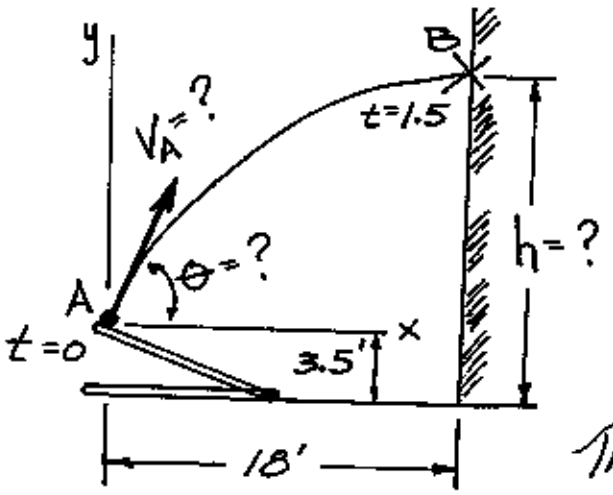
HIBBELER

PROBLEMS 84 through 90 are typical.

PROB. 12-84



ALL YOU KNOW IS THAT IT TAKES 1.5 s TO GET from A to B ON A CURVED PATH.

USE X & Y COMPONENTS.

USE pt. A AS ORIGIN.

Think of this: $a = \frac{dV}{dt}$

$$\int_0^t a\,dt = \int_A^B dV \quad \therefore \quad at = V_B - V_A$$

$$at + V_A = V_B$$

Then $V = \frac{ds}{dt}$

$$\int_0^t (at + V_A)\,dt = \int_{S_A}^{S_B} dS \quad \therefore \quad S_B = S_A + V_A t + \frac{1}{2}at^2$$

X components

$S_{BX} = S_{AX} + V_{AX}t + \frac{1}{2}a_x t^2$

$18' = 0 + V_A \cos\theta\,(1.5s) + 0$

$\boxed{12\frac{1}{s} = V_A \cos\theta}$

$V_{BX} = V_{AX} + a_x t$

Y components

$S_{BY} = S_{AY} + V_{AY}t + \frac{1}{2}a_y t^2$

$(h - 3.5') = 0 + V_A \sin\theta\,(1.5s) - \frac{32.2}{2}(1.5s)^2$

$h = 3.5' + V_A \sin\theta\,(1.5) - 36.225'$

$V_{BY} = V_{AY} + a_y t$

$0 = V_A \sin\theta - 32.2(1.5)$

$\boxed{48.3\frac{1}{s} = V_A \sin\theta}$

$\frac{V_A \sin\theta}{V_A \cos\theta} = \frac{48.3}{12} = \tan\theta \quad \therefore \quad \boxed{\theta = 76.05°}$

$V_A = \frac{12}{\cos\theta} = 49.777 \doteq \boxed{49.8'/s = V_A}$

$\therefore \; h = 3.5' + (49.8\frac{1}{s})(1.5s) - 36.225' = \boxed{41.94' = h}$

? SOLUTION BOOK HAS $h = 39.7'$?