PROB. 11-101

$|\vec{v}_0| = 13.4 \frac{m}{s}$, $\theta = 20°$, $y_0 = 2.1^m$, $x_0 = 0$

FIND y @ $x = 9^m$, FIND x @ $y = 0$.

$(v_x)_0 = 13.4 \cos 20° = 12.59 \frac{m}{s}$, $(v_y)_0 = 13.4 \sin 20° = 4.583 \frac{m}{s}$

$x = x_0 + (v_x)_0 t$, $t = \frac{x - x_0}{(v_x)_0}$

AT $x = 9^m$ (AT THE NET),

$t = \frac{(9) - (0)^m}{(12.59 \frac{m}{s})} = 0.7148^s$

$y = y_0 + (v_y)_0 t - \frac{1}{2} g t^2$

$y = (2.1^m) + (4.583 \frac{m}{s})(0.7148^s) - \frac{1}{2}(32.2 \frac{ft}{s^2})(0.7148^s)^2$

$\boxed{y = 2.870^m}$ IT WILL CLEAR THE NET.

FIND TIME WHEN $y = 0$:

$y = y_0 + (v_y)_0 t - \frac{1}{2} g t^2$

$-\frac{1}{2} g t^2 + (v_y)_0 t + y_0 = 0$, $-4.905 t^2 + 4.583 t + 2.1 = 0$

$-4.905 t^2 + 4.583 t + 2.1 = 0$

$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$t = \frac{-(4.583) \pm \sqrt{(4.583)^2 - 4(-16.1)(2.1)}}{-9.81}$

$t = 0.4672 \pm$

PROB. 11-101 CONT.

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{-(4.883) \pm \sqrt{(4.583)^2 - 4(-4.905)(2.1)}}{-(9.81)}$$

$t = 0.4672 \pm 0.8040$

TAKE THE POSITIVE ROOT:

$t = 1.271^{s}$

$X = \cancel{X_0}^{0} + (v_x)_0 t$

$X = \left(12.59 \frac{m}{s}\right)(1.271^{s}) = 16.00^{m}$

DISTANCE FROM THE NET = $16.0 - 9 \boxed{= 7.0^{m}}$