

Ex. A Football is kicked vertically. The approximate height of the ball h in meters after t seconds is given by the Quadratic equation: $h(t) = 1 + 20t - 5t^2$.

When will the ball hit the ground?

An approx. graph may help, including the starting height (vertical intercept).

$$h(t) = -5t^2 + 20t + 1$$

$$0 = (-5t^2 + 20t) + 1$$

$$0 = -5(t^2 - 4t + 4 - 4) + 1$$

$$0 = -5(t - 2)^2 + 21$$

$$\begin{array}{r} -21 \\ \hline -21 \end{array}$$

$$\begin{array}{r} -21 \\ \hline -5 \end{array} = \begin{array}{r} -5 \\ \hline -5 \end{array} (t - 2)^2$$

$$\sqrt{\frac{21}{5}} = \sqrt{(t - 2)^2}$$

$$\pm \sqrt{\frac{21}{5}} = t - 2$$

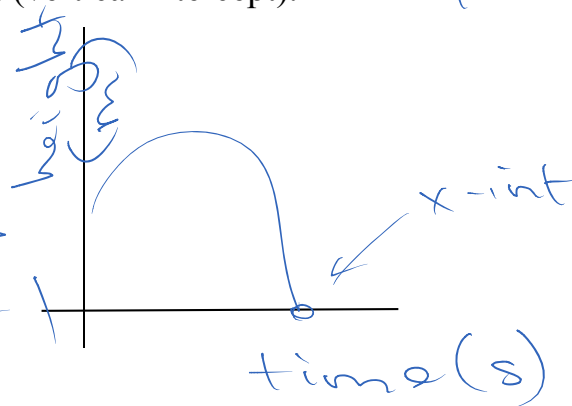
$$\begin{array}{r} +2 \\ \hline 2 \end{array} \pm \sqrt{\frac{21}{5}} = t$$

$$2 \pm \sqrt{\frac{21}{5}} = t$$

4.04... s

~~-0.04... s~~

inadmissible



Practice:

Projectiles p.241 # 9, 10, 12

Area p.241 # 8, 11

Profit p.233 # 29