MAT 104 Quiz 17  
Wednesday, October 24, 2004

1. Solve

\[ x^2 - 7x = -10 \]

\[ x^2 - 7x = -10 \iff x^2 - 7x + 10 = 0 \]

\[ \iff (x - 2)(x - 5) = 0 \]

\[ \iff x - 2 = 0 \text{ or } x - 5 = 0 \]

\[ \iff x = 2 \text{ or } x = 5 \]

\[ x \in \{2, 5\} \]

2. Solve

\[ 2x^3 - 5x^2 - 12x = 0 \]

\[ 2x^3 - 5x^2 - 12x = 0 \implies x(2x^2 - 5x - 12) = 0 \]

\[ \implies x(2x + 3)(x - 4) = 0 \]

\[ \implies x = 0 \text{ or } 2x + 3 = 0 \text{ or } x - 4 = 0 \]

\[ \implies x = 0 \text{ or } x = -\frac{3}{2} \text{ or } x = 4 \]

\[ x \in \left\{0, -\frac{3}{2}, 4\right\} \]

3. A ball thrown straight up in the air has height

\[ h(t) = -16t^2 + 16t + 32 \]

feet \( t \) seconds after the ball in thrown. Find the time it takes for the ball to land.

We need to find \( t \) that makes \( h(t) = 0 \). That is, we need to solve

\[ -16t^2 + 16t + 32 = 0 \]

This is solved as

\[ -16t^2 + 16t + 32 = 0 \implies -16(t^2 - t - 2) = 0 \]

\[ \implies -16(t - 2)(t + 1) = 0 \]

\[ \implies (t - 2)(t + 1) = 0 \]

\[ \implies t - 2 = 0 \text{ or } t + 1 = 0 \]

\[ \implies t = 2 \text{ or } t = -1 \]
Since $t = -1$ does not make sense for our problem (time is negative), the answer is

It takes the ball 2 seconds to land.