MAT 104 Quiz 17

Wednesday, October 24, 2004

1. Solve

$$x^2 - 7x = -10$$

$$\begin{aligned} x^2 - 7x = -10 &\iff x^2 - 7x + 10 = 0 \\ &\iff (x-2)(x-5) = 0 \\ &\iff x - 2 = 0 \text{ or } x - 5 = 0 \\ &\iff x = 2 \text{ or } x = 5 \end{aligned}$$

$$x \in \{2, 5\}$$

2. Solve

$$2x^3 - 5x^2 - 12x = 0$$

$$\begin{aligned} 2x^3 - 5x^2 - 12x = 0 &\implies x(2x^2 - 5x - 12) = 0 \\ &\implies x(2x+3)(x-4) = 0 \\ &\implies x = 0 \text{ or } 2x + 3 = 0 \text{ or } x - 4 = 0 \\ &\implies x = 0 \text{ or } x = -\frac{3}{2} \text{ or } x = 4 \end{aligned}$$

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

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

$$\begin{aligned} -16t^2 + 16t + 32 = 0 &\implies -16(t^2 - t - 2) = 0 \\ &\implies -16(t-2)(t+1) = 0 \\ &\iff (t-2)(t+1) = 0 \\ &\implies t - 2 = 0 \text{ or } t + 1 = 0 \\ &\implies t = 2 \text{ or } t = -1 \end{aligned}$$

Since $t = -1$ does not make sense for our problem (time is negative), the answer is

It takes the ball 2 seconds to land.