Solving Systems of Equations Word Problems - Answers

Part A

1. $y=ax^2+bx+c$

$$\begin{cases} a-b+c=2 \\ c=-2 \\ a+b+c=0 \end{cases}$$

AV=B

$$\begin{bmatrix} 1 & -1 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}\begin{bmatrix} a \\ b \\ c \end{bmatrix}=\begin{bmatrix} 2 \\ -2 \\ 0 \end{bmatrix}$$

V=A^{-1}B

$$\begin{bmatrix} 0.5 & -1 & 0.5 \\ -0.5 & 0 & 0.5 \\ 0 & 1 & 0 \end{bmatrix}\begin{bmatrix} 2 \\ -2 \\ 0 \end{bmatrix}=\begin{bmatrix} 3 \\ -1 \\ 2 \end{bmatrix}$$

$\boxed{y=3x^2-x-2}$

2. Same general setup as #1: $\boxed{y=-\frac{1}{250}x^2+\frac{11}{30}x+5}$

Quad formula or use calc. functions hits at 103.7' and max height 13.4'

3. Similar setup to #s 1 & 2, with 4 variables: $\boxed{y=3x^3-x^2+2x-5}$

4. Same general setup as #s 1 & 2: $\boxed{\begin{array}{l} y=-3.1x^2+57.1x-218.9 \\ 2002: t=12; y(12)=\$19.90 \end{array}}$

Part B

1. **Let t = number of touchdowns, e = number of extra-point kicks, f = number of field goals**

$$\begin{cases} t+e+f=11 \\ 6t+e+3f=39 \\ t-f=0 \end{cases}$$

There were 4 touchdowns, 3 extra-point kicks, and 4 field goals.

2. **Let W = speed of Watusi, U = speed of Ubangi, and P = speed of Pigmy**

$$\begin{cases} W+U+P=30 \\ \frac{1}{3}W-U+P=22 \\ 4W+3U-2P=12 \end{cases}$$

The Watusi runs 12 mph and the Pigmy runs 18 mph. It's unfortunate that the Ubangi can't run 0 mph).