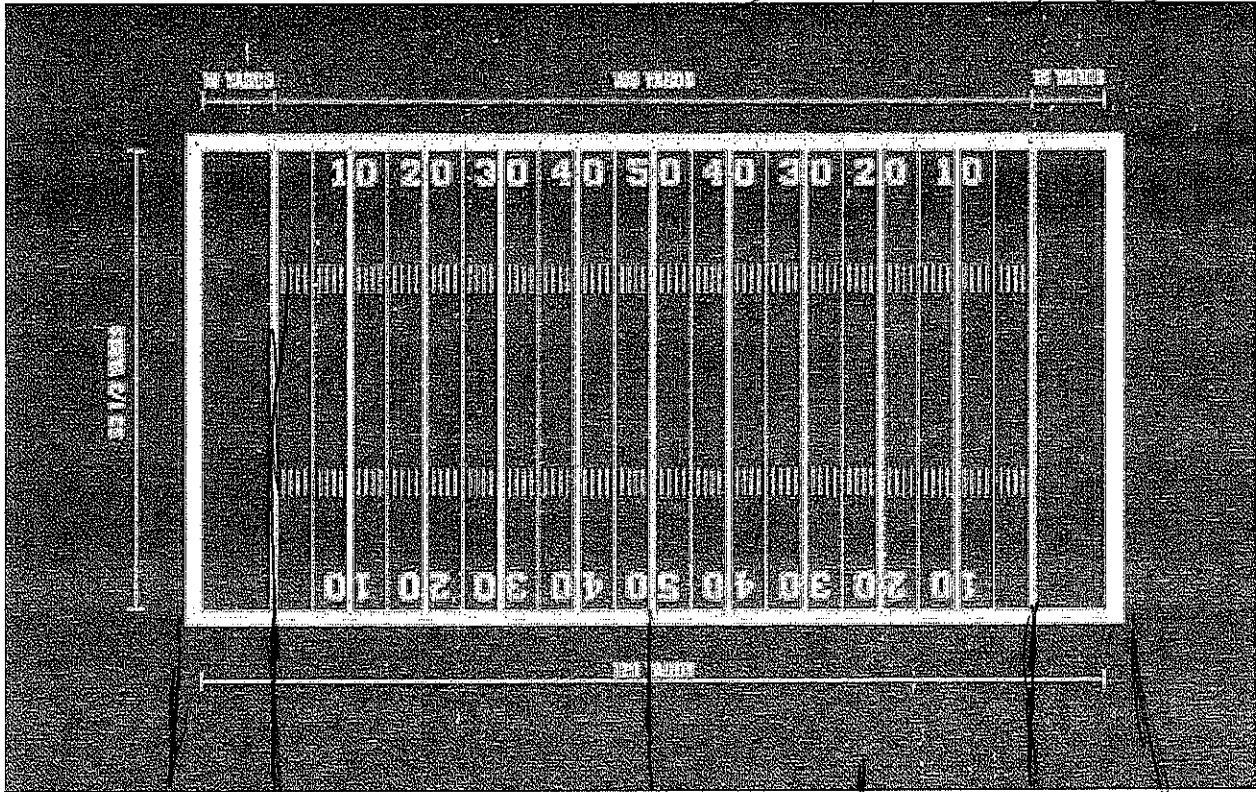


Football Modeling Problems

Use the picture and the given information to write a possible equation for each situation. Define your variables. There may be more than one correct answer for some problems. Use a graphing utility to check your equations.

Answers vary depending on how you choose x & y.



$x=10$ $x=0$ $x=50$ $x=80$ $x=100$ $x=110$

1. To start the game, there's a kickoff from the 40-yard line. The ball travels 30 yards

1) Vertex is $\frac{1}{2}$ way horizontally and reaches a maximum height of 50 feet. *so 15 feet past 40* Let $x = \text{yard line}$, $K(x) = \text{height of ball (ft)}$

2) Plug in $(40, 0)$

$$K(x) = a(x - 55)^2 + 50$$

$$0 = a(40 - 55)^2 + 50$$

$$0 = a(-15)^2 + 50$$

$$-50 = a(225)$$

$$\frac{-50}{225} = a = -\frac{2}{9}$$

$$K(x) = -\frac{2}{9}(x - 55)^2 + 50$$

3) Solve for a.

4) Write full Eq.

2. Your team is attempting a field goal from the 20 yard line. The uprights are at the back of the endzone and the horizontal cross bar is 10 feet high.

a. Write a possible equation that would miss the field goal

$$K(x) = \frac{1}{225}(x - 95)^2 + 1$$

b. Write a possible equation that would make the field goal

$$K(x) = \frac{-20}{900}(x - 110)^2 + 20$$

c. (Challenge) Write a possible equation that would hit the crossbar

$$K(x) = \frac{1}{90}(x - 110)^2 + 10$$

