Projectile Motion - Fun with Football

Recall that when dealing with motion in two dimensions (x and y) the vertical and horizontal components of the motion work independently of each other and can be solved as such. We can use our knowledge of motion in 2-D to study the motion of one of America's favorite pass times: ***Football.***

Jason Elam of the Denver Broncos kicks a football at an angle of 30° above the horizontal with an initial speed of the ball is v_0 = 88.0 ft/s. Ignoring air resistance solve the problems below.

1.) What is the maximum height that the ball goes?

Which direction should you be concerned with VERTICAL / HORIZONTAL?

2.) Find the time of flight of the kick.

Which direction should you be concerned with VERTICAL / HORIZONTAL?

3.) Find the range of a kick (in yards).

Which direction should you be concerned with VERTICAL / HORIZONTAL?

For what angle is the range maximized? _____

Extra: (On back) Later in the game the Broncos are attempting a field goal from the 41 yard line. The goal post is 10 yards back in the end zone, and the kicker is seven yards behind the line of scrimmage. If the kick is launched at 48° with an initial speed of 72 ft/s will the field goal be good?