The Railroad

A railroad is to pass through a valley. The track will slope downward with a grade of 3%, and it will slope upward out of the valley with a grade of 2%. Find an appropriate second-degree polynomial to determine the shape of the vertical curve that this railroad will make and the bottom of the valley. Assume that one end of the parabola will begin at a distance of 1500 yards from the bottom of the valley and on the approach with the 3% grade. Use a computer to draw the graph of the side view of your proposed railroad along with the linear approaches leading into and out of the valley.