Solve the given problems and show your complete solution.

1. When $x^4 + Rx^3 + Px^2 - 32x + 64$ is divided by $x - 1$, the remainder is 45. When divided by $x - 4$, the remainder is 0. Find R and P.

2. Find the height of a triangular-based pyramid if the volume is $8\sqrt{6}$ cubic feet and the length of the base of the triangular base are 1 less than the height, 8 less than twice the height and 1 more than the height.

3. A ball was thrown upward with initial velocity of $20m/s$ from the ground. It the acceleration of gravity is $10m/s^2$,
   a. what is the maximum height?
   b. after how many seconds will it reach the height of 15m?

4. A class trip with a fixed cost of $\$6000$ will be evenly divided to the number of attendees. If there had been 10 more attendees, the cost per attendee would be $\$30$ less. How many joined the trip?