Equations of Motion PQ 5b

In the following problems take the acceleration due to gravity to be 9.8 ms^{-2} unless stated otherwise.

1. A sandbag is released from a balloon that is moving upwards with a steady vertical velocity of 8 ms^{-1} If the sandbag hits the ground 15 s later, what was the height of the balloon above the ground when it was released?

2. Light takes 4.5 years to reach us from the nearest star. If the velocity of light is 3 x 10^{8} ms^{-1}, how far away is the star? A rocket just outside the Earth's atmosphere in space accelerates at 30 ms^{-2} for a week (7 days). How long will it take for the rocket to reach the star? (Ignore any gravitational attraction.)