Angled Projectile Problems

For each of these problems, determine what information is given. Decide what you need to know to answer the question and then choose the formula that will help get what you need. Caution! Don’t let the formulas tell you what to do – they are tools that you should use deliberately. Don’t get formula fever!

For better understanding of each problem, try the following:

 \*Ask yourself whether this projectile was launched horizontally or at an angle.

 \*Separate the information in the problem into its x-components and y-components.

1. A long jumper leaves the ground with an initial velocity of 12 m/s at an angle of 28o above the horizontal. Determine the time of flight, range (dx), and peak height of the jumper. Hint: First separate the velocity into its x and y components using SOH CAH TOA.
2. Emanuel Zacchini, the famous human cannonball, was fired out of a cannon with a speed of 24.0 m/s at an angle of 40o to the horizontal. If he landed in a net 56.6 m away at the same height from which he was fired, how long was Zachini in the air?
3. On May 20, 1999, 37-year-old Robbie Knievel, son of famed daredevil Evel Knievel, successfully jumped 69.5 m over a Grand Canyon gorge. Assuming that he started and landed at the same level and was airborne for 3.66 s, what height from his starting point did he achieve?
4. Ferdinand the frog is hopping from lily pad to lily pad in search of a good fly for lunch. If the lily pads are spaced 2.4 m apart, and Ferdinand jumps with a speed of 5.0 m/s, taking 0.60 s to go from lily pad to lily pad, at what angle must Ferdinand make each of his jumps?
5. Jack be nimble, Jack be quick, Jack jumped over the candlestick with a velocity of 5.0 m/s at an angle of 30o to the horizontal. Did Jack burn his feet on the 0.25-m-high candle?

Check your answers at http://www.walter-fendt.de/ph14e/projectile.htm using the simulation found there. Enter your info and see if your calculations are accurate.