Kinematics Review

Solve the following problems using the principles and equations of kinematics.

1.) The average velocity of a min-bike is $+15.0\frac{km}{h}$, how long will it take to go $35.0\ m$?

2.) A sprinter starting from rest reaches a final velocity of $+28.8\frac{km}{h}$. What is her average velocity?

3.) A coin is dropped and strikes the earth with a velocity of $-15.15\frac{m}{s}$. For how long was it falling, and what from what height did it fall?

4.) A rocket lifts off from Earth at $+13.3\frac{m}{s^2}$ from the launch pad, how high into the atmosphere does it rise during the first five seconds of its path?

5.) A truck accelerates from rest to a velocity of $+22.4\frac{m}{s}$ at a rate of $+0.60\ \frac{m}{s^2}$. How long was it accelerating and how far did it travel while accelerating?

6.) A car in a school zone accelerates from $85\frac{km}{h}$ to $120\frac{km}{h}$ in $9.2\ s$. What was its acceleration?

7.) How long will it take for a rock to fall to the ground if dropped from a height of $92.0\ m$?

8.) A rock is thrown down from a rail trestle with height $13.0\ m$ at velocity $-18.8\frac{m}{s}$. With what velocity will it strike the ground?

9.) A car travelling at $90.0\frac{km}{h}$ comes to a stop in $12.0\ s$, what was its acceleration?

10.) A car travelling at $60.0\frac{km}{h}$ accelerates to $90.0\frac{km}{h}$ at $+2.03\ \frac{m}{s^2}$. How long does this take and how far does the car travel in this time?

11.) A rock is dropped from a bridge and strikes the water below $24.0\ s$ later. With what speed did it strike the water and from what height was it dropped?

12.) A bullet is fired upward from a gun and reaches a maximum height of $2100\ m$. What is its velocity at the high point, what was its initial velocity, and how long was it **in the air**?

13.) A cat is thrown upward from the edge of a building with velocity $+2.0\frac{m}{s}$. If the cat then falls the entire height of the building ($30.0\ m$) with what velocity will it strike the ground?