DAY 7 & 8 – Solve Problems

1. A fireworks company is testing a new firework rocket. Once it explodes in the air, its path can be modelled by the relation $h = -4.9t^2 + 44.1t$, where *h* is the rocket's height, in metres, and *t* is the time, in seconds. When will the rocket hit the ground?

2. The speed of a turbine aircraft engine is controlled by a power setting, *x*. The length of time, *t*, in hours, that the engine will run on a given amount of fuel at power setting *x* is given by the relation $t = -0.2x^2 + 3.2x - 5.6$. Find the zeros of the relation.

3. In July 2005, professional skateboarder Danny Way jumped over the Great Wall of china. His path can be modelled by the relation $h = -0.05d^2 + 1.15d$, where *h* is his height above the Great Wall and *d* is his horizontal distance from the take-off ramp, both in metres. Determine the distance between Danny's take-off and landing.

4. The equation $h = -5(t-1)^2 + 7.5$ models the height, *h* metres, of a baseball *t* seconds after it is thrown.
   a. What is the maximum height of the ball? _____
   b. How long does it take for the ball to reach its maximum height? _____
   c. Write an equivalent equation in standard form.

   d. From what height is the ball thrown? _____
      How do you know? _____

5. A student council wants to raise money by selling tickets to a dinner. The income, *T* dollars, for the evening depends on the number *n* of students who buy tickets, according to the equation $T = \frac{1}{10}n^2 + 10n - 2000$.
   a. Find the income if 100 students buy tickets.

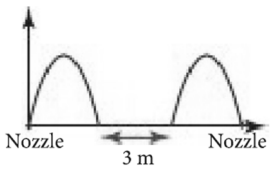
   b. What is the income if no tickets are sold? What might this represent?

   c. Factor the equation.

   d. How many tickets must the student council sell to make a profit? _____

6. The equation $h = -5t^2 + 20t + 25$ gives the height, *h* metres, of a flare *t* seconds after it is fired. For how long is the flare in the air?

7. A fountain will have two identical jets of water side-by-side. The horizontal distance between the streams of water is 3m. The path of water from the jet on the left is modelled by the relation $h = -1.5(d-1)^2 + 1.5$, where *h* is the height of the water and *d* is the horizontal distance from the nozzle, both in metres.



   a. Find the horizontal distance from the left nozzle to where the water hits the ground.

   b. Determine the horizontal distance between the nozzles for the two jets.