Name _____   Date _____

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1.   On a computer screen, the path of a ballistic missile is tracked. It is defined by the equation: $f(x) = 38 + 2t - 0.5t^2$, where h is the height in km and t is the time in minutes. What are the **coordinates of the maximum point** and **what do they mean**?

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2.   The water rushing from a new and improved fire hose travels at a speed of about $12m/s$. The height of the water, h(in meters) after t seconds is given by $h(t) = 1.6 + 12t - 4.9t^2$. What is the **maximum height** that the water reaches and **how long does it take to reach that height**?

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3.   By experiments, it is found that the most efficient pedestrian tunnel is given by: $y = -0.04x^2 + 0.88x$ where the floor of the tunnel is along the x-axis beginning at the origin. The height and width of the tunnel is measured in meters. Determine the **maximum height** and **width of the tunnel.**

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4.   Bill is on his first day at work delivering furniture for a large store in Calgary. He is unfamiliar with the city and in route to his first delivery he encounters and archway that supports an overpass above him. He is not sure if his cube van will fit through the archway.   The maximum height of the tunnel is 8 meters and follows a parabolic curve: $y = -\frac{1}{2}x^2 + 4x$. Bill decides to go through the tunnel knowing that his is truck is 2.5m wide and only 5m tall. There are two lanes through the tunnel but traffic is heavy and he is forced to stay in his own lane. Will Bill make it through the tunnel or will this be his last day on the job? Explain.