U2D6 MCR 3UI   REAL-WORLD APPLICATION OF QUADRATICS

**Separate paper needed for this note.

1. Raven and Ben are knitting scarves to sell at the craft show. The wool for each scarf costs $6. They were planning to sell the scarves for $10 each, the same as last year when they sold 40 scarves. However, they know that if they raise the price, they will be able to make more profit, even if they end up selling fewer scarves. They have been told that for every 50¢ increase in price, they can expect to sell four fewer scarves. What selling price will maximize their profit and what will the profit be?

2. Narein throws a ball that will move through the air in a parabolic path due to gravity. The height, h, in metres, of the ball above the ground after t seconds can be modelled by the function $h(t) = -4.9t^2 + 40t + 1.5$.

a) Find the zeros (rounded to the nearest thousandth) of the function and interpret their meaning.

b) Determine the time needed for the ball to reach its maximum height, to the nearest tenth of a seond.

c) What is the maximum height of the ball, to the nearest tenth of a metre?

3. A rectangular lot is bounded on one side by a river and on the other three sides by fencing. Then another section of fencing is used to divide the lot into two parts as shown. A total of 80m of fencing is used. Determine the area and dimensions of the largest possible lot.