

- 1 Algebraically determine the EXACT roots to the quadratic equations below in simplest form.

A)  $3x^2 - 7x = 4$

B)  $6x^2 = 2(x + 3)$

C)  $\frac{2x}{x-7} = 4x$

D)  $3x^2 + 24 = 0$

E)  $5x^2 - 8x + 2 = 0$

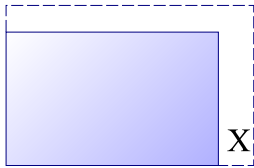
F)  $\frac{x}{x-1} = 6x$

- 2 A rocket is fired into the air from a platform 3 m above ground level. After 4 seconds the rocket reaches a maximum height of 1400 m. Determine a quadratic function in standard form and use it to determine the height of the rocket after 2 seconds.
- 3 A tennis ball is hit into the air and its path can be describes by the function  $h(t) = -5t^2 + 120t$  where t is time in seconds and H(t) is the height of the ball in metres. Determine ALGEBRAICALLY when was the ball at its maximum height and what was the maximum height.
- 4 A rocket is shot into the air and its path can be described by the function  $h(t) = -5t^2 + 60t + 5$  where t is time in seconds and h(t) is the height in metres.
- A) What is the initial height of the rocket?
  - B) Set up an equation and use it to determine when the rocket will hit the ground.
  - C) Set up an equation and use it to determine when the rocket is at a height of 60 metres.
  - D) Determine the maximum height reached by the rocket and when will it reach this height.

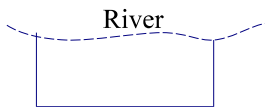
- 5 A rectangular picture and its frame has an area of  $864 \text{ cm}^2$ . It has to be framed with a border of uniform width. If the picture is 12 cm by 24 cm, set up a quadratic equation and determine the width of the picture frame.



- 6 A rectangular hockey rink is to be increased so that its original area will be doubled. If the original dimensions are 80 feet by 60 feet, set up a quadratic equation and determine the width of the uniform strip that must be added as below.



- 7 A farmer has 900 m of fencing to build a rectangular pasture along side of a river using the river as one of the sides in the pasture. Set a quadratic function and use it to determine the maximum area she can enclose. What are the dimension that give this maximum area?



- 8 A sand box is to be made using 20 metres of lumber and the two sides of a fence as in a rectangular indicated below. Set up a quadratic function and determine the dimensions that will yield the maximum area.

