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Lab Test # 1, Sept. 21, 1998.

Name:

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1- A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 20 cm. by 30 cm. by cutting out equal squares of side x at each corner and then folding up the sides. Express the volume V of the box as a function of x .



$V = L \cdot W \cdot h$ ✓
 $V(x) = (20-2x)(30-2x)x$ ✓
 $V(x) = (600 - 40x - 60x + 4x^2)x$ ✓
 $V(x) = 600x - 100x^2 + 4x^3$ ✓

2- In Regina, when an arrow is shot upwards with a velocity of 49 m/s, its height $H(t)$ (in meters) after t seconds is given by $H(t) = 49t - 4.9t^2$. How long does it take to hit the ground, and at what velocity does it hit the ground.

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$H(t) = 49t - 4.9t^2$
 $H(t) = 0 = 49t - 4.9t^2$ ✓
 $0 = 49 - 4.9t$
 $t = 10$ ✓
easier to solve for when $H(t) = 0$
 $t = 10$ ✓
 $t = 10$ ✓
 $v_f = 49 - 9.8(10)$
 $= -49 \text{ m/s}$ ✓

It will take 10 s for the arrow to hit the ground with a velocity of -49 m/s.