A. Lesson Context

BIG PICTURE of this UNIT:	• How & why do we build NEW knowledge in Mathematics? • What NEW IDEAS & NEW CONCEPTS can we now explore with specific references to QUADRATIC FUNCTIONS? • How can we extend our knowledge of FUNCTIONS, given our BASIC understanding of Functions?		
CONTEXT of this LESSON:	Where we've been In previous lessons, you reviewed 2 methods for solving quadratic equations – factoring & c/s	Where we are NOW we will focus on addressing the idea of quadratic equations that DON'T factor … can we develop a general approach that will work ALL the time?	Where we are heading How do we extend our knowledge & skills of the algebra of quadratic functions, and build in new ideas & concepts involving functions.

B. Lesson Objectives

a. Review methods for solving quadratic equations in standard form (square rooting & factoring)
b. Review forms of quadratic equations and state which information can be determined from the equation
c. Practice using the QF to solve quadratic equations
d. Present real world applications involving quadratic equations

C. Solving Quadratic Equations

a. To solve an equation means ➔
b. Quadratic equations can be solved by
   i. ➔
   ii. ➔
c. To make a graphic connection, what are we finding (graphically) when we solve the eqn $0 = ax^2 + bx + c$?

D. Forms of Quadratic Relations

Forms	(a)	(b)	(c)
Obvious Info			
Info we can calculate			

E. ***SKILLS REVIEW: Quadratic Equations by Factoring & by Square Roots (C/S)***

Solve $0 = x^2 - 4x - 5$ by factoring	Solve $0 = (x - 2)^2 - 9$ by square roots.	Graph $y = x^2 - 4x - 5$ and $y = (x - 2)^2 - 9$. What do you notice?

F. ***Quadratic Formula (From the method of completing the square)***

The quadratic formula can be used to determine the zeroes of a quadratic (or to solve $0 = ax^2 + bx + c$). The quadratic formula can be developed/derived as follows:

$y = 2x^2 + 6x - 7$	$y = ax^2 + bx + c$

G. ***Examples***

Ex 1: Solve each equation using the quadratic formula. You can verify graphically on the GDC.

$0 = x^2 + 7x + 12$

$0 = 3x^2 - 6x + 3$

$1 = x^2 - 4x$

$0 = x^2 - 4x + 9$

$3.2w^2 - 8.4 = -28.9w$

$2x^2 = 20 - 3x$

Ex 2: For the quadratic equation $y = 2(x - 3)^2 - 11$;

Find the zeroes by using the square root method.	Expand the equation and then find the zeroes using the QF	Which method is easier? Why?

EX 3. The quadratic relation $\boldsymbol{d(s)} = 0.0056\boldsymbol{s}^2 + 0.14\boldsymbol{s}$ models the relationship between a vehicles stopping distance ***d***, in meters, and its speed ***s***, in km/h.

i. What is the fastest you could drive and still be able to stop within 80m?
ii. What is the stopping distance for a car travelling at 120 km/hr?
iii. Estimate the average length of a car. How many car lengths does the stopping distance in (b) correspond to?

EX 4. The revenue generated by a dance at school is modelled by the equation $R(t) = -60t^2 + 600t$, where R is the revenue in dollars and t is the ticket price in dollars. To find the PROFIT made from this dance, the equation $P = R - E$ is used, where E represents the expense equation.

i. It was found that the expenses equation was a linear equation, $E(t) = 1000 - 90t$. Calculate the break even price for the tickets.
ii. Find the maximum profit and the ticket price that earns this profit.
iii. Determine the equation of the INVERSE of the Revenue function & explain what this equation can be used for.

EX 5. A motion detector records the height of a baseball, h in meters, t seconds after it is hit into the air. The relation is $h(t) = -4.9t^2 + 20.58t + 0.49$

i. From what height was the ball hit?
ii. For how long was the ball in flight?
iii. What was the maximum height of the ball?
iv. What is the equation of the inverse & what does the eqn represent?

H. Homework

From the Nelson 10 textbook, Chap 6.4, p343, Q2,5ace,9ace,12,14,18