Algebra 1B Live Lesson

U4L5: Completing the Square
(Chapter 9-5 in textbook)

Agenda

1. Review selected problems and topics from U4L5 – Completing the Square

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template

1. Announcements/To Do's	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information	What to do
1. Complete 1 math lesson per day.	1. Go to your Planner in Connexus to find the math lesson for the day
2. Check your WebMail every day	2. Go to Connexus to find WebMail
3. Be prepared to spend 4 - 6 hours per day on schoolwork.	3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Remind your Learning Coach to take daily attendance	4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	
6. Contact Mr. Elizondo for math questions. Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered. Make an appointment at: https://elizondo.youcanbook.me Send a WebMail

U4L5 – California Common Core State Standards

- HSA-REI.B.4: Solve quadratic equations in one variable.
- HSF-IF.C.8: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

U4L5 - Objectives

- Solve quadratic equations by Completing the Square

U4L5 - Vocabulary

- Completing the square

U4L5 - Introduction

- In previous lessons, you solved quadratic equations by **factoring** and **finding square roots**. These 2 methods work in most cases, but not all. We will learn a 3rd method called **Completing the Square**.

- In general, you can change the expression $x^2 + bx$ into a perfect square trinomial by adding $(b/2)^2$ to $x^2 + bx$.

- The process is the same whether *b* is positive or negative.

- This Completing the Square process works when a = 1 in $ax^2 + bx + c = 0$

U4L5 – Finding c to Complete the Square

What is the value of c such that x^2 -16x + c is a perfect-square trinomial?

The value of b is – 16

$$Use\ \left(\frac{b}{2}\right)^2$$

$$\left(\frac{-16}{2}\right)^2$$

$$(-8)^2 = 64$$

$$\boldsymbol{c = 64}$$

U4L5 – Finding c to Complete the Square

What is the value of c such that the expression is a perfect-square trinomial?

$$w^2 + 18w + c$$

$$Use \left(\frac{b}{2}\right)^2$$

$$\left(\frac{18}{2}\right)^2 = (9)^2 = 81$$

$$c = 81$$

$$w^2 + 18w + 81$$

$$(w + 9)(w + 9) =$$

$$\boldsymbol{(w + 9)^2}$$

U4L5 – Solving $x^2 + bx + c$

What are the solutions of the equation $\mathbf{x^2 + 6x = 216?}$

$$x^2 + 6x = 216$$

$$x^2 + 6x + 9 = 216 + 9$$

Add $(6/2)^2$, or 9 to each side.

$$(x + 3)(x + 3) = 225$$

Write $x^2 + 6x + 9$ as a square.
Simplify the right side.

$$(x + 3)^2 = 225$$

Find the square roots of both sides.

$$\sqrt{(x + 3)^2} = \sqrt{225}$$

$$x + 3 = \pm 15$$

Write as 2 equations.

$x + 3 = 15$ $\qquad$ $x + 3 = -15$

Subtract 3 from each side and solve.

$\boldsymbol{x = 12}$ $\qquad$ $\boldsymbol{x = -18}$

U4L5 – Solving $x^2 + bx + c$

What are the solutions of the equation $\mathbf{x^2 - 14x + 16 = 0}$?

$$x^2 - 14x + 16 = 0$$

$$x^2 - 14x = -16$$

Subtract 16 from both sides

$$x^2 - 14x + 49 = -16 + 49$$

Add $(-14/2)^2$, or 49 to each side.

$$(x - 7)^2 = 33$$

Write $x^2 - 14x + 49$ as a square. Simplify the right side.

$$\sqrt{(x-7)^2} = \sqrt{33}$$

Find the square roots of both sides.

$$x - 7 \approx \pm 5.74$$

Write as 2 equations.

$x - 7 \approx 5.74$ $\quad$ $x - 7 \approx -5.74$

Add 7 to each side and solve.

$\boldsymbol{x \approx 12.74}$ $\quad$ $\boldsymbol{x \approx 1.26}$

U4L5 – Completing the Square When a ≠ 1

To solve an equation when a ≠ 1, divide each side by a before completing the square.

$$3x^2 + 8x = 96$$

$$x^2 + \frac{8}{3}x = 32$$

Divide each side by 3

$$x^2 + \frac{8}{3}x + \frac{16}{9} = 32 + \frac{16}{9}$$

Add $(4/3)^2$, or 16/9, to each side.

$$\left(x + \frac{4}{3}\right)^2 = \frac{304}{9}$$

Write left side as a square and right side as a fraction.

U4L5 – Completing the Square When a ≠ 1

$\left(x+\frac{4}{3}\right)^2=\frac{304}{9}$	
$\sqrt{\left(x+\frac{4}{3}\right)^2}=\sqrt{\frac{304}{9}}$	Find the square roots of each side.
$x+\frac{4}{3}\approx\pm 5.81$	Use a calculator to approximate √304/9
$x+1.33\approx 5.81$ or $x+1.33\approx -5.81$	Write as two equations.
$\boldsymbol{x\approx 4.48}$ or $\boldsymbol{x\approx -7.14}$	Solve for x.

Questions?

- Check the Message Board first
- Send a WebMail
- You can also make an appointment at https://elizondo.youcanbook.me
- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.