Algebra 1 Readiness Intervention Lessons

Readiness Standard 5 - 8.EE.2

Learning Target: I will solve non-linear equations using square roots and cube roots

Readiness for A.REI.4: Factor quadratic equations

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Learning Target: I will solve non-linear equations using square roots and cube roots.

IES Recommendations for Improving Algebra Knowledge:

Recommendation
1. Use solved problems to engage students in analyzing algebraic reasoning and strategies.
2. Teach students to utilize the structure of algebraic representations.
3. Teach students to intentionally choose from alternative algebraic strategies when solving problems.

(Teaching Strategies for Improving Algebra Knowledge in
Middle and High School Students, 2015, p. 3)

	Recommended Actions ≈ 30 minutes
Beginning *(5 min.)*	➢ **Review** the learning target with the whole group. ➢ For sessions 2, 3 and 4, ask each student to **set a personal goal** for the day based on their previous Quick Check Score and use a highlighter to plot their goal on their Growth Chart.

Middle *(15 min.)*	➢ **Guided Practice**
	
	  o **Whole Group (Analyze solved problems)**
	    ▪ The teacher covers up all solution steps except the first two.
	    ▪ The teacher asks, "What math happened?" and elicits student responses to fill in the missing information.
	    ▪ The teacher answers student questions to clarify the solution step.
	    ▪ The teacher uncovers the next answer blank and repeats the analysis.
	
	  o **Pairs (Gradual release to solve problems)**
	    ▪ Students take turns leading to "think aloud" while completing each problem.

End *(10 min.)*	➢ **Reflect, Assess and Monitor Progress**
	
	  o Ask students to **reflect** on their progress towards the learning target.
	    ▪ What did I learn today about the learning target?
	    ▪ How confident do I feel about doing the learning target on my own?
	
	  o **Assess** each student's progress using a Quick Check.
	
	  o Guide students to **self-correct** their Quick Check.
	
	  o Guide students to **chart their progress** in their Growth Chart.
	    ▪ If not using Delta Math lessons, record the activity in the table.
	
	  o Collect each student's Quick Check and Growth Chart.

After	➢ **Exit** students who meet or exceed the learning goal for a third time.

Learning Target: I will solve non-linear equations using
square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 1: Guided Practice (Whole Group)

Directions: Below are solved problems to solve non-linear equations. For each solution step,
discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^2 = 81$ $x \bullet x = 81$ $x \bullet x = 9 \bullet 9$ or $x \bullet x = -9 \bullet -9$ $x = 9$ or $x = -9$ $x = \pm 9$	 **Changed to Repeated Multiplication** $x \bullet x =$ _____ to eliminate the exponent **Found Possible Values of** x 9 • 9 and -9 • -9 = _____ **Wrote the Solutions** $x = \pm 9$ means $x =$ _____ or $x =$ _____
2. Solve: $x^3 = -125$ $x \bullet x \bullet x = -125$ $x \bullet x \bullet x = -5 \bullet -5 \bullet -5$ $x = -5$	 **Changed to Repeated Multiplication** $x \bullet x \bullet x =$ _____ to eliminate the exponent **Found a number multiplied by itself 3 times equal to -125** -5 • -5 • -5 = _____ **Wrote the Solution** $x =$ _____
3. Solve: $x^2 = \dfrac{9}{16}$ $x \bullet x = \dfrac{9}{16}$ $x \bullet x = \dfrac{3}{4} \bullet \dfrac{3}{4}$ or $x \bullet x = -\dfrac{3}{4} \bullet -\dfrac{3}{4}$ $x = \dfrac{3}{4}$ or $x = -\dfrac{3}{4}$ $x = \pm \dfrac{3}{4}$	 **Changed to Repeated Multiplication** $x \bullet x =$ _____ to eliminate the exponent **Found a number multiplied by itself equal to** $\dfrac{9}{16}$**?** $\dfrac{3}{4} \bullet \dfrac{3}{4}$ and $-\dfrac{3}{4} \bullet -\dfrac{3}{4}$ = _____ **Wrote Both Possible Solutions** $x = \pm \dfrac{3}{4}$ means $x =$ _____ or $x =$ _____

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 1: Guided Practice (Pairs)

Directions: Complete the missing steps to solve each non-linear equation.

4. $x^2 = 49$ $x \cdot x = 49$ $x \cdot x =$ ___ • ___ or $x \cdot x =$ ___ • ___ $x =$ ___ or $x =$ ___ $x = \pm$ _____	**5.** $x^2 = 64$ $x \cdot x = 64$ $x \cdot x =$ ___ • ___ or $x \cdot x =$ ___ • ___ _____ or _____ $x =$ _____
6. $x^2 = 225$ $x \cdot x =$ _____ $x \cdot x =$ _____ or $x \cdot x =$ _____ $x =$ _____ or $x =$ _____ $x = \pm 15$	**7.** $x^2 = 144$ _____ $x \cdot x = 12 \cdot 12$ or _____ _____ or _____ $x =$ _____
8. $x^2 = \dfrac{16}{121}$ $x \cdot x = \dfrac{16}{121}$ $x \cdot x =$ ── • ── or $x \cdot x = -\dfrac{4}{11} \cdot -\dfrac{4}{11}$ $x =$ ── or $x = -$── $x = \pm\dfrac{4}{11}$	**9.** $x^2 = \dfrac{100}{36}$ $x \cdot x = \dfrac{100}{36}$ _____ or _____ _____ or $x = -\dfrac{10}{6}$ $x =$ _____

Learning Target: I will solve non-linear equations using
square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 1: Guided Practice (Teacher Notes)

Directions: Below are solved problems to solve non-linear equations. For each solution step,
discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $\quad x^2 = 81$	
$x \bullet x = 81$	**Changed to Repeated Multiplication** $x \bullet x = x^2$ to eliminate the exponent
$x \bullet x = 9 \bullet 9 \quad$ or $\quad x \bullet x = \text{-}9 \bullet \text{-}9$	**Found a number multiplied by itself equal to 81?** $9 \bullet 9$ and $\text{-}9 \bullet \text{-}9 = \mathbf{81}$
$x = 9 \quad$ or $\quad x = \text{-}9$	**Wrote Both Possible Solutions** $x = \pm 9$ means $x = \mathbf{+9}$ or $x = \mathbf{\text{-}9}$
$x = \pm 9$	
2. Solve: $\quad x^3 = \text{-}125$	
$x \bullet x \bullet x = \text{-}125$	**Changed to Repeated Multiplication** $x \bullet x \bullet x = x^3$ to eliminate the exponent
$x \bullet x \bullet x = \text{-}5 \bullet \text{-}5 \bullet \text{-}5$	**Found a number multiplied by itself 3 times equal to -125** $\text{-}5 \bullet \text{-}5 \bullet \text{-}5 = \mathbf{\text{-}125}$
$x = \text{-}5$	**Wrote the Solution** $x = \mathbf{\text{-}5}$
3. Solve: $\quad x^2 = \dfrac{9}{16}$	
$x \bullet x = \dfrac{9}{16}$	**Changed to Repeated Multiplication** $x \bullet x = x^2$ to eliminate the exponent
$x \bullet x = \dfrac{3}{4} \bullet \dfrac{3}{4} \quad$ or $\quad x \bullet x = \text{-}\dfrac{3}{4} \bullet \text{-}\dfrac{3}{4}$	**Found a number multiplied by itself equal to $\dfrac{9}{16}$?** $\dfrac{3}{4} \bullet \dfrac{3}{4}$ and $\text{-}\dfrac{3}{4} \bullet \text{-}\dfrac{3}{4} = \dfrac{\mathbf{9}}{\mathbf{16}}$
$x = \dfrac{3}{4} \quad$ or $\quad x = \text{-}\dfrac{3}{4}$	**Wrote Both Possible Solutions** $x = \pm\dfrac{3}{4}$ means $x = \dfrac{\mathbf{3}}{\mathbf{4}}$ or $x = \mathbf{\text{-}}\dfrac{\mathbf{3}}{\mathbf{4}}$
$x = \pm\dfrac{3}{4}$	

Session 1: Self-Reflection

Algebra 1 – Readiness Standard 5 – 8.EE.2

Learning Target: I will solve non-linear equations using square roots and cube roots

Briefly discuss student responses

- ➢ What did I learn today about solving non-linear equations?

- ➢ How confident do I feel about solving non-linear equations on my own? *(Thumbs up, down, or sideways)*

Algebra 1 Quick Check – Form A

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1.

$$x^2 = 9$$

±9   81   ±3   4.5

2.

$$x^2 = 36$$

6   72   ±6   18

3.

$$x^3 = 125$$

±5   -5   5   375

4.

$$x^3 = -27$$

3   ±3   -3   -9

5.

$$x^2 = \frac{16}{36}$$

$-\dfrac{4}{6}$ $\dfrac{4}{6}$ $\pm\dfrac{4}{6}$ $\pm\dfrac{8}{18}$

6.

$$x^2 = \frac{81}{49}$$

$\dfrac{9}{49}$ $\dfrac{9}{7}$ $\pm\dfrac{9}{7}$ $\pm\dfrac{9}{49}$
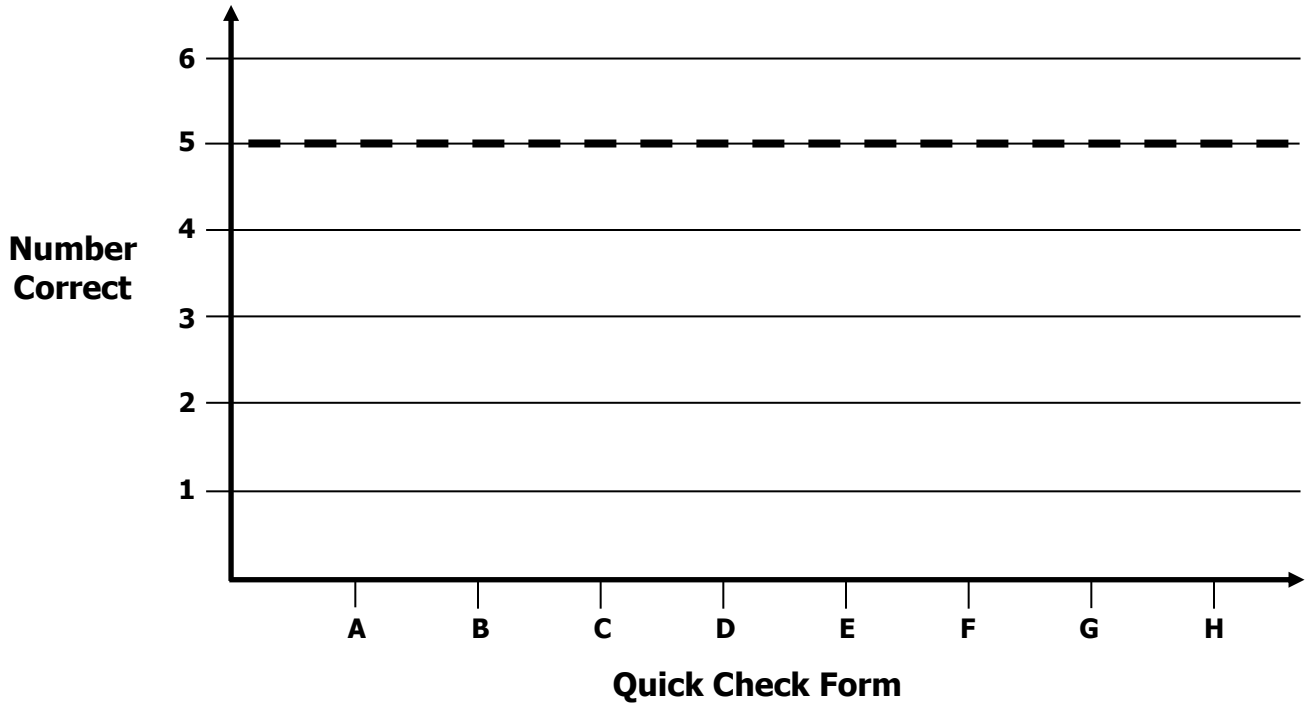
Algebra 1 Growth Chart

Readiness Standard 5 - 8.EE.2

Name_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Goal: 5 out of 6 correct

Intervention Notes	Date	Score

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 2: Guided Practice (Whole Group)

Directions: Below are solved problems to solve non-linear equations. For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^3 = 8$ $x \bullet x \bullet x = 8$ $x \bullet x \bullet x = 2 \bullet 2 \bullet 2$ $x = 2$	**Changed to Repeated Multiplication** $x \bullet x \bullet x =$ _____ to eliminate the exponent **Found a number multiplied by itself 3 times equal to 8** $2 \bullet$ -2 $\bullet$ 2 = _____ **Wrote the Solution** $x =$ _____
2. Solve: $x^2 = 25$ $x \bullet x = 25$ $x \bullet x = 5 \bullet 5$ or $x \bullet x = $ -5 $\bullet$ -5 $x = 5$ or $x = $ -5 $x = \pm 5$	**Changed to Repeated Multiplication** $x \bullet x =$ _____ to eliminate the exponent **Found a number multiplied by itself equal to 25?** $5 \bullet 5$ and -5 $\bullet$ -5 = _____ **Wrote Both Possible Solutions** $x = \pm 5$ means $x =$ _____ or $x =$ _____
3. Solve: $x^3 = \dfrac{27}{64}$ $x \bullet x \bullet x = \dfrac{27}{64}$ $x \bullet x \bullet x = \dfrac{3}{4} \bullet \dfrac{3}{4} \bullet \dfrac{3}{4}$ $x = \dfrac{3}{4}$	**Changed to Repeated Multiplication** $x \bullet x \bullet x =$ _____ to eliminate the exponent **Found a number multiplied by itself equal to $\dfrac{27}{64}$?** $\dfrac{3}{4} \bullet \dfrac{3}{4} \bullet \dfrac{3}{4} =$ _____ **Wrote the Solutions** $x =$ _____

Learning Target: I will solve non-linear equations using   Algebra 1 – Readiness Standard 5 – 8.EE.2
square roots and cube roots

Readiness for factoring quadratic equations

Session 2: Guided Practice (Pairs)

Directions: Complete the missing steps to solve each non-linear equation

4. Solve: $x^3 = 27$ $x \bullet x \bullet x = 27$ $x \bullet x \bullet x = 3 \bullet \underline{\quad} \bullet \underline{\quad}$ $x = \underline{\qquad\quad}$	**5.** Solve: $x^3 = 125$ $x \bullet x \bullet x = \underline{\quad\quad}$ $x \bullet x \bullet x = \underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}$ $x = \underline{\qquad\quad}$
6. Solve: $x^3 = 216$ $x \bullet x \bullet x = 216$ $x \bullet x \bullet x = \underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}$ $x = 6$	**7.** Solve: $x^3 = -64$ $x \bullet x \bullet x = \underline{\quad\quad}$ $x \bullet x \bullet x = \underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}$ $x = \underline{\qquad\quad}$
8. Solve: $x^3 = \dfrac{8}{1000}$ $x \bullet x \bullet x = \dfrac{8}{1000}$ $x \bullet x \bullet x = \underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}$ $x = \underline{\quad}$	**9.** Solve: $x^3 = -\dfrac{343}{27}$ $x \bullet x \bullet x = -\underline{\quad}$ $x \bullet x \bullet x = -\underline{\quad} \bullet -\underline{\quad} \bullet -\underline{\quad}$ $x = -\dfrac{7}{3}$

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 2: Guided Practice (Teacher Notes)

Directions: Below are solved problems to solve non-linear equations. For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^3 = 8$ $x \bullet x \bullet x = 8$ $x \bullet x \bullet x = 2 \bullet 2 \bullet 2$ $x = 2$	 **Changed to Repeated Multiplication** $x \bullet x \bullet x = x^3$ to eliminate the exponent **Found a number multiplied by itself 3 times equal to 8** 2 • -2 • 2 = **8** **Wrote the Solution** x = **2**
2. Solve: $x^2 = 25$ $x \bullet x = 25$ $x \bullet x = 5 \bullet 5$ or $x \bullet x = -5 \bullet -5$ $x = 5$ or $x = -5$ $x = \pm 5$	 **Changed to Repeated Multiplication** $x \bullet x = x^2$ to eliminate the exponent **Found a number multiplied by itself equal to 25?** 5 • 5 and -5 • -5 = **25** **Wrote Both Possible Solutions** $x = \pm 5$ means x = **+5** or x = **-5**
3. Solve: $x^3 = \dfrac{27}{64}$ $x \bullet x \bullet x = \dfrac{27}{64}$ $x \bullet x \bullet x = \dfrac{3}{4} \bullet \dfrac{3}{4} \bullet \dfrac{3}{4}$ $x = \dfrac{3}{4}$	 **Changed to Repeated Multiplication** $x \bullet x \bullet x = x^3$ to eliminate the exponent **Found a number multiplied by itself equal to $\dfrac{27}{64}$?** $\dfrac{3}{4} \bullet \dfrac{3}{4} \bullet \dfrac{3}{4} = \dfrac{27}{64}$ **Wrote the Solutions** $x = \dfrac{3}{4}$

Session 2: Self-Reflection

Algebra 1 – Readiness Standard 5 – 8.EE.2

Learning Target: I will solve non-linear equations using square roots and cube roots

Briefly discuss student responses

➢ What did I learn today about solving non-linear equations?

➢ How confident do I feel about solving non-linear equations

on my own? *(Thumbs up, down, or sideways)*

Algebra 1 Quick Check – Form B

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1. $$x^2 = 100$$ ±100 10,000 ±10 50	**2.** $$x^2 = 25$$ ±5 50 5 ±50
3. $$x^3 = -8$$ ±24 -2 ±2 -24	**4.** $$x^3 = 216$$ 6 -6 ±6 72
5. $$x^2 = \frac{64}{25}$$ $-\frac{8}{25}$ $\pm\frac{8}{5}$ $\frac{8}{5}$ $\pm\frac{32}{12.5}$	**6.** $$x^2 = \frac{9}{36}$$ $\pm\frac{3}{36}$ $\frac{3}{18}$ $\pm\frac{3}{6}$ $\frac{3}{6}$

DELTA MATH R&E PROGRAM

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 3: Guided Practice (Whole Group)

Directions: Below are solved problems to solve non-linear equations. For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $\quad x^2 = 81$ $\sqrt{x^2} = \sqrt{81}$ $x = \pm 9$	 **Took the square root of each side** $\sqrt{x^2} = \sqrt{\underline{\quad} \cdot \underline{\quad}} = \underline{\quad}$ to eliminate the exponent **Simplified each radical** $\sqrt{81} = \sqrt{\underline{\quad} \cdot \underline{\quad}}$ or $\sqrt{\underline{\quad} \cdot \underline{\quad}}$
2. Solve: $\quad x^3 = \text{-}64$ $\sqrt[3]{x^3} = \sqrt[3]{-64}$ $x = -4$	 **Took the cube root of each side** Since $\sqrt{x^3} = \sqrt{\underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad}} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{-64} = \sqrt{\underline{\quad} \cdot \underline{\quad} \cdot \underline{\quad}}$
3. Solve: $\quad x^2 = \dfrac{9}{25}$ $\sqrt{x^2} = \sqrt{\dfrac{9}{25}}$ $x = \pm\dfrac{3}{5}$	 **Took the square root of each side** $\sqrt{x^2} = \sqrt{\underline{\quad} \cdot \underline{\quad}} = \underline{\quad}$ to eliminate the exponent **Simplified each radical** $\sqrt{\dfrac{9}{25}} = \sqrt{\dfrac{\underline{\quad}}{\underline{\quad}} \cdot \dfrac{\underline{\quad}}{\underline{\quad}}}$ or $\sqrt{\dfrac{\underline{\quad}}{\underline{\quad}} \cdot \dfrac{\underline{\quad}}{\underline{\quad}}}$

Name _____ Date _____

Learning Target: I will solve non-linear equations using
square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 3: Guided Practice (Pairs)

Directions: Complete the missing steps to solve each non-linear equation.

4. $x^2 = 49$ $\sqrt{x^2} = \sqrt{}$ $\sqrt{x^2} = \sqrt{\underline{} \cdot \underline{}}$ or $\sqrt{\underline{} \cdot \underline{}}$ $x = \pm \underline{}$	**5.** $x^2 = 64$
6. $x^3 = 125$ $\sqrt[3]{x^3} = \sqrt[3]{}$ $\sqrt[3]{x^3} = \sqrt{\underline{} \cdot \underline{} \cdot \underline{}}$ $x = \underline{}$	**7.** $x^3 = -27$
8. $x^2 = \dfrac{16}{81}$ $\sqrt{x^2} = \sqrt{\dfrac{}{}}$ $\sqrt{x^2} = \sqrt{\dfrac{}{} \cdot \dfrac{}{}}$ or $\sqrt{\dfrac{}{} \cdot \dfrac{}{}}$ $x = \pm \dfrac{}{}$	**9.** $x^3 = \dfrac{64}{8}$

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 3: Guided Practice (Teacher Notes)

Directions: Below are solved problems to solve non-linear equations. For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^2 = 81$ $\sqrt{x^2} = \sqrt{81}$ $x = \pm 9$	**Took the square root of each side** $\sqrt{x^2} = \sqrt{x \cdot x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{81} = \sqrt{9 \cdot 9}$ or $\sqrt{-9 \cdot -9}$
2. Solve: $x^3 = -64$ $\sqrt[3]{x^3} = \sqrt[3]{-64}$ $x = -4$	**Took the cube root of each side** Since $\sqrt{x^3} = \sqrt{x \cdot x \cdot x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{81} = \sqrt{4 \cdot 4 \cdot 4}$ or $\sqrt{-4 \cdot -4 \cdot -4}$
3. Solve: $x^2 = \dfrac{9}{25}$ $\sqrt{x^2} = \sqrt{\dfrac{9}{25}}$ $x = \pm \dfrac{3}{5}$	**Took the square root of each side** $\sqrt{x^2} = \sqrt{x \cdot x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{\dfrac{9}{25}} = \sqrt{\dfrac{3}{5} \cdot \dfrac{3}{5}}$ or $\sqrt{-\dfrac{3}{5} \cdot -\dfrac{3}{5}}$

Learning Target: I will solve non-linear equations using square roots and cube roots

Briefly discuss student responses

➢ What did I learn today about solving non-linear equations?

➢ How confident do I feel about solving non-linear equations on my own? *(Thumbs up, down, or sideways)*

Algebra 1 Quick Check – Form C

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1.

$$x^2 = 16$$

±4   8   4   ±8

2.

$$x^2 = 64$$

-8   ±32   ±8   128

3.

$$x^3 = 27$$

3   ±3   ±9   81

4.

$$x^3 = -64$$

192   -4   4   ±4

5.

$$x^2 = \frac{49}{100}$$

$\frac{7}{100}$ $\frac{7}{10}$ $\pm \frac{7}{100}$ $\pm \frac{7}{10}$

6.

$$x^2 = \frac{36}{16}$$

$\frac{18}{8}$ $\pm \frac{6}{16}$ $\pm \frac{6}{4}$ $\frac{6}{4}$

Learning Target: I will solve non-linear equations using square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 4: Guided Practice (Whole Group)

Directions: Below are solved problems to solve non-linear equations. For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^2 = 64$ $\sqrt{x^2} = \sqrt{64}$ $x = \pm 8$	**Took the square root of each side** $\sqrt{x^2} = \sqrt{\underline{\quad} \bullet \underline{\quad}} = \underline{\quad}$ to eliminate the exponent **Simplified each radical** $\sqrt{64} = \sqrt{\underline{\quad} \bullet \underline{\quad}}$ or $\sqrt{\underline{\quad} \bullet \underline{\quad}}$
2. Solve: $x^3 = -125$ $\sqrt[3]{x^3} = \sqrt[3]{-125}$ $x = -5$	**Took the cube root of each side** Since $\sqrt{x^3} = \sqrt{\underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{-125} = \sqrt{\underline{\quad} \bullet \underline{\quad} \bullet \underline{\quad}}$
3. Solve: $x^2 = \dfrac{36}{121}$ $\sqrt{x^2} = \sqrt{\dfrac{36}{121}}$ $x = \pm \dfrac{6}{11}$	**Took the square root of each side** $\sqrt{x^2} = \sqrt{\underline{\quad} \bullet \underline{\quad}} = \underline{\quad}$ to eliminate the exponent **Simplified each radical** $\sqrt{\dfrac{36}{121}} = \sqrt{\dfrac{\underline{\ }}{\underline{\ }} \bullet \dfrac{\underline{\ }}{\underline{\ }}}$ or $\sqrt{\dfrac{\underline{\ }}{\underline{\ }} \bullet \dfrac{\underline{\ }}{\underline{\ }}}$

Learning Target: I will solve non-linear equations using
square roots and cube roots

Algebra 1 – Readiness Standard 5 – 8.EE.2

Readiness for factoring quadratic equations

Session 4: Guided Practice (Pairs)

Directions: Solve each non-linear equation.

4. $\qquad x^2 = 36$	**5.** $\qquad x^2 = 81$
6. $\qquad x^3 = 8$	**7.** $\qquad x^3 = -64$
8. $\qquad x^2 = \dfrac{49}{81}$	**9.** $\qquad x^3 = \dfrac{125}{27}$

Name _____ Date _____

Learning Target: I will solve non-linear equations using   Algebra 1 – Readiness Standard 5 – 8.EE.2
square roots and cube roots

Readiness for factoring quadratic equations

Session 4: Guided Practice (Teacher Notes)

Directions: Below are solved problems to solve non-linear equations. For each solution step,
discuss what happened and fill in the missing information.

Write	Describe
1. Solve: $x^2 = 64$ $\sqrt{x^2} = \sqrt{64}$ $x = \pm 8$	 **Took the square root of each side** $\sqrt{x^2} = \sqrt{x \bullet x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{64} = \sqrt{8 \bullet 8}$ or $\sqrt{-8 \bullet -8}$
2. Solve: $x^3 = -125$ $\sqrt[3]{x^3} = \sqrt[3]{-125}$ $x = -5$	 **Took the cube root of each side** Since $\sqrt{x^3} = \sqrt{x \bullet x \bullet x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{-125} = \sqrt{-5 \bullet -5 \bullet -5}$
3. Solve: $x^2 = \dfrac{36}{121}$ $\sqrt{x^2} = \sqrt{\dfrac{36}{121}}$ $x = \pm\dfrac{6}{11}$	 **Took the square root of each side** $\sqrt{x^2} = \sqrt{x \bullet x} = x$ to eliminate the exponent **Simplified each radical** $\sqrt{\dfrac{36}{121}} = \sqrt{\dfrac{6}{11} \bullet \dfrac{6}{11}}$ or $\sqrt{-\dfrac{6}{11} \bullet -\dfrac{6}{11}}$

Learning Target: I will solve non-linear equations using square roots and cube roots

Briefly discuss student responses

➢ What did I learn today about solving non-linear equations?

➢ How confident do I feel about solving non-linear equations on my own? *(Thumbs up, down, or sideways)*

Algebra 1 Quick Check – Form D

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1. $x^2 = 49$ ±7 98 -7 ± 98	**2.** $x^2 = 81$ ± 162 -9 ±9 162
3. $x^3 = -216$ 6 -6 ± 6 -72	**4.** $x^3 = 8$ 2 ±2 24 ± 24
5. $x^2 = \dfrac{25}{16}$ $\dfrac{5}{8}$ $\dfrac{5}{4}$ $\pm\dfrac{5}{4}$ $\pm\dfrac{5}{16}$	**6.** $x^2 = \dfrac{64}{81}$ $\dfrac{8}{9}$ $\pm\dfrac{8}{9}$ $\pm\dfrac{32}{81}$ $\dfrac{8}{81}$

Algebra 1 Quick Check – Form E

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1. $$x^2 = 9$$ ±9　　81　　±3　　4.5	**2.** $$x^2 = 36$$ 6　　72　　±6　　18
3. $$x^3 = 125$$ ±5　　-5　　5　　375	**4.** $$x^3 = -27$$ 3　　±3　　-3　　-9
5. $$x^2 = \frac{16}{36}$$ $-\dfrac{4}{6}$　　$\dfrac{4}{6}$　　$\pm\dfrac{4}{6}$　　$\pm\dfrac{8}{18}$	**6.** $$x^2 = \frac{81}{49}$$ $\dfrac{9}{49}$　　$\dfrac{9}{7}$　　$\pm\dfrac{9}{7}$　　$\pm\dfrac{9}{49}$

Algebra 1 Quick Check – Form F

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1. $x^2 = 100$ ±100 10,000 ±10 50	**2.** $x^2 = 25$ ±5 50 5 ±50
3. $x^3 = -8$ ±24 -2 ±2 -24	**4.** $x^3 = 216$ 6 -6 ±6 72
5. $x^2 = \dfrac{64}{25}$ $-\dfrac{8}{25}$ $\pm\dfrac{8}{5}$ $\dfrac{8}{5}$ $\pm\dfrac{32}{12.5}$	**6.** $x^2 = \dfrac{9}{36}$ $\pm\dfrac{3}{36}$ $\dfrac{3}{18}$ $\pm\dfrac{3}{6}$ $\dfrac{3}{6}$

Algebra 1 Quick Check – Form G

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1.	2.
$x^2 = 16$	$x^2 = 64$
±4 8 4 ±8	-8 ±32 ±8 128

3.	4.
$x^3 = 27$	$x^3 = -64$
3 ±3 ±9 81	192 -4 4 ±4

5.	6.
$x^2 = \dfrac{49}{100}$	$x^2 = \dfrac{36}{16}$
$\dfrac{7}{100}$ $\dfrac{7}{10}$ $\pm\dfrac{7}{100}$ $\pm\dfrac{7}{10}$	$\dfrac{18}{8}$ $\pm\dfrac{6}{16}$ $\pm\dfrac{6}{4}$ $\dfrac{6}{4}$

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Algebra 1 Quick Check – Form H

Readiness Standard 5 - 8.EE.2

Name_____ Date_____

Learning Target: I will solve non-linear equations using square roots and cube roots.

Directions: Circle the solution to each equation. (Work time: 3 minutes)

1. $x^2 = 49$ ±7 98 -7 ± 98	**2.** $x^2 = 81$ ± 162 -9 ±9 162
3. $x^3 = -216$ 6 -6 ± 6 -72	**4.** $x^3 = 8$ 2 ±2 24 ± 24
5. $x^2 = \dfrac{25}{16}$ $\dfrac{5}{8}$ $\dfrac{5}{4}$ $\pm \dfrac{5}{4}$ $\pm \dfrac{5}{16}$	**6.** $x^2 = \dfrac{64}{81}$ $\dfrac{8}{9}$ $\pm \dfrac{8}{9}$ $\pm \dfrac{32}{81}$ $\dfrac{8}{81}$