

Today's Plan:

Learning Target (standard): I will solve radical equations.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Simplify.

$$\begin{array}{l}
 (5 - \sqrt{-12}) - (9 + \sqrt{-108}) \\
 5 - \sqrt{2 \cdot 2 \cdot 3} i - 9 - \sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3} i \\
 \underline{5} - \underline{2\sqrt{3}} i - \underline{9} - \underline{6\sqrt{3}} i \\
 -4 - 8\sqrt{3} i
 \end{array}$$

12
 \wedge
 $4 \quad 3$
 \wedge
 $2 \quad 2$

108
 \wedge
 $9 \quad 12$
 $\wedge \quad \wedge$
 $3 \quad 3 \quad 3 \quad 4$
 \wedge
 $2 \quad 2$

Simplify.

$$\begin{aligned}
 & (\sqrt{40} - \sqrt{-98}) - (\sqrt{90} + \sqrt{-32}) \\
 & \begin{array}{cccc}
 \begin{array}{c} \wedge \\ 4 \quad 10 \\ \wedge \quad \wedge \\ 2 \quad 2 \quad 5 \end{array} & \begin{array}{c} \wedge \\ 2 \quad 49 \\ \wedge \\ 7 \quad 7 \end{array} & \begin{array}{c} \wedge \\ 9 \quad 10 \\ \wedge \quad \wedge \\ 3 \quad 3 \quad 2 \quad 5 \end{array} & \begin{array}{c} \wedge \\ 4 \quad 8 \\ \wedge \quad \wedge \\ 2 \quad 2 \quad 2 \quad 4 \\ \wedge \\ 2 \quad 2 \end{array}
 \end{array} \\
 & = \sqrt{2 \cdot 2 \cdot 2 \cdot 5} - \sqrt{2 \cdot 7 \cdot 7} i - \sqrt{2 \cdot 3 \cdot 3 \cdot 5} - \sqrt{2 \cdot 2 \cdot 2 \cdot 2} i \\
 & = \underline{2\sqrt{10}} - \underline{7\sqrt{2}i} - \underline{3\sqrt{10}} - \underline{4\sqrt{2}i} \\
 & = -\sqrt{10} - 11\sqrt{2}i
 \end{aligned}$$

Simplify.

$$\begin{aligned}
 & \sqrt{-15} \sqrt{-27} \\
 & \begin{array}{ccc}
 \begin{array}{c} \wedge \\ 3 \quad 5 \quad i \end{array} & \begin{array}{c} \wedge \\ 3 \quad 9 \\ \wedge \\ 3 \quad 3 \quad i \end{array} & \\
 & = \sqrt{3 \cdot 3 \cdot 3 \cdot 5} i \cdot i \\
 & = 9\sqrt{5} \boxed{i^2} = -1 \\
 & = -9\sqrt{5}
 \end{array}
 \end{aligned}$$

Simplify.

$$\begin{aligned}
 & -3i(4 - 5i) \\
 & = -12i + 15 \boxed{i^2} = -1 \\
 & = -15 - 12i
 \end{aligned}$$

Simplify.

$$\begin{aligned}
 & \sqrt{-3}(\sqrt{12} - \sqrt{-6}) \\
 & \quad \uparrow i \quad \quad \quad \begin{matrix} \wedge \\ 3 \cdot 4 \\ \wedge \\ 2 \cdot 2 \end{matrix} \quad \quad \quad \begin{matrix} \wedge \\ 3 \cdot 2 \cdot i \end{matrix} \\
 & = \sqrt{2 \cdot 2 \cdot 3 \cdot 3} i - \sqrt{2 \cdot 3 \cdot 3} i^2 \\
 & = 6i - 3\sqrt{2} \boxed{i^2} = -1 \\
 & = 3\sqrt{2} + 6i
 \end{aligned}$$

Simplify.

$$\begin{aligned}(4 - 7i)(2 + 3i) \\ &= 8 + \underline{12i} - \underline{14i} - 2\underbrace{i^2}_{=-1} \\ &= 8 - 2i + 2 \\ &= 29 - 2i\end{aligned}$$

Simplify.

$$\begin{aligned}(9 - \sqrt{-1})^2 &= (9 - i)(9 - i) \\ &= 81 - \underline{9i} - \underline{9i} + \underbrace{i^2}_{=-1} \\ &= 81 - 18i - 1 \\ &= 80 - 18i\end{aligned}$$

Equations Containing Radicals:

- if the equation has a single radical, isolate it and square, cube, etc. both sides
 - since this is not one of the four operations used to isolate variables, extraneous solutions may result
 - answers must be verified
- if the equation has more than one radical, isolate one of them and square, cube, etc. both sides and repeat until the variable can be isolated
 - since this is not one of the four operations used to isolate variables, extraneous solutions may result
 - answers must be verified

Solve:

$$\left(\sqrt[3]{4x}\right)^3 = (-2)^3$$

$$4x = -8$$

$$x = -2$$

verify:

$$\sqrt[3]{4 \cdot -2} \stackrel{?}{=} -2$$

$$\sqrt[3]{m} = m^{\frac{1}{3}}$$

$$\left(m^{\frac{1}{3}}\right)^3 = m$$

Solve:

$$(\sqrt{5x})^2 = (-5)^2$$

$$\sqrt{55} \neq -5$$

$$5x = 25$$

$$x = 5$$

no solution

Solve:

$$\sqrt{4x-3} - 5 = 0$$

$$(\sqrt{4x-3})^2 = (5)^2$$

$$4x-3 = 25$$

$$4x = 28$$

$$x = 7$$

$$\begin{aligned} \sqrt{28-3} - 5 &\stackrel{?}{=} 0 \\ 5 - 5 &= 0 \checkmark \end{aligned}$$

Solve:

$$\sqrt{25-20+1} + 3 \stackrel{?}{=} 5$$

$$2+3=5 \checkmark$$

$$\sqrt{x^2 - 4x - 1} + 3 = x$$

$$\left(\sqrt{x^2 - 4x - 1}\right)^2 = (x-3)^2 \quad (x-3)(x-3)$$

$$x^2 - 4x - 1 = x^2 - 3x - 3x + 9$$

$$x^2 - 4x - 1 = x^2 - 6x + 9$$

$$-4x - 1 = -6x + 9$$

$$2x - 1 = 9$$

$$2x = 10$$

$$x = 5$$

Solve:

$$\sqrt{1} - \sqrt{4} = 1$$

$$1 - 2 \neq 1$$

$$\sqrt{4x+1} - \sqrt{2x+4} = 1$$

$$\left(\sqrt{4x+1}\right)^2 = \left(1 + \sqrt{2x+4}\right)^2 \quad (1 + \sqrt{2x+4})(1 + \sqrt{2x+4})$$

$$4x+1 = 1 + 2\sqrt{2x+4} + 2x+4$$

$$4x+1 = 5 + 2x + 2\sqrt{2x+4}$$

$$2x-4 = 2\sqrt{2x+4}$$

$$(x-2)^2 = (\sqrt{2x+4})^2$$

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

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

$$x(x-6) = 0$$

$$x = 0, 6$$

$$x = 6$$

$$\sqrt{2x+1} - \sqrt{2x+4} \stackrel{?}{=} 1$$

$$\sqrt{25} - \sqrt{16} = 1$$

$$5 - 4 = 1 \checkmark$$

Assignment:

p.251 #4-60 (by 4)