

Algebra II - Notes

Alg. II
 chp 6-7 T6-6
 Notes
 2-13-14

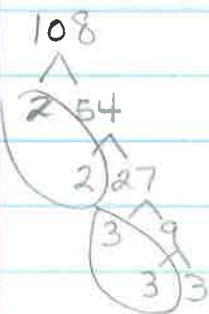
2-13-14 T6-6 Solving/verify w/Radicals
 chp 6-7

Sample:
 Test Q's

$$\sqrt{\frac{1}{108} x^6 y^9} = \frac{\sqrt{1}}{\sqrt{108}} \sqrt{x^6} \sqrt{y^9} =$$

even

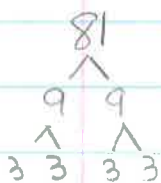
$$\frac{1|x^3|y^4\sqrt{y}}{2 \cdot 3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{|x^3|y^4\sqrt{y}\sqrt{3}}{2 \cdot 3 \cdot 3} =$$



$$\boxed{\frac{|x^3|y^4\sqrt{3y}}{18}}$$

$$\frac{\sqrt[8]{81}}{\sqrt[6]{3}} = \frac{\sqrt[8]{3^4}}{\sqrt[6]{3^1}} = \frac{3^{\frac{4}{8}}}{3^{\frac{1}{6}}} = \frac{3^{\frac{1}{2}}}{3^{\frac{1}{6}}} = 3^{\frac{1}{2} - \frac{1}{6}} =$$

$$3^{\frac{3}{6} - \frac{1}{6}} = 3^{\frac{2}{6}} = 3^{\frac{1}{3}} = \boxed{\sqrt[3]{3}}$$



Note = $x^2 \cdot x^7 = x^{2+7} = x^9$ } Exponent Rule

$$\frac{x^7}{x^2} = x^{7-2} = x^5$$

SADMERP

↑
 Use to
Solve

$$1. \sqrt{y-2} + 1 = 5$$

$$\begin{array}{r|l} \sqrt{y-2} + 1 & = 5 \\ \hline \sqrt{y-2} & = 4 \\ y-2 & = 16 \\ y+2 & = 18 \\ \hline y & = 16 \end{array}$$

← Square both sides

Verify:

$$\begin{array}{l} \sqrt{38-2} - 1 = 5 \\ \sqrt{36} - 1 = 5 \\ 6 - 1 = 5 \\ 5 = 5 \checkmark \end{array}$$

$$2. \sqrt{x-12} = 2 - \sqrt{x}$$

square both sides $\rightarrow \sqrt{x-12}^2 = (2 - \sqrt{x})^2$

$$x-12 = (2 - \sqrt{x})(2 - \sqrt{x})$$

$$x-12 = 4 - 2\sqrt{x} - 2\sqrt{x} + x$$

$$\begin{array}{r} x-12 = 4 - 4\sqrt{x} + x \\ -x \quad \quad \quad -x \end{array}$$

$$\begin{array}{r} -12 = 4 - 4\sqrt{x} \\ -4 \quad -4 \end{array}$$

$$\begin{array}{r} -16 = 4\sqrt{x} \\ -4 \quad -4 \end{array}$$

$$4^2 = \sqrt{x}^2 \quad \leftarrow \text{square both sides, again!}$$

$$16 = x \quad \boxed{\text{No Solution}}$$

Verify: $\sqrt{16-12} = 2 - \sqrt{16}$

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

$$2 \neq -2$$

$$3. (3y+1)^{\frac{1}{3}} + 5 = 0$$

raise to 3 power (both sides)

$$\begin{array}{r} ((3y+1)^{\frac{1}{3}})^3 = (-5)^3 \\ -5 \quad -5 \end{array}$$

$$\begin{array}{r} 3y+1 = -125 \\ -1 \quad -1 \end{array}$$

$$\begin{array}{r} 3y = -126 \\ 3 \quad 3 \end{array}$$

$$\boxed{y = -42}$$

Note:

Exponent Rule

$$(2^3)^4 = 2^{3 \cdot 4} = 2^{12}$$

$$(x^{\frac{1}{3}})^3 = x^{\frac{1}{3} \cdot 3} = x^1 = x$$

Verify:

$$(3(-42)+1)^{\frac{1}{3}} + 5 = 0 \quad \checkmark$$

(on calculator)

★ $4.2\sqrt{2x-7} = \sqrt{2x+4}$ ← square both sides

↓
on test

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

$$(2^2)(\sqrt{2x-7})^2 = \sqrt{2x+4}^2$$

Distribute → $4(2x-7) = 2x+4$

$$\begin{array}{r} 8x - 28 \\ -2x \\ \hline 6x - 28 \end{array} = \begin{array}{r} 2x + 4 \\ -2x \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6x - 28 \\ +28 \\ \hline 6x \end{array} = \begin{array}{r} 4 \\ +28 \\ \hline 32 \end{array}$$

$$\frac{6x}{6} = \frac{32}{6}$$

$$x = \frac{16}{3}$$

Note:

$$(a \cdot b)^2 = a^2 b^2$$

only with multiplication & DIV.

$$(a+b)^2 = (a+b)(a+b)$$

Verify:

$$\checkmark 2\sqrt{2(\frac{16}{3})-7} = \sqrt{2(\frac{16}{3})+4}$$

Done on calculator

5. $\sqrt{4x+13} - x = -8$

$$+x \quad +x$$

square both sides

→ $\sqrt{4x+13}^2 = (x-8)^2$ ← foil

$$4x+13 = (x-8)(x-8)$$

$$4x+13 = x^2 - 8x - 8x + 64$$

$$4x+13 = x^2 - 16x + 64$$

Quadratic

$$4x+13 = x^2 - 16x + 64$$

$$-4x - 13 = -4x - 13$$

$$0 = x^2 - 20x + 51$$

$$0 = (x-3)(x-17)$$

$$\begin{array}{r} x-3=0 \\ +3 \quad +3 \\ \hline x=3 \end{array}$$

$$\begin{array}{r} x-17=0 \\ +17 \quad 17 \\ \hline x=17 \end{array}$$

$$x=17$$

verify (both solutions):

① $\sqrt{4(3)+13} - 3 = -8$

$$\sqrt{12+13} - 3 = -8$$

$$\sqrt{25} - 3 = -8$$

$$5 - 3 = -8$$

$$2 = -8$$

② $\sqrt{4(17)+13} - 17 = -8$

$$\sqrt{68+13} - 17 = -8$$

$$\sqrt{81} - 17 = -8$$

$$9 - 17 = -8$$

$$-8 = -8 \checkmark$$

$$\begin{array}{r|l} 51 & -20 \\ -3 \cdot 17 & -3 - 17 \end{array}$$

$$6. \quad 7(\sqrt[6]{5m+4}) - 4 = 10$$

$$\frac{7(\sqrt[6]{5m+4})}{7} = \frac{14}{7}$$

→ raise to 6th power

$$(\sqrt[6]{5m+4})^6 = 2^6$$

$$\frac{5m+4}{-4} = \frac{64}{-4}$$

$$\frac{5m}{5} = \frac{60}{5}$$

$$m = 12$$

Verify: $7(\sqrt[6]{5(12)+4}) - 4 = 10$

$$7(\sqrt[6]{60+4}) - 4 = 10$$

$$7\sqrt[6]{64} - 4 = 10$$

$$7\sqrt[6]{2^6} - 4 = 10$$

$$7 \cdot 2 - 4 = 10$$

$$14 - 4 = 10$$

$$10 = 10 \quad \checkmark$$