q9 #4

Rationalizing a denominator: Quotient involving higher radicals and monomials

Rationalize the denominator and simplify.

$$\sqrt[3]{\frac{7x^5}{2y}}$$

Assume that all variables represent positive numbers.

$$\frac{\sqrt[3]{7x^5}}{\sqrt[3]{2y}} \cdot \frac{\sqrt[3]{4y^2}}{\sqrt[3]{4y^2}} = \frac{\sqrt[3]{28x^5y^2}}{2y}$$

$$= x\,\frac{\sqrt[3]{28x^2y^2}}{2y}$$

Simplifying a product and quotient involving square roots of negative numbers

Simplify the expressions below as much as possible.

Leave no negative numbers under radicals and no radicals in denominators.

$\frac{\sqrt{-54}}{\sqrt{-3}} = \square$ $\sqrt{18} = \boxed{3\sqrt{2}}$ 54/3=18

$\sqrt{-15}\cdot\sqrt{6} = \square$ $\sqrt{-90} = \boxed{3i\sqrt{10}}$

Dividing complex numbers

Divide.

$$\frac{-i}{4+6i}\ \frac{4-6i}{4-6i} = \frac{-4i+6i^2}{16-36i^2} = \frac{-4i-6}{16+36} = \frac{-4i}{52} - \frac{6}{52}$$

Write your answer as a complex number in standard form.

conjugate of

4+6i is 4 - 6i

7.4 #9.

Rationalizing a denominator: Quotient involving a higher radical

Rationalize the denominator and simplify.

$$\frac{4}{\sqrt[4]{27}}\ \frac{\sqrt[4]{3}}{\sqrt[4]{3}} = \frac{4\sqrt[4]{3}}{\sqrt[4]{81}} = \frac{4\sqrt[4]{3}}{3}$$

10.

Rationalizing a denominator: Quotient involving higher radicals and monomials

Rationalize the denominator and simplify.

$$\frac{2x^6}{\sqrt[3]{25y^{14}}} \cdot \frac{\sqrt[3]{5y}}{\sqrt[3]{5y}} = \boxed{\frac{2x^6\sqrt[3]{5y}}{5y^5}}$$

Assume that all variables represent positive numbers.

$$\sqrt[3]{125y^{15}} = 5y^5$$

$$\frac{-7}{2\sqrt{5}-1} \cdot \frac{2\sqrt{5}+1}{2\sqrt{5}+1} \quad \frac{-14\sqrt{5}-7}{20-1} = 19$$

$$\boxed{\frac{-14\sqrt{5}}{19} - \frac{7}{19}}$$

Simplifying a sum or difference of higher radical expressions

Simplify.

$$-4\sqrt[3]{81x^{11}} + \sqrt[3]{24x^{11}}$$

Assume that the variable represents a positive real number.

$27 \cdot 3$ $8 \cdot 3$

$$-4 * \sqrt[3]{27x^9}\sqrt[3]{3x^2} + \sqrt[3]{8x^9}\sqrt[3]{3x^2}$$

$$-12x^3\boxed{\sqrt[3]{3x^2}} + 2x^3\boxed{\sqrt[3]{3x^2}}$$

$$\boxed{-10x^3\boxed{\sqrt[3]{3x^2}}}$$

Simplifying a product of radical expressions: Multivariate

Simplify.

$$\sqrt{2u^4x^3}\sqrt{18u^7x^9}$$

Assume that all variables represent positive real numbers.

$$\sqrt{2u^4x^3}\sqrt{18u^7x^9} = \sqrt{2u^4x^3 \cdot 18u^7x^9}$$ Using the property $\sqrt{A}\sqrt{B} = \sqrt{AB}$ for positive A and B

$$= \sqrt{36u^{11}x^{12}}$$ Multiplying under the square root sign

$$= \sqrt{36u^{10}x^{12} \cdot u}$$ Factoring out the perfect square $36u^{10}x^{12}$

More

$$= \sqrt{36u^{10}x^{12}}\sqrt{u}$$ Using the property $\sqrt{AB} = \sqrt{A}\sqrt{B}$ for positive A and B

$$= 6u^5x^6\sqrt{u}$$

Insert Symbols

Here is the answer.

$$\boxed{6u^5x^6\sqrt{u}}$$

Special products of radical expressions: Conjugates and squaring

Multiply and simplify.

$(\sqrt{x}-\sqrt{3})^2 = \square$ $\boxed{X-2\sqrt{3X}+3}$

$(\sqrt{x}-3\sqrt{3})(\sqrt{x}+3\sqrt{3}) = \square$ $\boxed{X+27}$

FOIL

$(\sqrt{x}-\sqrt{3})(\sqrt{x}-\sqrt{3})$ $x - 2\sqrt{3x} + 3$

$x + 3\sqrt{3x} - 3\sqrt{3x} + 27$

$3\sqrt{3} \cdot 3\sqrt{3}$

$9 \cdot 3 = 27$

Section 7.5 Radicals Equations - Question #1;
Introduction to solving a radical equation

Solve for w, where w is a real number.

$$\sqrt{w} = 11$$

If there is more than one solution, separate them with commas. If there is no solution, click on "No solution".

$(\sqrt{w})^2 = (11)^2$

W = 121

$(w^{1/2})^2 = w^1$

Section 7.5 Radicals Equations - Question #7;
Solving a radical equation that simplifies to a quadratic equation: One radical, advanced

Solve for w, where w is a real number.

$$w - 2 = \sqrt{-20 + 7w}$$

If there is more than one solution, separate them with commas. If there is no solution, click on "No solution".

$$(w-2)^2 = \left(\sqrt{-20+7w}\right)^2$$

BOTH WORK!

$$(W-2)(W-2) = -20 + 7W$$

$$W^2-4W+4 = -20 + 7W$$

$$W^2-4W+4 = -20 + 7W$$

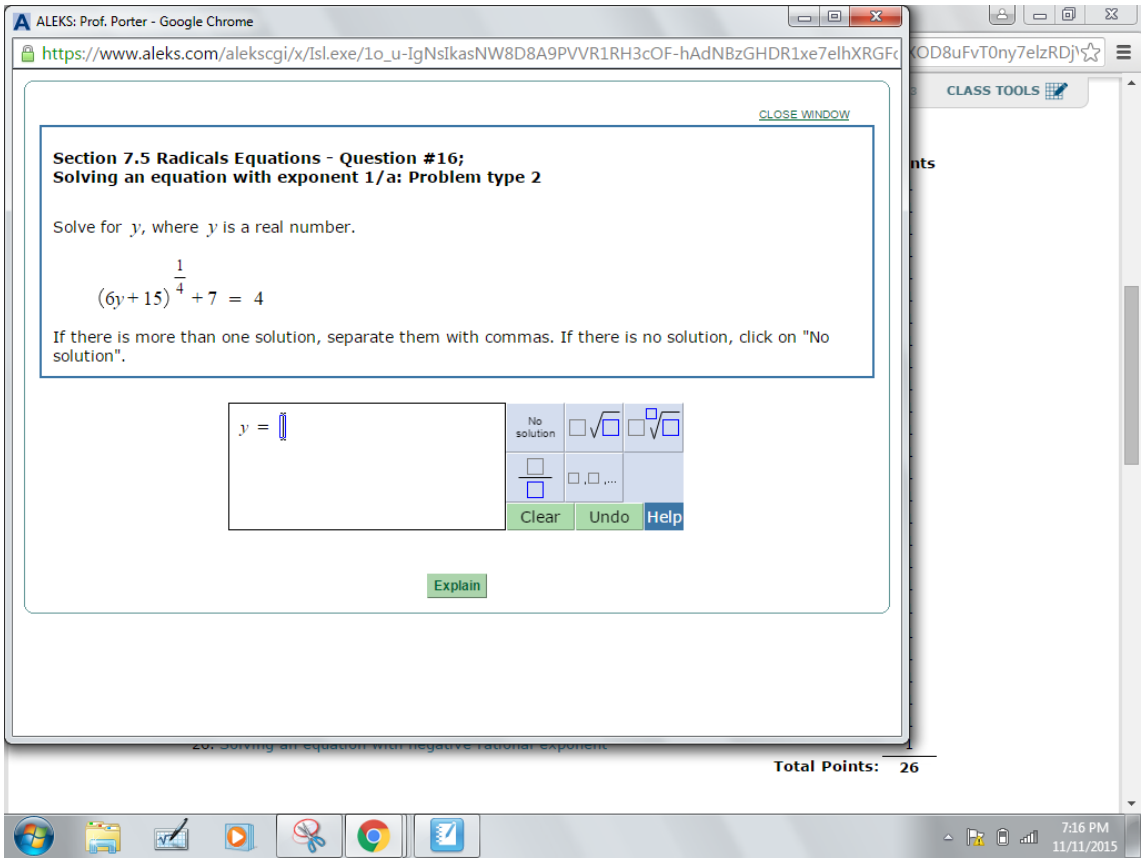
CHECK!!!

$$-7W+20 \quad +20 \quad -7W$$

$$W^2- 11W+ 24 = 0$$

$$(W-8)(W-3)=0$$

$$W=8, 3$$



Section 7.5 Radicals Equations - Question #16;
Solving an equation with exponent 1/a: Problem type 2

Solve for y, where y is a real number.

$$(6y+15)^{\frac{1}{4}}+7 = 4$$

If there is more than one solution, separate them with commas. If there is no solution, click on "No solution

We will use the following property.

If $a = b$, then $a^n = b^n$ for any exponent n.

We solve as follows.

$$(6y+15)^{\frac{1}{4}}+7 = 4$$

$$(6y+15)^{\frac{1}{4}} = -3$$

$$\left((6y+15)^{\frac{1}{4}}\right)^4 = (-3)^4 \quad \text{By the property above}$$

$$6y+15 = 81 \quad \text{Using exponent properties}$$

$$6y = 66$$

$$y = 11$$

Raising both sides of an equation to a power might lead to a value that is *not* a solution.
So we must check that $y = 11$ makes the original equation true.

Check: $(6y+15)^{\frac{1}{4}}+7 = 4$ Original equation

$(6(11)+15)^{\frac{1}{4}}+7 \stackrel{?}{=} 4$ Letting $y = 11$

$$81^{\frac{1}{4}}+7 \stackrel{?}{=} 4$$

$$3+7 \stackrel{?}{=} 4$$

$$10 = 4 \quad \text{This is FALSE}$$

So, $y = 11$ is *not* a solution to the original equation.

There is no solution. More

Here is the answer.

No solution

#4

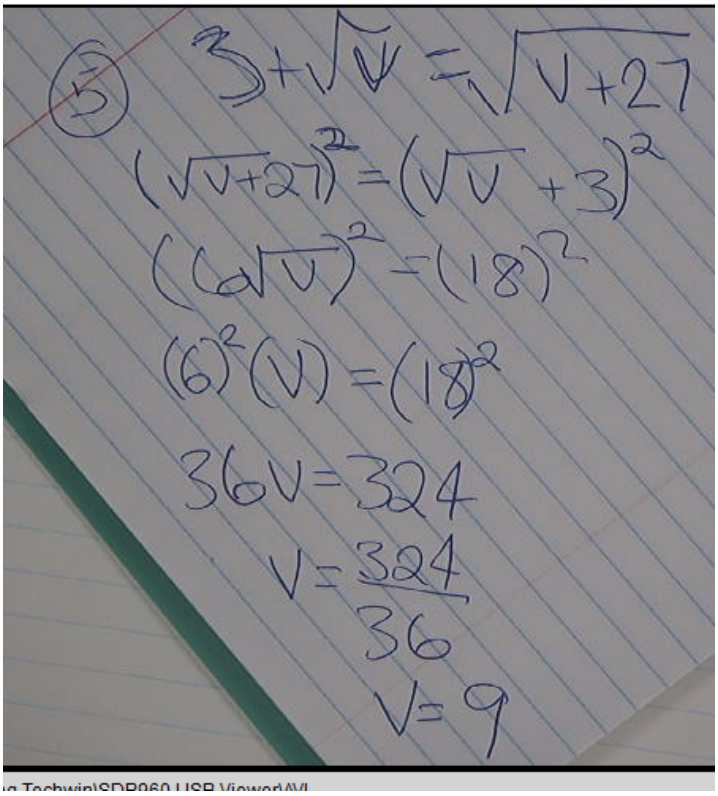
$$\sqrt{3v+14}^{\,2} = \sqrt{7v-14}^{\,2}$$

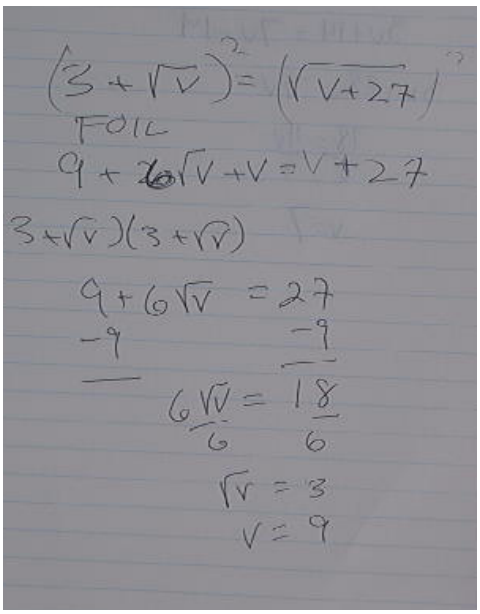
$$3v+14 = 7v-14$$

$$3v+28 = 7v$$

$$\frac{28}{4} = \frac{4v}{4}$$

$$v = 7$$


5
3+√v = √v+27
(√v+27)² = (√v +3)²
((6√v)² = (18)²
(6)²(v) = (18)²
36v = 324
v = 324/36
v = 9


(3 + √v)² = (√v+27)²
FOIL
9 + 6√v + v = v + 27
3+√v)(3+√v)
9 + 6√v = 27
−9 −9
6√v/6 = 18/6
√v = 3
v = 9

$$m = \sqrt{\frac{k}{5}}$$

$$m^2 = \left(\sqrt{\frac{k}{5}}\right)^2$$

$$m^2 = \frac{k}{5}$$

$$k = 5m^2$$

#14.

Solve for $u \rightarrow \sqrt[3]{4u-16} - 2 = 0$

$$+2 + \sqrt[3]{4u-16} - 2 = 0 + 2$$

$$\sqrt[3]{4u-16} = 2$$

$$\left(\sqrt[3]{4u-16}\right)^3 = (2)^3$$

$$4u - 16 = 8$$

$$4u = 8 + 16$$

$$4u = 24$$

$$u = 6$$

$$\left[(z+5)^{3/2}\right]^{2/3} = \left[4\right]^{2/3}$$

$$z+5 = 4^{2/3}$$

$$-5 \qquad -5$$

$$z = 4^{2/3} - 5$$

$$\sqrt[3]{4^2}$$

$$\sqrt[3]{16} - 5$$

$$2\sqrt[3]{2} - 5$$