9/20/2010 Fall 10, College Algebra I Quiz 3 solutions Sitaraman
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1.(10 points) Simplify the following: (a) $\sqrt[4]{\frac{32x^5y^6}{2xy^2}}$ (b) $\frac{(xy)^{1/4}}{(x^3y^2)^{1/2}}$

Soln: (a) (a)

$$\sqrt[4]{\frac{32x^5y^6}{2xy^2}} = \sqrt[4]{16x^{5-1}y^{6-2}} = \sqrt[4]{2^4}\sqrt[4]{x^4}\sqrt[4]{y^4} = 2xy.$$

(b)

$$\frac{(xy)^{1/4}}{(x^3y^2)^{1/2}} = \frac{x^{1/4}y^{1/4}}{(x^3)^{1/2}(y^2)^{1/2}} = x^{\frac{1}{4}-\frac{3}{2}}y^{\frac{1}{4}-1} = x^{-5/4}y^{-3/4}.$$

2.Rationalize the denominator of $\frac{2}{\sqrt{12}-\sqrt{3}}$.

Soln:Multiply above and below by conjugate.

$$\frac{2}{\sqrt{12}-\sqrt{3}} = \frac{2(\sqrt{12}+\sqrt{3})}{(\sqrt{12}-\sqrt{3})\sqrt{12}+\sqrt{3})} =$$

$$\frac{2\sqrt{12}+2\sqrt{3}}{(\sqrt{12})^2-(\sqrt{3})^2} = \frac{2\sqrt{12}+2\sqrt{3}}{12-3} = (2/9)(\sqrt{12}+\sqrt{3})$$

3. Solve for x : $\frac{2x}{x+1} = \frac{1}{x+1} + 1$

Soln: Making all with common denominator $x+1$ we get:

$$\frac{2x}{x+1} = \frac{1}{x+1} + \frac{x+1}{x+1}.$$

Simplifying and gathering them on one side:

$$\frac{2x-1-(x+1)}{x+1} = \frac{x-2}{x+1} = 0$$

The solution is whatever makes the numerator 0 WITHOUT MAKING DENOMINATOR 0. Here numerator is $x-2$ and so the solution is $x=2$. This doesn't make denominator 0 because denominator is $x+1=0$ means $x=-1$.

Alternatively, you can say $\frac{2x}{x+1} - \frac{1}{x+1} = 1$ which gives $\frac{2x-1}{x+1} = 1$ which means $2x - 1 = x + 1$ (provided $x + 1$ is not equal to 0). From this you get $x = 2$.

4.(10 points) A total of 121450 is to be divided between Tom and Al with Al getting 12125 more than Tom. How much does each get?

Soln: STEP 1: IDENTIFYING VARIABLE. Let x be the amount Tom gets. (You can also choose amount Al gets).

STEP 2: SETTING UP EQUATION:

If x is what Tom gets, then Al gets $x + 12125$. So total amount $= 121450 = (x) + (x + 12125)$. [Total of what Tom gets + what Al gets].

STEP 3: SOLVING EQUATION:

$121450 = 2x + 12125$ means $121450 - 12125 = 109325 = 2x$ which gives $x = 54662.50$. So Tom gets 54662.50 dollars and Al gets $54662.50 + 12125 = 66787.50$