Adding and Subtracting Radicals

You can only add and subtract like-radicals. In other words, they must be **exactly the same underneath the radical**. Then, just combine like-terms!

Examples Simplify the following expressions by adding or subtracting.

1. $3\sqrt{7} + 2\sqrt{7}$

2. $\sqrt{3} - \sqrt{48}$

3. $4\sqrt{2} + \sqrt{3} - \sqrt{2}$

4. $\sqrt{90} - \sqrt{40}$

Multiplying and Dividing Radicals

Product Property of Radicals: $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

Examples: Simplify the following radical expressions using the Product Property.

5. $2\sqrt{2} \cdot -4\sqrt{6}$

6. $4\sqrt{7}(3\sqrt{2} - 2)$

Quotient Property of Radicals: $\sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$

Examples: Simplify the following perfect squares using the Quotient Property.

7. $\sqrt{\dfrac{16}{49}}$

8. $\sqrt{\dfrac{121}{25}}$

Rationalizing the Denominator

It is not appropriate to leave a radical in the denominator of a fraction. Multiply by a form of 1 to get it out:
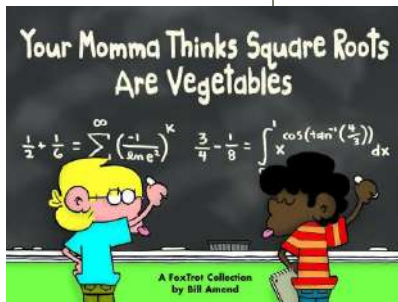
Examples Simplify the following expressions by rationalizing the denominator:

9. $\dfrac{3}{\sqrt{11}}$

10. $\dfrac{1}{\sqrt{4}}$

11. $\sqrt{\dfrac{8}{5}}$

12. $\sqrt{\dfrac{12}{6}}$

Your Momma Thinks Square Roots Are Vegetables

$\frac{1}{2} + \frac{1}{6} = \sum_{\infty}^{\infty} \left(\frac{-1}{\ell_m e^2}\right)^k$ $\frac{3}{4} - \frac{1}{8} = \int_0^1 \frac{\cos(\tan^{-1}(\frac{4}{3}))}{x}\, dx$

A FoxTrot Collection
by Bill Amend

Examples: Simplify the following radical expressions.

13. $3\sqrt{7} - 2\sqrt{28} + \sqrt{63}$

14. $\left(3\sqrt{3} - 2\sqrt{2}\right)^2$

15. $2\sqrt{5} + \sqrt{12} - \sqrt{27}$

16. $\left(4\sqrt{5} - 3\sqrt{2}\right)^2$

Bring The Pain!

Now, summarize your notes here!

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Algebra 1 (Your last practice...sniffle sniffle...)   Name_____

Practice 11.2

Simplify by adding and subtracting.

1) $-\sqrt{2} + 3\sqrt{2}$

2) $-2\sqrt{3} - \sqrt{3}$

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

4) $2\sqrt{3} - 3\sqrt{2} - 2\sqrt{2}$

5) $2\sqrt{54} - \sqrt{6}$

6) $3\sqrt{20} + 3\sqrt{20}$

Simplify by multiplying.

7) $\sqrt{15} \cdot \sqrt{5}$

8) $\sqrt{2} \cdot \sqrt{10}$

9) $5\sqrt{2} \cdot 5\sqrt{5}$

10) $4\sqrt{10} \cdot -3\sqrt{15}$

11) $\sqrt{2}(\sqrt{2} + 5)$

12) $5\sqrt{5}(2 - 5\sqrt{6})$

Simplify by multiplying. (Hint: DOUBLE DISTRIBUTE!)

13) $(5 - 4\sqrt{5})(5 + 3\sqrt{5})$

14) $(-5\sqrt{5} + 4)(-2\sqrt{5} - 4)$

Simplify.

15) $\sqrt{\dfrac{5}{2}}$

16) $\dfrac{4}{\sqrt{2}}$

17) $\sqrt{\dfrac{6}{3}}$

18) $\dfrac{3\sqrt{3}}{5\sqrt{75}}$

Quick Review: Solve the quadratic equations using the given method.		
1. Solve by factoring: $3x^2 + 4x - 4 = 0$	2. Solve by double factoring: $2x^2 - 4 = -2$	3. Solve by factoring: $2x^2 + 3 = 7x$

Application and Extension

1. Simplify: $\dfrac{12}{\sqrt{5}}$

2. Simplify: $4\sqrt{3} + \sqrt{27} - \sqrt{12}$

For Number 3, you will have to graph several graphs on the same coordinate plane. Please graph extra neat and be precise!

3. a. b. Graph $y = \sqrt{x}$ and $y = -\sqrt{x}$ on the same graph by filling in Tables A and B and plotting the points. (Hint: Use different colors for each graph.)

c. Graph $y = x^2$ by filling in Table C and plotting the points.

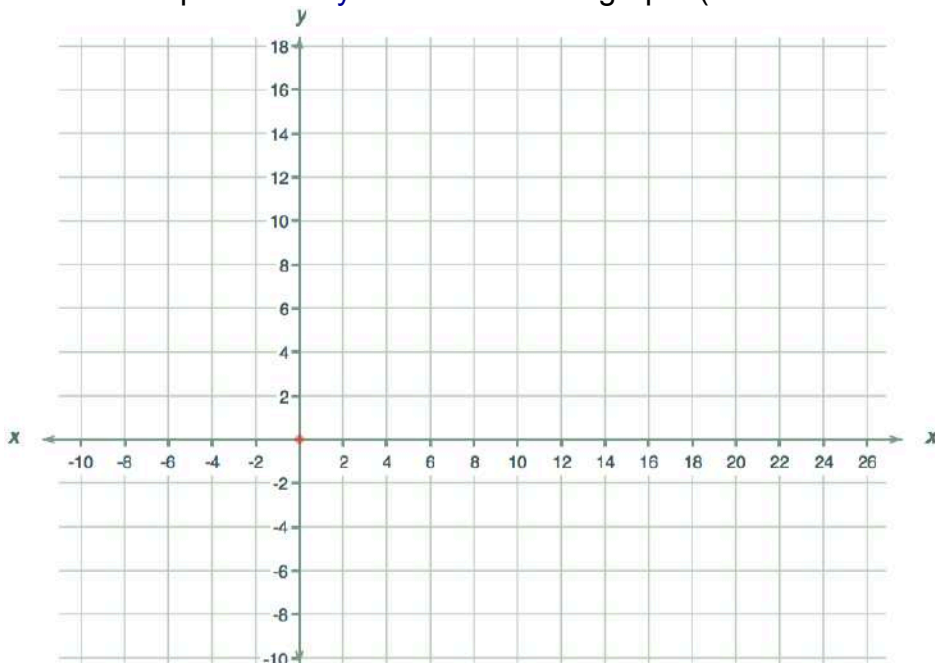d. Graph the line $y = x$ on the same graph. (Use a dotted line.)

Table A

X	$\sqrt{x}$
0	
1	
4	
9	
16	
25	

Table B

X	$-\sqrt{x}$
0	
1	
4	
9	
16	
25	

Table C

X	x^2
−4	
−2	
0	
1	
3	
4	

e. Now, find the solutions to the following system of equations:

$$\begin{cases} y = \sqrt{x} \\ y = x^2 \\ y = x \end{cases}$$

(Hint: You already did! You solved it by graphing!)