Name: Key Date: 1/26/18

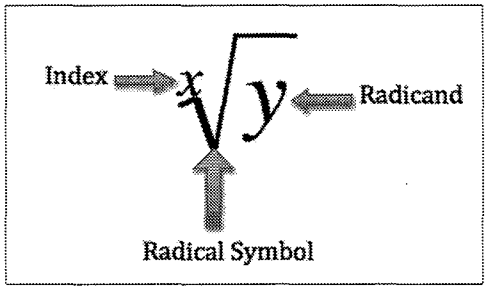
CC GEOMETRY TROICI

LESSON #1: SIMPLIFYING RADICALS

Do Now:

1. List the first 12 perfect squares:	2. Simplify: $2x + 4y - (x + y)$
1, 4, 9, 16, 25, 36, 49, 64, 81, 100 121, 144	$= -x - y$ $x + 3y$

Radical Vocab



SIMPLIFYING SQUARE ROOTS THAT ARE PERFECT SQUARES:

1. $\sqrt{121} = 11$	2. $\sqrt{\frac{144}{4}} = \frac{\sqrt{144}}{\sqrt{4}} = \frac{12}{4} = 3$	3. $-2\sqrt{9}$ $-2(3) = -6$

SIMPLIFYING SQUARE ROOTS THAT ARE NOT PERFECT SQUARES

STEPS	EXAMPLE
1. Go to y = in your calculator and type $\frac{Radicand}{x}$ to see all factors of your radicand 2. Find the **LARGEST** perfect square that goes into your radicand and break down the radical into the product of those factors 3. Simplify the perfect square 4. Multiply any numbers in front of the radical to represent final answer	$3\sqrt{72}$ $3 \cdot \sqrt{36} \cdot \sqrt{2}$ $3 \cdot 6 \cdot \sqrt{2}$ $18\sqrt{2}$

1. $\sqrt{63}$ $\sqrt{9}\ \sqrt{7}$ $3\sqrt{7}$	2. $\sqrt{\frac{108}{36}} = \frac{\sqrt{108}}{\sqrt{36}} < \frac{\sqrt{36}\sqrt{3}}{\sqrt{3}}\ \frac{6\sqrt{3}}{6}$ $= \sqrt{3}$	3. $\frac{1}{2}\sqrt{60}$ $\frac{1}{2}\sqrt{4}\sqrt{15}$ $\frac{1}{2} \cdot 2\sqrt{15}$ $\sqrt{15}$

SIMPLFYING SQUARE ROOTS THAT INCLUDE VARIABLES

IF THE EXPONENT IS EVEN	EXAMPLE
1. Break down radicals - $\sqrt{Number} \cdot \sqrt{Variable}$ 2. Simplify number 3. Divide the exponent of variable by 2 and rewrite outside the radical 4. Place new variable with variable on outside of radical	$\sqrt{12x^4}$ $\sqrt{12} \cdot \sqrt{x^4}$ $\sqrt{4} \cdot \sqrt{3} \cdot \sqrt{x^4}$ $2 \cdot \sqrt{3} \cdot x^2$ $2x^2\sqrt{3}$
IF THE EXPONENT IS ODD	**EXAMPLE**
1. Break down radicals - $\sqrt{Number} \cdot \sqrt{Variable}$ 2. Simplify number 3. Subtract the exponent of variable by 1 and rewrite as product: $variable^{exponent-1} \cdot variable^1$ 4. Simplify even exponent using steps above 5. Leave $variable^1$ under the radical 6. Multiply number and variable with even exponent on outside of the radical	$\sqrt{45x^5}$ $\sqrt{9} \cdot \sqrt{5} \cdot \sqrt{x^4} \cdot \sqrt{x^1}$ $3 \cdot \sqrt{5} \cdot x^2 \cdot \sqrt{x}$ $3x^2\sqrt{5x}$

PRACTICE:

1. $\sqrt{64} = \boxed{8}$	2. $2\sqrt{36}$ $2(6) = \boxed{12}$	3. $\frac{1}{2}\sqrt{4}$ $\frac{1}{2}(2) = \boxed{1}$
4. $\sqrt{17^2} = \sqrt{289}$ $\boxed{17}$ Do in your calc!	5. $3\sqrt{4x^6}$ $3 \cdot \sqrt{4} \cdot \sqrt{x^6}$ → $6 \div 2 = 3$ $3 \cdot 2x^3$ $\boxed{6x^3}$	6. $\sqrt{\frac{100}{25}} = \frac{\sqrt{100}}{\sqrt{25}} = \frac{10}{5} = \boxed{2}$
7. $\frac{3}{2}\sqrt{72}$ $\frac{3}{2}\sqrt{36}\sqrt{2}$ $\frac{3}{2} \cdot 6 \cdot \sqrt{2}$ → $\boxed{9\sqrt{2}}$	8. $\sqrt{\frac{17}{25}} = \frac{\sqrt{17}}{\sqrt{25}} = \boxed{\frac{\sqrt{17}}{5}}$	9. $-5\sqrt{54x^2}$ $-5 \cdot \sqrt{54} \cdot \sqrt{x^2}$ → $2 \div 2 = 1$ $-5 \cdot \sqrt{9}\sqrt{6} \cdot x$ $-5 \cdot 3 \cdot \sqrt{6} \cdot x$ → $\boxed{-15x\sqrt{6}}$
10. $12\sqrt{32x}$ $12 \cdot \sqrt{16}\sqrt{2}\sqrt{x}$ $12 \cdot 4 \cdot \sqrt{2}\sqrt{x}$ → $\boxed{48\sqrt{2x}}$	11. $-3\sqrt{x^5}$ $-3 \cdot \sqrt{x^{5-1}} \cdot \sqrt{x^1}$ $-3 \cdot \sqrt{x^4} \cdot \sqrt{x}$ $\boxed{-3x^2\sqrt{x}}$	12. $8\sqrt{108}$ $8\sqrt{36}\sqrt{3}$ $8 \cdot 6\sqrt{3}$ $\boxed{48\sqrt{3}}$
13. $\sqrt{12x^9}$ $\sqrt{12}\sqrt{x^{9-1}}\sqrt{x^1}$ $\sqrt{4}\sqrt{3}\sqrt{x^8}\sqrt{x}$ $2\sqrt{3}x^4\sqrt{x}$ $\boxed{2x^4\sqrt{3x}}$	14. $2\sqrt{18}$ $2\sqrt{9}\sqrt{2}$ $2 \cdot 3 \cdot \sqrt{2}$ $\boxed{6\sqrt{2}}$	15. $\sqrt{40x^6}$ $\sqrt{40}\sqrt{x^6}$ $\sqrt{4}\sqrt{10}x^3$ $\boxed{2x^3\sqrt{10}}$