

NOTES FOR SIMPLIFYING RADICALS, RATIONALIZING THE DENOMINATOR,
 SQUARE ROOT PROPERTY PART 1

Simplifying Radicals:

Make a list of perfect squares up to 15^2

Test perfect squares in the calculator

Use the list to simplify non-perfect squares- go to the perfect square larger than the radical to be simplified. Make 2 new radicals, and simplify

Examples:

1. $\sqrt{12}$ 2. $\sqrt{98}$ 3. $\sqrt{200}$ 4. $-4\sqrt{300}$ 5. $10\sqrt{108}$ 6. $15\sqrt{1000}$
 $\pm 2\sqrt{3}$ $\pm 7\sqrt{2}$ $\pm 10\sqrt{2}$ $-40\sqrt{3}$ $\pm 60\sqrt{3}$ $15\sqrt{10 \cdot 100}$
 $15\sqrt{10 \cdot 100}$
 $15(10\sqrt{10})$
 $\pm 150\sqrt{10}$

Rationalizing the denominator:

Multiply the numerator and denominator by the denominator and simplify

Examples:

1. $\frac{4}{\sqrt{6}}$ 2. $\frac{2}{\sqrt{3}}$ 3. $\frac{-8}{\sqrt{6}}$ 4. $\frac{5}{\sqrt{10}}$ 5. $\frac{\sqrt{7}}{\sqrt{12}}$ 6. $\frac{\sqrt{12}}{\sqrt{3}}$
 $\pm \frac{2\sqrt{6}}{3}$ $\pm \frac{2\sqrt{3}}{3}$ $\frac{-4\sqrt{6}}{3}$ $\frac{\sqrt{10}}{2}$ $\frac{\sqrt{21}}{6}$ 2

Square root property for solving:

Isolate the squared term.

Take the square root of both sides and simplify.

Examples:

1. $x^2 - 9 = 0$ 2. $4x^2 - 7 = 9$ 3. $36x^2 = 121$ 4. $16x^2 + 81 = 81$

5. $4x^2 - 225 = 0$ 6. $3(x+3)^2 = 39$ 7. $5(x-1)^2 = 40$ 8. $2(x+4)^2 = 18$

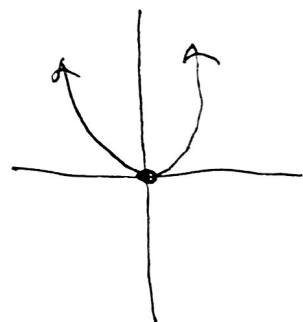
9. $4(x-5)^2 = 32$

$$\textcircled{1} \quad \begin{array}{r} x^2 - 9 = 0 \\ +9 \quad +9 \\ \hline \sqrt{x^2} = \sqrt{9} \\ x = \pm 3 \end{array}$$

$$\textcircled{2} \quad \begin{array}{r} 4x^2 - 7 = 9 \\ +7 \quad +7 \\ \hline 4x^2 = 16 \\ \frac{4}{4} \quad \frac{16}{4} \\ \hline \sqrt{x^2} = \sqrt{4} \\ x = \pm 2 \end{array}$$

$$\textcircled{3} \quad \begin{array}{r} 36x^2 = 121 \\ \frac{36}{36} \quad \frac{121}{36} \\ \hline \sqrt{x^2} = \sqrt{3.36} \quad \left| \quad \sqrt{x^2} = \sqrt{\frac{121}{36}} \right. \\ x = \pm 1.83 \quad \left| \quad \pm \frac{11}{6} \right. \end{array}$$

$$\textcircled{4} \quad \begin{array}{r} 16x^2 + 81 = 81 \\ -81 \quad -81 \\ \hline 16x^2 = 0 \\ \frac{16}{16} \quad \frac{0}{16} \\ \hline x^2 = 0 \\ x = 0 \end{array}$$



$$\textcircled{5} \quad \begin{array}{r} 4x^2 - 225 = 0 \\ +225 \quad +225 \\ \hline 4x^2 = 225 \\ \frac{4}{4} \quad \frac{225}{4} \\ \hline \sqrt{x^2} = \sqrt{56.25} \\ x = \pm 7.5 \\ = \pm \frac{15}{2} \end{array}$$

$$\begin{array}{r} \sqrt{x^2} = \sqrt{\frac{225}{4}} \\ x = \pm \frac{15}{2} \end{array}$$