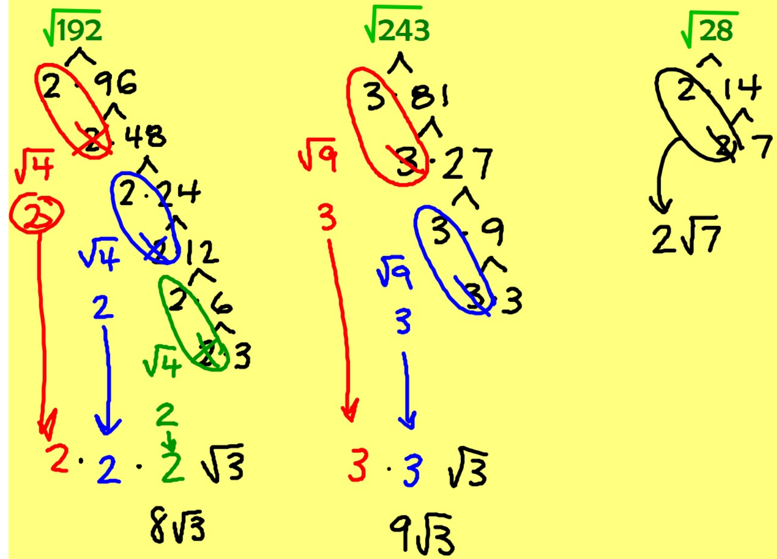
Sometimes, it's hard to figure out what the perfect square factor is. But we know that a perfect square is the result of a number times itself (identical twins!)

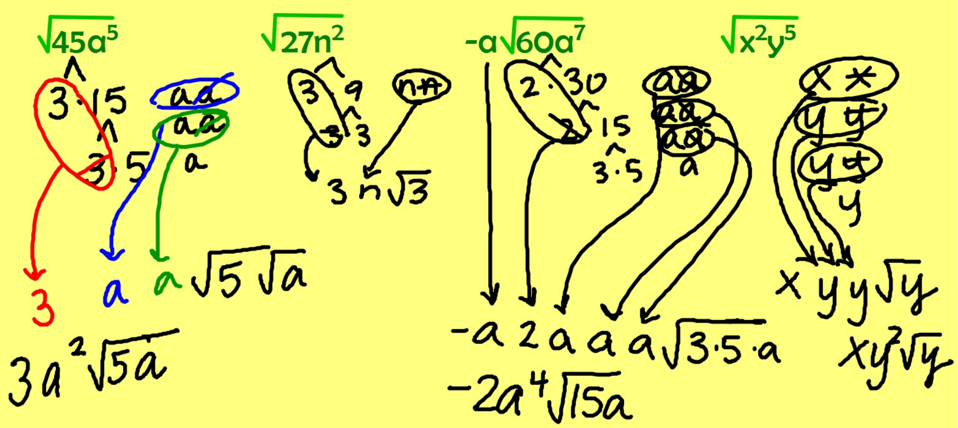
I like to simplify radicals assuming the following little make-believe scenario...

Pretend that the radical sign is a jail cell. No number wants to be in radical jail, so they try to escape. The only way to escape is to factor yourself into prime factors and see if you can find an identical twin to escape with. When you try to escape, one twin makes it out to the free world, and one twin dies at the electric fence. If more than one set of twins escape, they quickly multiply together to change their identity and hopefully not be discovered as fugitives. Any factors that cannot find a twin must stay in jail :(

OK, let's try this out.



Variables don't like Radical Jail either.



The Multiplication Property of Square Roots says that for every number $a > 0$ and $b > 0$, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$.

For example, $\sqrt{54} = \sqrt{9} \cdot \sqrt{6} = 3 \cdot \sqrt{6} = 3\sqrt{6}$

You can use the Multiplication Property of Square Roots to simplify perfect square factors.

The Multiplication Property of Square Roots works backwards too.

$\sqrt{13}\cdot\sqrt{52}$

$\sqrt{676}$

$2\cdot 338$

$2\cdot 169$

$13\cdot 13$

$2\cdot 13 = 26$

$5\sqrt{3c}\cdot\sqrt{6c}$

$5\sqrt{18c^2}$

$2\cdot 9$

$3\cdot 3$

$c\cdot c$

$5\cdot 3\cdot c\sqrt{2}$

$15c\sqrt{2}$

$2\sqrt{5a^2}\cdot 6\sqrt{10a^3}$

$12\sqrt{50a^5}$

$2\cdot 25$

$5\cdot 5$

$a\cdot a$

$a\cdot a$

a

$12\cdot 5\cdot a\cdot a\sqrt{2\cdot a}$

$60a^2\sqrt{2a}$