Note page for Simplifying Radicals

Simplifying examples: Treat them like factor trees (literally)

1) without negative

$\sqrt{48x^2}$

$\sqrt{6}\sqrt{8}\sqrt{x}\sqrt{x}$

$\sqrt{2}\sqrt{3}\sqrt{2}\sqrt{4}\sqrt{x}\sqrt{x}$

$\sqrt{2}\sqrt{3}\sqrt{2}\sqrt{2}\sqrt{2}\sqrt{x}\sqrt{x}$

2) with negative

$\sqrt{-50}$

$\sqrt{-1}\sqrt{50}$

$\sqrt{-1}\sqrt{2}\sqrt{25}$

$\sqrt{-1}\sqrt{2}\sqrt{5}\sqrt{5}$

Circle any pairs you see and use one of those numbers as your outside total. The square root of -1 = *i*

Answer: $2 \bullet 2x\sqrt{3}$ $= 4x\sqrt{3}$ $= 5i\sqrt{2}$

Multiply and divide examples: Treat mult. problems like the above.

1) $(7\sqrt{10})(3\sqrt{-14})$

$7\sqrt{2}\sqrt{5} \bullet 3\sqrt{-1}\sqrt{2}\sqrt{7}$

$7 \bullet 3 \bullet 2 \bullet i\sqrt{5}\sqrt{7}$

$= 42i\sqrt{35}$

2) $\frac{\sqrt{120}}{\sqrt{30}}$

combine as one

$\sqrt{\frac{120}{30}}$

$\sqrt{4}$

$= 2$

3) $\sqrt{\frac{3}{100}}$

split into two

$\frac{\sqrt{3}}{\sqrt{100}}$

since $\sqrt{100} = 10$

$= \frac{\sqrt{3}}{10}$ done!

Examples using imaginary numbers (i)
Treat the "i" like any other variable, then consult the i-chart to simplify

i-chart	
$\sqrt{-1} = i$	$i^2 = -1$
$i^3 = -i$	$i^4 = 1$

1) $-5i^2 \bullet 4i$

$-20i^3$

$-20 \bullet -i$

$= 20i$

2) $(3i)^3(2i^4)$

$(27i^3)(2i^4)$

$(27 \bullet -i)(2 \bullet 1)$

$54 \bullet -i$

$= -54i$

3) i^{39}

$i^{36} \bullet i^3$ (find a multiple of 4)

$(i^4)^9 \bullet i^3$

$(1)^9 \bullet i^3$

$1 \bullet -i$

$= -i$