

Simplifying Radicals

With a Calculator:

1) $\sqrt{25} = \underline{5} \rightarrow$ Rational

2) $\sqrt{73} = \underline{8.54}$

3) $\sqrt{18.6} = \underline{4.31}$

4) $\sqrt{(7/12)} = \underline{0.76}$

$\sqrt{\frac{7}{12}}$

} Irrational

Simplifying Radicals

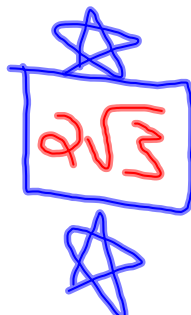
Without a Calculator:

$\begin{matrix} 1, 12 \\ 2, 6 \\ 3, 4 \end{matrix}$

$\rightarrow \sqrt{12} = 2\sqrt{3}$

Steps:

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



- 1) Find the factors of the #. One of the factors should be a perfect square.
- 2) Rewrite the radical using its factors.
- 3) Take the square root of the factor that is a perfect square.
- 4) Keep the factor under the radical if it is not a perfect square.
- 5) Rewrite as the square root times the radical of the other factor.
- 6) Check to see if the # left under the radical has any factors that are a perfect square. If so, then follow steps 1 - 5 again.

Example:

$$\sqrt{16} \cdot \sqrt{3}$$
$$4\sqrt{3}$$

$$\sqrt{48}$$

P.B → #1-9

$$\sqrt{4} \cdot \sqrt{12}$$

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

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

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

$$4\sqrt{3}$$

Perfect squares

☆ 4

☆ 9

16

25

36

49

64

81

100

Simplify **WITHOUT** a calculator

1) $\sqrt{24}$

$$2\sqrt{6}$$

2) $\sqrt{32}$

$$4\sqrt{2}$$

3) $\sqrt{80}$

$$\begin{aligned} & 4 \cdot \sqrt{20} \\ & 2 \cdot \sqrt{20} \\ & 2 \cdot 2 \cdot \sqrt{5} \\ & 4\sqrt{5} \end{aligned}$$

4) $\sqrt{54}$

5) $\sqrt{50}$

$$5\sqrt{2}$$

6) $\sqrt{48}$

$$4\sqrt{3}$$

7) $\sqrt{120}$

8) $5\sqrt{12}$

Rationalizing a denominator

- You are not allowed to leave a radical in the denominator.

① - Multiply both the numerator & denominator by the radical in the denominator.

② - Simplify the fraction.

Example: $\frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{10\sqrt{2}}{14} = \frac{5\sqrt{2}}{7} = \boxed{5\sqrt{2}}$

Rationalize each denominator:

$$\frac{11}{7\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{11\sqrt{2}}{7\sqrt{4}} = \frac{11\sqrt{2}}{7 \cdot 2} = \boxed{\frac{11\sqrt{2}}{14}}$$

$$\frac{7}{\sqrt{32}} = \frac{7}{\sqrt{16 \cdot 2}} = \frac{7}{4\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{4 \cdot 2} = \boxed{\frac{7\sqrt{2}}{8}}$$

$$\frac{20}{\sqrt{5}}$$

$$\frac{3}{\sqrt{7}}$$

$$\frac{\sqrt{2}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{14}}{\sqrt{49}} = \boxed{\frac{\sqrt{14}}{7}}$$