

put answer in
"simplest radical form"

Radicals Day #1 Notes

A. General Information

1. ~~Radicals vs. Non-radicals~~

Remember:

$$\sqrt{x} \cdot \sqrt{y} = \sqrt{xy}$$

$$\sqrt{x} + \sqrt{y} = \sqrt{x+y}$$

2. Rational vs. Irrational Numbers

- Simple fraction
- terminating decimals
- Repeating decimals
- $\sqrt{\text{non perfect squares}}$
- non terminating & non repeating decimals
- EX: π $\sqrt{2}$ $\sqrt{3}$ $\sqrt{51}$

3. Perfect Squares

4, 9, 16, 25,

* use to simplify square roots

B. Simplify. No decimals.

A. $\sqrt{20}$
 $\sqrt{4 \cdot 5}$
 $2\sqrt{5}$

B. $\sqrt{50}$
 $\sqrt{25 \cdot 2}$
 $5\sqrt{2}$

C. $\sqrt{98}$
 $\sqrt{49 \cdot 2}$
 $7\sqrt{2}$

D. $\sqrt{x^2}$
 $\sqrt{x \cdot x}$
 x

E. $\sqrt{-112}$
NOT
Real

F. $-\sqrt{112}$
 $-\sqrt{16 \cdot 7}$
 $-4\sqrt{7}$

$$\sqrt{147a^8b^4cd}$$

G. $\sqrt{x^4y^7}$
 $\sqrt{x^4 \cdot y^6 \cdot y}$
 $x^2y^3\sqrt{y}$

H. $\sqrt{300a^5b}$
 $\sqrt{100 \cdot 3 \cdot a^4 \cdot a \cdot b}$
 $10a^2\sqrt{3ab}$

I. $\sqrt{147a^8b^4cd}$
 $\sqrt{49 \cdot 3 \cdot a^8 \cdot b^4 \cdot c \cdot d}$
 $7a^4b^2\sqrt{3cd}$

C. Add and subtract the radicals.

A. $2\sqrt{5} + 1\sqrt{5}$
 $3\sqrt{5}$

B. $5\sqrt{12} + 4\sqrt{3}$
 $5\sqrt{4 \cdot 3} + 4\sqrt{3}$
 $10\sqrt{3} + 4\sqrt{3}$
 $14\sqrt{3}$

C. $\sqrt{3} + 6\sqrt{3}$
 $7\sqrt{3}$

D. $3\sqrt{6} - 9\sqrt{6}$
 $-6\sqrt{6}$

E. $\sqrt{25} - 2\sqrt{5}$
 $5 - 2\sqrt{5}$

F. $\sqrt{48} + 5\sqrt{3}$
 $\sqrt{16 \cdot 3} + 5\sqrt{3}$
 $4\sqrt{3} + 5\sqrt{3}$
 $9\sqrt{3}$

G. $\sqrt{32} + 5\sqrt{2}$
 $\sqrt{16 \cdot 2} + 5\sqrt{2}$
 $4\sqrt{2} + 5\sqrt{2}$
 $9\sqrt{2}$

H. $2\sqrt{75} - 6\sqrt{3}$
 $2\sqrt{25 \cdot 3} - 6\sqrt{3}$
 $10\sqrt{3} - 6\sqrt{3}$
 $4\sqrt{3}$

I. $-2\sqrt{80} + \sqrt{45}$
 $-2\sqrt{16 \cdot 5} + \sqrt{9 \cdot 5}$
 $-8\sqrt{5} + 3\sqrt{5}$
 $-5\sqrt{5}$

$$\sqrt{x} \cdot \sqrt{y} = \sqrt{xy}$$

Radicals Day #2 Notes

A. Multiply the radicals.

A. $\sqrt{3} \cdot \sqrt{27}$
 $\sqrt{81} = \boxed{9}$

B. $\sqrt{10} \cdot \sqrt{15}$
 $\sqrt{150}$
 $\sqrt{25 \cdot 6}$
 $\boxed{5\sqrt{6}}$

C. $\sqrt{160} = \sqrt{16 \cdot 10}$
 $\boxed{4\sqrt{10}}$
 \uparrow
 $\sqrt{5} \cdot \sqrt{32}$
 $\sqrt{5} \cdot \sqrt{16 \cdot 2}$
 $\boxed{4\sqrt{10}}$

D. $\sqrt{2} \sqrt{7} \sqrt{3} \sqrt{14}$
 $6\sqrt{98} = 6\sqrt{49 \cdot 2}$
 $\boxed{42\sqrt{2}}$

E. $\sqrt{3} \sqrt{27} \cdot \sqrt{-1} \sqrt{6}$
 $-3\sqrt{162}$
 $-3\sqrt{81 \cdot 2}$
 $\boxed{-27\sqrt{2}}$

F. $2\sqrt{32} \cdot \sqrt{5}$
 $2\sqrt{160}$
 $2\sqrt{16 \cdot 10}$
 $\boxed{8\sqrt{10}}$

G. $3\sqrt{18} \cdot -2\sqrt{3}$

H. $-\sqrt{50} \cdot 3\sqrt{3}$

I. $\sqrt{16} \cdot \sqrt{25}$

B. Divide the radicals.

A. $\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}}$
 $\boxed{\frac{\sqrt{3}}{2}}$

B. $\sqrt{\frac{5}{16}} = \frac{\sqrt{5}}{\sqrt{16}}$
 $\boxed{\frac{\sqrt{5}}{4}}$

C. $\frac{\sqrt{75}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{225}}{\sqrt{9}}$
 $\frac{15}{3} = \boxed{5}$

D. $\frac{\sqrt{64}}{\sqrt{16}} = \frac{8}{4} = \boxed{2}$

E. $\frac{\sqrt{120}}{\sqrt{4}} = \frac{\sqrt{30 \cdot 4}}{2} = \frac{2\sqrt{30}}{2}$
 $\boxed{\sqrt{30}}$
 $\frac{\sqrt{3}}{\sqrt{25}} = \frac{\sqrt{3}}{5}$
 $\boxed{\frac{\sqrt{3}}{5}}$

G. $\frac{\sqrt{32}}{\sqrt{50}}$

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

I. $\frac{12\sqrt{32}}{2\sqrt{18}}$
 $\frac{12\sqrt{16 \cdot 2}}{2\sqrt{9 \cdot 2}} = \frac{48\sqrt{2}}{6\sqrt{2}} = 8$

C. Rationalize the denominator.

A. $\frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15}}{5}$

B. $\sqrt{4/7}$

C. $\frac{12\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{12\sqrt{3}}{3}$
 $4\sqrt{3}$

D. $2\sqrt{3/11}$
 $\frac{2\sqrt{3}}{\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}} = \frac{2\sqrt{33}}{11}$

E. $\frac{8}{\sqrt{2}}$

F. $\frac{\sqrt{7}}{\sqrt{3t^3}} \cdot \frac{\sqrt{3t^3}}{\sqrt{3t^3}} = \frac{\sqrt{21t^3}}{3t^3}$
 $\frac{\sqrt{21 \cdot t^2 \cdot t}}{3t^3} = \frac{\sqrt{21}t}{3t^2}$

G. $\frac{\sqrt{64a^2b^2}}{20ab^3}$
 $\frac{\sqrt{4 \cdot 5 \cdot a \cdot b^2} \cdot b}{2b\sqrt{5ab}} = \frac{4a}{2\sqrt{5ab}} = \frac{4a}{\sqrt{5ab}}$

H. $\frac{\sqrt{192a^3b^2}}{45a^6b^4c}$

I. $\frac{\sqrt{12a^3b^4c^8}}{5ab}$

$\frac{4\sqrt{5ab}}{5b}$