

Multiply

on back of
organizer

$$(4x-3)(3x-7)$$

$$12x^2 - 37x + 21$$

	<u>4x</u>	<u>-3</u>
<u>3x</u>	12x ²	-9x
<u>-7</u>	-28x	21

List out all the Perfect Squares

→ same # twice → Radical sign goes away

- $\sqrt{1}=1$ $\sqrt{4}=2$ $\sqrt{9}=3$ $\sqrt{16}=4$ $\sqrt{25}=5$ $\sqrt{36}=6$ $\sqrt{49}=7$ $\sqrt{64}=8$
 $\sqrt{81}=9$ $\sqrt{100}=10$ $\sqrt{121}=11$ $\sqrt{144}=12$ $\sqrt{169}=13$ $\sqrt{196}=14$ $\sqrt{225}=15$ $\sqrt{256}=16$
 $\sqrt{289}=17$ $\sqrt{324}=18$ $\sqrt{361}=19$ $\sqrt{400}=20$ $\sqrt{10,000}=100$

Use prime factorization (factor tree) to simplify each radicand (inside number).

It takes two of the same number or variable to become an outside term.

Multiply all outside numbers and variables to obtain only one outside term.

Multiply all inside numbers and variables to obtain only one inside term.

singles—stay in
pairs—come out

1) $\sqrt{49}$
 Factor tree: $49 \rightarrow 7 \cdot 7$
 Simplified: $7\sqrt{1}$

2) $\sqrt{144}$
 Factor tree: $144 \rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$
 Simplified: $12\sqrt{1}$

3) $\sqrt{256}$
 Factor tree: $256 \rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
 Simplified: $16\sqrt{1}$

4) $\sqrt{64}$
 Factor tree: $64 \rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
 Simplified: $8\sqrt{1}$

5) $\sqrt{196}$
 Factor tree: $196 \rightarrow 2 \cdot 2 \cdot 7 \cdot 7$
 Simplified: $14\sqrt{1}$

6) $\sqrt{36}$
 Factor tree: $36 \rightarrow 2 \cdot 2 \cdot 3 \cdot 3$
 Simplified: $6\sqrt{1}$

7) $\sqrt{144}$
 Factor tree: $144 \rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$
 Simplified: $12\sqrt{1}$

8) $\sqrt{147}$
 Factor tree: $147 \rightarrow 3 \cdot 7 \cdot 7$
 Simplified: $7\sqrt{3}$

z
 \sqrt{x}
 \sqrt{z}

9) $\sqrt{12x^3}$ (xxx)
 $2 \cdot 2 \cdot x \sqrt{3x}$
 $4x\sqrt{3x}$

11) $5\sqrt{20v^3}$
 $5 \cdot 5 \cdot v \sqrt{2 \cdot 3 \cdot v}$
 $25v\sqrt{6v}$

13) $\sqrt{12x^4y^3}$ (xxx) (yyy)
 $2 \cdot 2 \cdot x \cdot x \cdot y \sqrt{3y}$
 $4x^2y\sqrt{3y}$

15) $4\sqrt{3xy^3}$
 $4 \cdot 3 \cdot y \sqrt{2 \cdot 3 \cdot x \cdot y}$
 $-12y\sqrt{6xy}$

17) $\sqrt{70x^8y^7z}$
 $x^4y^3\sqrt{70yz}$

19) $-6\sqrt{9p^4r^4}$
 $-6 \cdot 7 \cdot q \cdot r \sqrt{2p}$
 $-42q^2r^2\sqrt{2p}$

10) $\sqrt{28x^2}$ (xx)
 $7x\sqrt{2 \cdot 3}$
 $7x\sqrt{6}$

12) $7\sqrt{12x^4}$ (xxx)
 $7 \cdot 2 \cdot x \cdot x \sqrt{3}$
 $14x^2\sqrt{3}$

14) $\sqrt{24x^3y^2}$ (xxx) (yy)
 $2 \cdot 3 \cdot x \cdot y \sqrt{2x}$
 $6xy\sqrt{2x}$

16) $-8\sqrt{36m^4n^3}$
 m^2m
 $n \cdot n$
 $-8 \cdot 6 \cdot m \cdot n \sqrt{10n}$

18) $\sqrt{18m^2p^4q^4}$
 $4 \cdot 9 \cdot m^2 \cdot p^2 \cdot q^2 \sqrt{5}$
 $5m^2p^2q^2\sqrt{5}$

20) $-\sqrt{8ab^3c^3}$
 8
 b^2b
 $c \cdot c$
 $-8bc\sqrt{abc}$