WARMUP

75

3 25

5 5

$3 \cdot 5 \cdot 5$

Do the prime factorization of each

1) 96

2 48

2 24

2 12

2 6

2 3

2) 162

2 81

9 9

3 3 3 3

3) 900

2 450

2 225

3 75

3 25

5 5

Section 10.3 Simplifying and Combining Radical Expressions

$$\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

Simplify Radical Expressions

1) Each factor in radicand is to a power less than index.
2) No fractions or negatives in radicand.
3) No radicals in denominator.

ex: 1 a) $\sqrt{18} = 3\sqrt{2}$

2 9

3 3

b) $\sqrt{48} = 2 \cdot 2\sqrt{3} = 4\sqrt{3}$

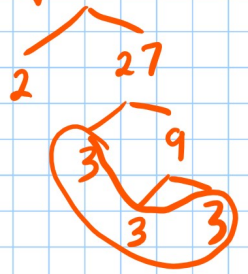
2 24

2 12

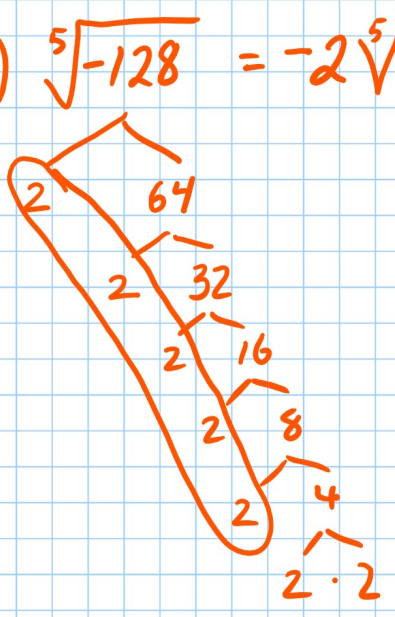
2 6

2 3

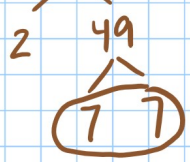
c) $\sqrt[3]{54} = 3\sqrt[3]{2}$



d) $\sqrt[5]{-128} = -2\sqrt[5]{4}$

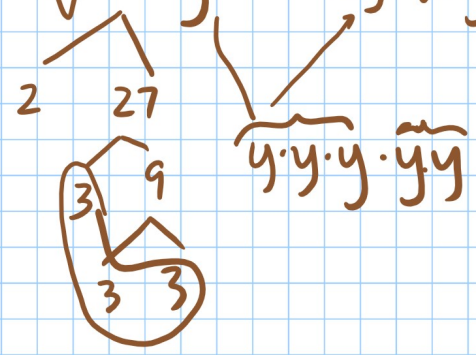


ex2 a $\sqrt{98b^2} = 7b\sqrt{2}$



$\sqrt{b^2} = b$

b) $\sqrt[3]{-54y^5} = -3y\sqrt[3]{2y^2}$



c) $\sqrt[4]{t^8y^{11}} = t^2y^2\sqrt[4]{y^3}$

exponent divided by index, if no remainder t to that power out front

For $y^{11} \Rightarrow 11 \div 4 = 2$ with remainder 3

d) $\sqrt[5]{x^{12}y^{18}} = x^2y^3\sqrt[5]{x^2y^3}$

quotient → x^2, remainder → $\sqrt[5]{x^2y^3}$

quotient
2
$5\overline{)12}$
-10
2 ← remainder

ex: $14 + 3\sqrt{75} - 2\sqrt{12} + 2\sqrt{48} - 8$

$75 = 3 \cdot 25 = 3 \cdot 5 \cdot 5$

$12 = 2 \cdot 6 = 2 \cdot 2 \cdot 3$

$48 = 2 \cdot 24 = 2 \cdot 2 \cdot 12 = 2 \cdot 2 \cdot 2 \cdot 6 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

$14 + 3 \cdot 5\sqrt{3} - 2 \cdot 2\sqrt{3} + 2 \cdot 2 \cdot 2 \cdot 2\sqrt{3} - 8$

$14 + 15\sqrt{3} - 4\sqrt{3} + 8\sqrt{3} - 8$

$6 + 19\sqrt{3}$

$$\sqrt[n]{b^n} = b$$

4) $\sqrt[3]{y^8}$

$\sqrt[3]{y^3 \cdot y^3 \cdot y^2}$

$y \cdot y \sqrt[3]{y^2}$

$y^2 \cdot \sqrt[3]{y^2}$

7) $\sqrt{x^6 y^{11}}$

$\sqrt{x^2 \cdot x^2 \cdot x^2 \cdot y^2 \cdot y^2 \cdot y^2 \cdot y^2 \cdot y^2 \cdot y}$

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

$x^3 y^5 \sqrt{y}$