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3/04/20

Workbook Pg 43.

Roots of negative numbers.

$\sqrt[4]{-16}$ ✗ Not a real number.

When $\sqrt[\text{odd}]{\text{number}}$ = Answer

$\sqrt[\text{even}]{\text{number}}$ = ✗ can't have it

(a) $\sqrt{13} = +\sqrt{13}$ Positive

(b) $\sqrt[5]{-17} = -\sqrt[5]{17}$ Negative

(c) $\sqrt[10]{-10}$ = ✗ can't have it. Not Real

(d) $\sqrt{-2}$ = ✗ can't have it. Not Real

(e) $\sqrt[3]{-1} = -1$ Positive

Divisibility Rules

By 2: even number 2, 4, 6, 8, 10...

By 5: ends in 0 or 5: 5, 10, 15, 20...

By 3: Add digits. If Divisible By 3, then the number is: 18, 27, 36

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Workbook pg 93.

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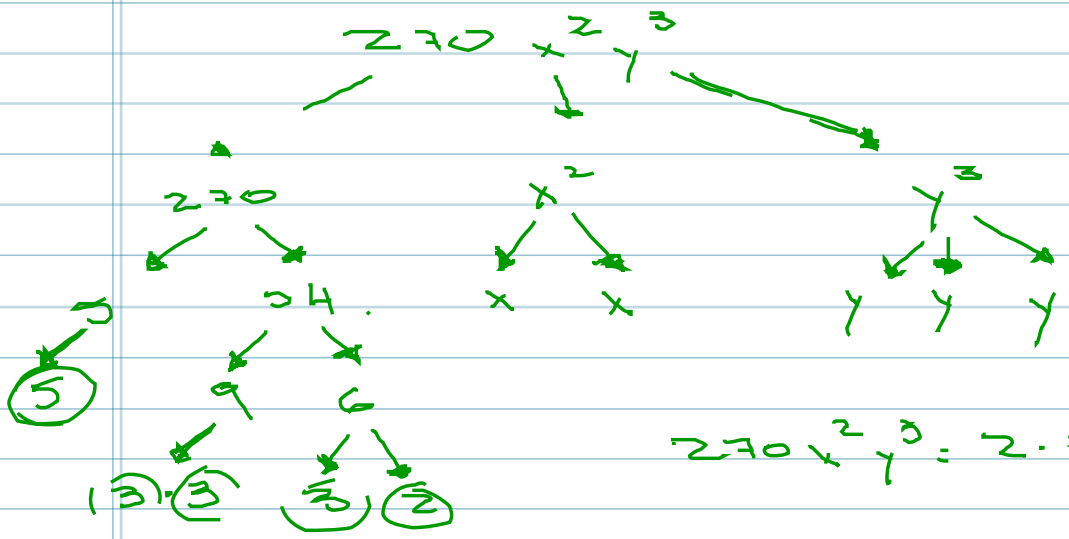
: 18, 27, 36

7.1.3 Prime factorization



$270x^2y^3 = 2 \cdot 3\ 3 \cdot 3 \cdot 5 \cdot x \cdot x \cdot y \cdot y \cdot y$

Use this concept to solve roots.

$\sqrt{x^2 + y^6}$ can't be simplified. Because of "+"

$\sqrt{x^2y^6} = \sqrt{x\,x\,y\,y\,y\,y\,y\,y} = \sqrt{(x\,x)(y\,y)(y\,y)(y\,y)}$ (groups of 2)

$= xy^3$

$\sqrt[3]{-8a^6c^3} = \sqrt[3]{(-2)(-2)(-2) \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot c \cdot c \cdot c}$

$= -2aaac = -2a^2c$

$\sqrt[3]{16z^5} = \sqrt[3]{(2 \cdot 2 \cdot 2)\ 2 \cdot (z \cdot z \cdot z)\ z \cdot z}$

$= 2z\sqrt[3]{2z^2}$

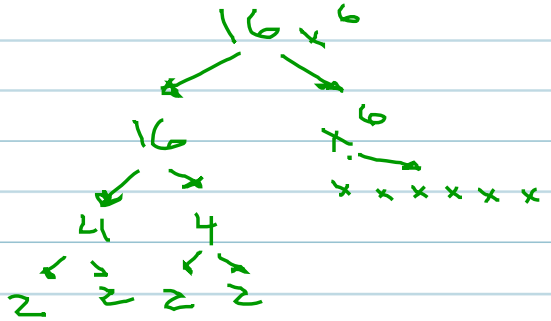
(40) Simplify if possible.

$\sqrt{16x^6}$

$= \sqrt{(2\cdot2)(2\cdot2)(x\cdot x)(x\cdot x)(x\cdot x)}$

$= 2 \quad 2 \quad x \quad x \quad x$

$= \boxed{4x^3}$



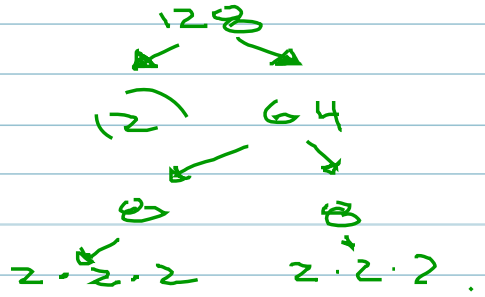
(41) Simplify

$\sqrt[3]{128x^5}$

$= \sqrt[3]{(2\cdot2\cdot2)(2\cdot2\cdot2)(x\cdot x\cdot x)(x\cdot x)}$

$= 2 \quad 2 \quad x \quad \sqrt[3]{2x^2}$

$= \boxed{4x\sqrt[3]{2x^2}}$

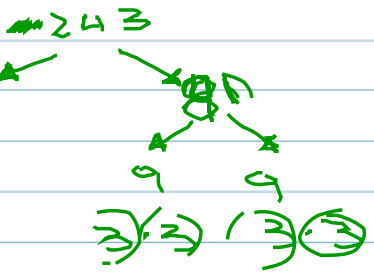


$\sqrt{16+x^6}$ → Can't solve it any further

$\sqrt[5]{-243x^{10}y^5}$

$= \sqrt[5]{(-3)(-3)(-3)(-3)(-3)\,x^5\,x^5\,yyyyy}$

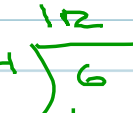
$= -3xxy = \boxed{-3x^2y}$



Short cut using Exponents

$\sqrt[n]{0^x}$ $\frac{x}{n}$ = Even (goes outside)

Ex) $\sqrt[4]{x^6 y^4}$



$$\begin{array}{r} 2 \\ 4\overline{)9} \\ -8 \\ \hline 1 \text{ Rem} \end{array}$$

$$\begin{array}{r} 1R \\ 4\overline{)6} \\ -4 \\ \hline 2 \\ R \end{array}$$

= Not even (Remainder stays as exponent in Root)

$\longrightarrow xy^2\sqrt[4]{x^2y}$

Simplify

$-\sqrt{448\,x^6y^{15}} = -\sqrt{2\cdot2\;2\cdot2\cdot2\cdot2\;7\;x^6y^{15}}$

$= -2\cdot2\cdot2\,x^3y^7\sqrt{7y} = -8x^3y^7\sqrt{7y}$

What are the square roots of 36? 6 & −6

Because $(6)^2 = (-6)^2 = 36$

$\sqrt[n]{a^n} = |a|$ if n is an even positive integer

$\sqrt[n]{a^n} = a$ if n is an odd positive integer

(47) Simplify. Assume x is any real number.

$$\sqrt{49x^2}$$

- x could be negative? YES
- Is index even? YES.

$$\sqrt{7 \cdot 7 \cdot x \cdot x} = |7x| = 7|x|$$

(49) $\sqrt[3]{x^3} = x$

① Could x be negative?

$(-x)^3 = -x$ ≠ $-x$ / x

So NO

① Is index even? NO

Simplify. Assume x is any real number.

functions

$f(x) = \sqrt{x-5}$ $\quad x - 5 \geq 0$

$x \geq 5$

"Can't have negative values, That's why we use ≥ 0

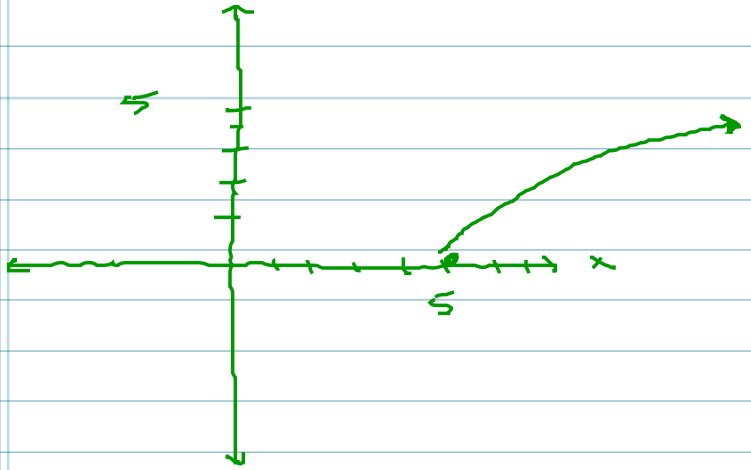
x	$f(x)$
5	0
6	1
9	2
14	3

$\sqrt{5-5} = \sqrt{0} = 0$

$\sqrt{6-5} = \sqrt{1} = 1$

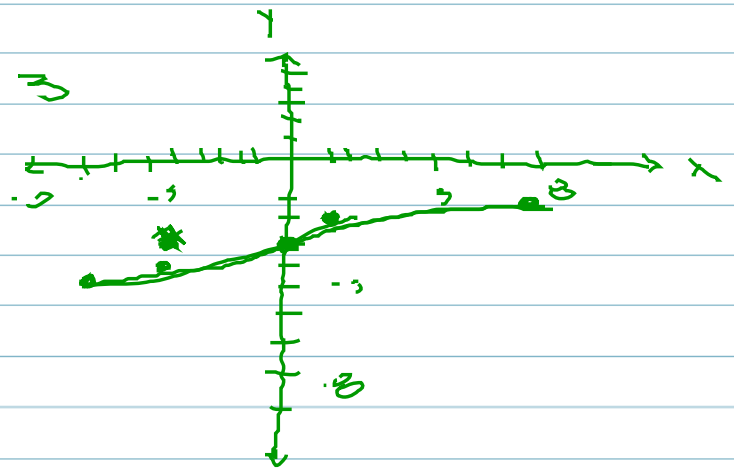
$\sqrt{9-5} = \sqrt{4} = 2$

$\sqrt{14-5} = \sqrt{9} = 3$



$f(x) = \sqrt[3]{x} - 3$

x	$f(x)$
-8	-5
-1	-4
0	-3
1	-2
8	-1
27	

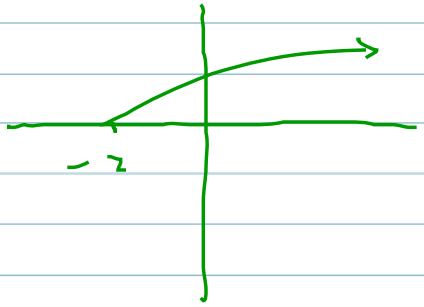


$y = \sqrt{x+2}$

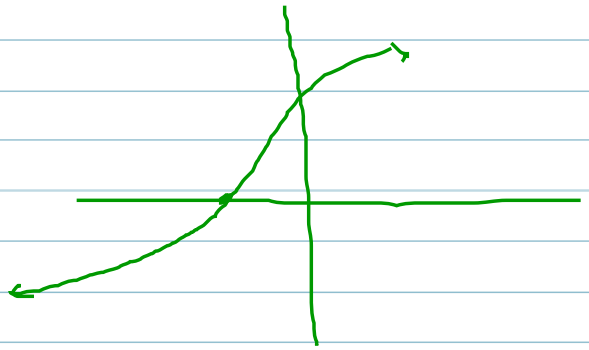
$x + 2 \geq 0$

$x \geq -2$

x	y
-2	0
-1	1
2	2
7	3
14	4



$y = \sqrt[3]{x+3}$

$(x) - 3 \in \mathbb{R}$

x	y
-10	-2
-3	-1
-2	0
-1	1
6	2