10.1 p. 607 Find all square roots of...

ex 8 $16 \rightarrow 4$ or -4

$\sqrt[4]{16} = 2$ or -2

ex 10 $100 \rightarrow 10$ or -10

ex 12 $225 \rightarrow 15$ or -15

ex 14 $\frac{81}{400} \rightarrow \frac{9}{20}$ or $-\frac{9}{20}$

ex 18 $\sqrt{4} = 2$

ex 20 $\sqrt{81} = 9$

ex 22 $-\sqrt{196} = -14$

ex 24 $-\sqrt{\frac{49}{36}} = -\frac{7}{6}$

ex 26 $\sqrt{.16} = .4$

$\sqrt{\frac{16}{100}} = \frac{4}{10}$

index $\sqrt{}$ "radical"

$\sqrt{\square}$ $\sqrt[x]{\square}$

$\sqrt{x^2}$ $\sqrt[y]{x^y}$

$\sqrt{\wedge}$

ex 28 $\sqrt{-64}$ what # times itself is -64.

not a real #

ex 30 $-\sqrt{-100}$ not a real #

but... $\sqrt[3]{-8} = -2$

$(-2)(-2)(-2) = -8$

Find the square of...

ex 32 $\sqrt{59}$ $\left(\sqrt{59}\right)^2 = 59$

radicand

$\left(\sqrt{4}\right)^2 = (2)^2 = 4$

$\left(\sqrt{25}\right)^2 = (5)^2 = 25$

ex 34 $\left(-\sqrt{59}\right)^2 = 59$

ex 36 $\left(\sqrt{\frac{5}{7}}\right)^2 = \frac{5}{7}$ ex 38 $\left(\sqrt{9y^2+3}\right)^2 = 9y^2+3$

ex 44 $\sqrt{169} = 13$ rational $\mathbb{Q}$

ex 46 $\sqrt{33} \approx 5.745$ irrational $\mathbb{I}$

ex 48 $-\sqrt{81} = -9$ rational $\mathbb{Q}$

ex 52 $\sqrt{-47}$ not a real #

p. 30

natural $1, 2, 3, 4, 5, \ldots$ $\mathbb{N}$ or $\mathbb{N}$

whole #s $0, 1, 2, 3, 4, \ldots$ $\mathbb{W}$

integers $\ldots -3, -2, -1, 0, 1, 2, 3, \ldots$ $\mathbb{Z}$ Zahlen

rational $\frac{\text{some integer}}{\text{some non zero integer}}$ $\mathbb{Q}$ ← quotient

irrational

decimals that neither stop, nor repeat

$\mathbb{I}$ $\pi, \sqrt{2}, \sqrt{3}, \sqrt{5}, \ldots$

$\mathbb{R}$ real #s

ex56 $6 = \sqrt{36} < \sqrt{43} < \sqrt{49} = 7$

ex58 $5 = \sqrt{25} < \sqrt{30} < \sqrt{36} = 6$

ex60 $-8 = -\sqrt{64} < -\sqrt{63} < -\sqrt{49} = -7$

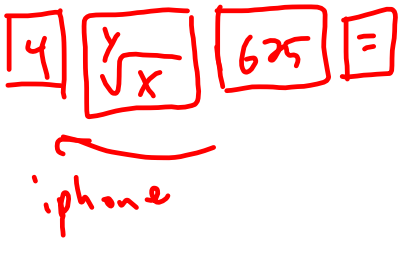
ex68 $-\sqrt{121} = -11$

ex70 $\sqrt[3]{343} = 7$ because $7 \cdot 7 \cdot 7 = 343$

ex72 $\sqrt[3]{-125} = -5$

ex76 $\sqrt[4]{625} = 5$

ex78 $-\sqrt[4]{256} = -4$



ex 80 $\sqrt[4]{-256}$ not a real #

ex 84 $\sqrt[8]{-1}$ = not a real #

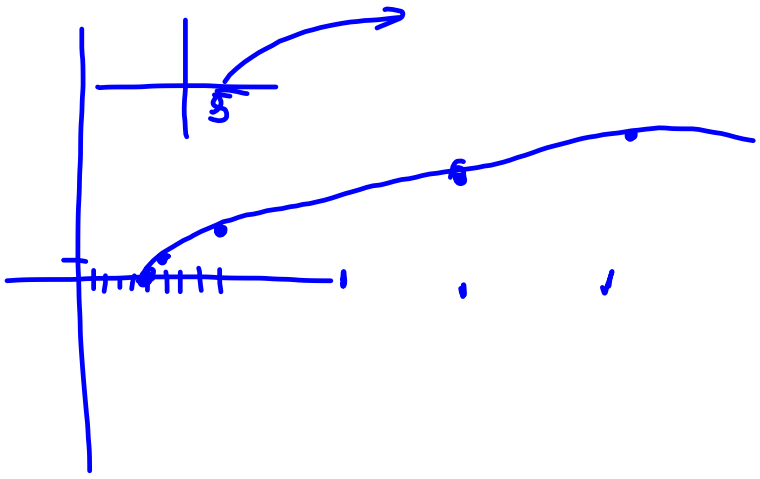
ex 88 $\sqrt[4]{\frac{81}{16}} = \frac{3}{2}$

ex 94 $\sqrt{.36} = .6$ ex 96 $-\sqrt{.81} = -.9$

ex 100 $f(x) = \sqrt{x-5}$ D: $[5, \infty)$

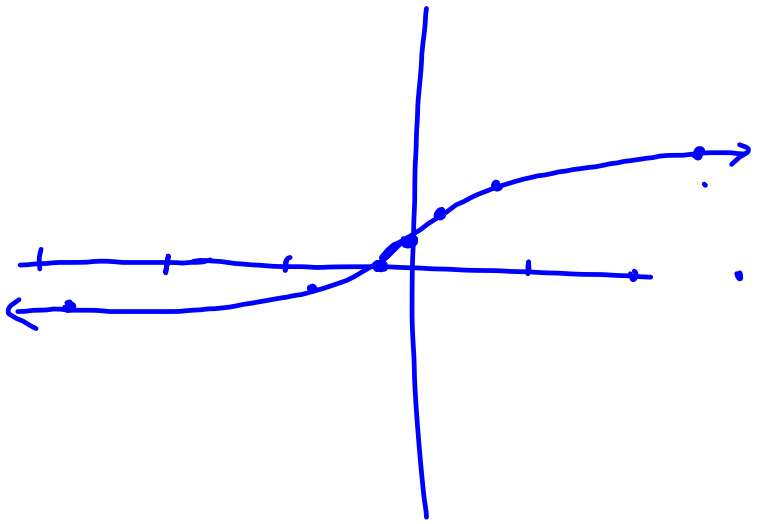
$y = \sqrt{x-5}$ R: $[0, \infty)$

x	y
5	0
6	1
9	2
30	5
41	6



ex 104 $f(x) = \sqrt[3]{x} + 1$

x	y
-27	-2
-8	-1
-1	0
0	1
1	2
8	3
27	4



10.2 p 617

ex 12 $121^{\frac{1}{2}}$ (power or exponent; root) $= \sqrt[2]{121^1} = \left(\sqrt{121}\right)^1 = 11$

ex 14 $512^{\frac{1}{3}} = \sqrt[3]{512^1}$ or $\left(\sqrt[3]{512}\right)^1 = 8$

ex 16 $625^{\frac{1}{4}} = \sqrt[4]{625} = 5$

ex 20 $(-32)^{\frac{1}{5}} = \sqrt[5]{-32} = -2$

ex24 $64^{3/2} = \sqrt{64^3}$ or $(\sqrt{64})^3$

$\sqrt{262144}$ → 512 and 8^3 → 512

ex26

$216^{\frac{2}{3}} = (\sqrt[3]{216})^2 = (6)^2 = 36$

$81^{\frac{2}{2}} = 81^1 = 81$

ex32 $27^{-\frac{4}{3}} = (\sqrt[3]{27})^{-4} = (3)^{-4} = \frac{1}{3^4} = \frac{1}{81}$

power, root, reciprocal

$\left(\sqrt[3]{\frac{1}{27}}\right)^4$

$(81)^{-1} = \frac{1}{81}$

ex34 $81^{-\frac{3}{2}} = (\sqrt{81})^{-3} = 9^{-3} = \frac{1}{729}$

ex 36 $\left(\frac{64}{125}\right)^{-\frac{2}{3}} = \left(\frac{125}{64}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\frac{125}{64}}\right)^2 = \left(\frac{5}{4}\right)^2 = \frac{25}{16}$

ex 40 $3^{\frac{1}{2}} = \sqrt{3}$

ex 42 $7^{\frac{2}{3}} = \sqrt[3]{7^2}$ or $\left(\sqrt[3]{7}\right)^2$

ex 44 $(3p)^{\frac{3}{4}} + (4x)^{\frac{1}{3}}$

$= \left(\sqrt[4]{3p}\right)^3 + \sqrt[3]{4x}$

ex 52 $\sqrt{5^{10}} = 5^{\frac{10}{2}} = 5^5$ or 3125 (test / book)

ex 54 $\sqrt[4]{6^8} = 6^{\frac{8}{4}} = 6^2 = 36$

ex 58 $\sqrt[4]{y} \cdot \sqrt[5]{y^2}$

$= y^{\frac{1}{4}} \cdot y^{\frac{2}{5}}$

$= y^{\frac{5}{20}} \cdot y^{\frac{8}{20}} = y^{\frac{13}{20}}$

ex 64 $\frac{125^{7/3}}{125^{5/3}} = 125^{\frac{7}{3}-\frac{5}{3}}$

$= 125^{\frac{2}{3}}$

$= \left(\sqrt[3]{125}\right)^2$

$= 25$

ex 70 $\dfrac{z^{3/4}}{z^{5/4}\cdot z^{-2}} = \dfrac{z^{3/4}\cdot z^{2}}{z^{5/4-\frac{2}{4}}} = \dfrac{z^{2}}{z^{1/2}}$

$= z^{1\frac{1}{2}} = z^{3/2}$

ex 76 $\dfrac{(a^{2}b^{5})^{-\frac{1}{4}}}{(a^{-3}b^{2})^{\frac{1}{2}}} = \dfrac{a^{-\frac{1}{2}}\,b^{-\frac{5}{4}}}{a^{-\frac{1}{2}}\,b^{\frac{1}{3}}} = \dfrac{1}{b^{1/3}\cdot b^{5/4}}$

$= \dfrac{1}{b^{4/12}\cdot b^{15/12}} = \dfrac{1}{b^{19/12}}$

ex 86

$r^{\frac{3}{5}}\left(r^{\frac{1}{2}} + r^{\frac{3}{4}}\right) = r^{\frac{6}{10}} \cdot r^{\frac{5}{10}} + r^{\frac{12}{20}} \cdot r^{\frac{15}{20}}$

$= r^{\frac{11}{10}} + r^{\frac{27}{20}}$

$r^2 + r^3$

unlike terms