7.2

$a^{m/n}$ $\qquad \sqrt[2]{x^1} = x^{1/2}$

$4^{1/2} = \sqrt{4} = 2$

$a^{\frac{m}{n}} = \sqrt[n]{a^m}$ $\qquad \sqrt[3]{x^1} = x^{1/3}$

$\sqrt[6]{x^3} = x^{3/6} = x^{1/2} = \sqrt[2]{x^1}$ $\qquad \sqrt[6]{x^5} = x^{5/6}$

$27^{2/3} = \sqrt[3]{27^2}$

$27^{2/3}$ ← square
cube root

$3 \overline{)27}$
$3 \overline{)9}$
3

$\sqrt[3]{(3\cdot3\cdot3)(3\cdot3\cdot3)}$

$3\cdot3 = 9$

$3^2 = \boxed{9}$

$x^{-3} = \frac{1}{x^3}$

$16^{-3/4}$ — flip it
3 — cube it
4 — 4th root

$16 \downarrow$

$2^{-3} = \frac{1}{8}$

$2 \overline{)16}$
$2 \overline{)8}$
$2 \overline{)4}$
2

#60 $\dfrac{(a^{-2}b^3)^{1/8}}{(a^{-3}b)^{-1/4}}$ $\qquad \frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{2}{8} = \frac{5}{8}$

$\dfrac{a^{-\frac{2}{8}} b^{\frac{3}{8}}}{a^{3/4} b^{-1/4}} = \dfrac{b^{3/8} b^{1/4}}{a^{2/8} a^{3/4}}$

$a^{2/8 + 3/4} = \frac{1}{4} + \frac{3}{4}$

$\boxed{\dfrac{b^{5/8}}{a^1}}$

$\dfrac{(x^{-2}y^3)^4}{(x^{-3}y^{-2})^3} = \dfrac{x^{-8}y^{12}}{x^{-9}y^{-6}}$

$\dfrac{x^9 y^{12} y^6}{x^8} = xy^{18}$

$\sqrt{x}\sqrt[3]{x} = x^{1/2} \cdot x^{1/3} = x^{\frac{1}{2}+\frac{1}{3}} = x^{5/6} = \sqrt[6]{x^5}$

$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

$\sqrt[2]{x^1}\sqrt[3]{x^1} = \sqrt[6]{x^3}\sqrt[6]{x^2} = \sqrt[6]{x^5}$

LCD 12

$\sqrt[4]{x^3} \cdot \sqrt[3]{x^2} = \sqrt[12]{x^9}\sqrt[12]{x^8} = \sqrt[12]{x^{17}} = x^{\frac{17}{12}}$

$x\sqrt[12]{x^5}$

$\sqrt[2]{\sqrt[3]{x}} = \left(x^{1/3}\right)^{1/2} \quad x^{1/6} = \sqrt[6]{x}$

$\sqrt[2]{\sqrt[3]{\sqrt[4]{\sqrt[5]{\sqrt[3]{\sqrt[3]{x}}}}}} \qquad 720\sqrt{x}$

$2 \cdot 3 \cdot 4 \cdot 5 \cdot 3 \cdot 2 = 720$

$\sqrt{56} \sim 7.48$

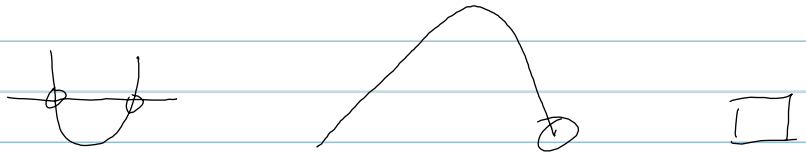
$\sqrt[3]{12}$ math $\Rightarrow \sqrt[3]{}$ $\rightarrow$ 2.29 $\quad 12 \wedge 1/3$

$(16)^{3/4}$ - $16 \wedge (3/4)$ or $(.75)$ $= 8$

$(23)^{.1/4}$

$16^{3/4}$ 3-cube 4-4th root $\rightarrow \underline{2^3} = 8$

$\sqrt[n]{\quad}$ $\sqrt[6]{5}$ $6\sqrt[n]{\quad}5$ $\sqrt[x]{\quad}$



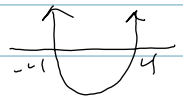
8.1 – 8.2

1) factoring
2) square root method
3) completing the square
4) quadratic formula
   - traditional $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
   - Brazilian $x = \frac{-b \pm \sqrt{D}}{2a}$ $D = b^2-4ac$
   - (h, k) method $x = h \pm \sqrt{\frac{-k}{a}}$

Factoring

1) set to zero
2) factor
3) set each factor to zero
4) solve

$2x^2 - 32 = 0$
$2(x^2 - 16) = 0$
$2(x+4)(x-4) = 0$
$2 = 0$ $x+4=0$ $x-4=0$
$x = -4$ $x = 4$



Square Root Method

$2x^2 - 32 = 0$
$\frac{2x^2}{2} = \frac{32}{2}$
$x^2 = 16$
$x = \pm 4$
$\sqrt{x^2} = |x|$

$x^2 - 3x + 8 = 0$

$(\quad)^2$

$x^2 - 7 = 0$

$x^2 = 7$

$x = \pm\sqrt{7}$

$x^2 - 7 = 0$

$(x+\sqrt{7})(x-\sqrt{7})$

$(x-3)^2 = 4$

$x-3 = \pm\sqrt{4}$

$x-3 = \pm 2$

$x-3=2$ $\quad +3 \quad +3$ $\quad x=5$

$x-3=-2$ $\quad +3 \quad +3$ $\quad x=1$

$x^2-6x+9=4$

$-4 \quad -4$

$x^2-6x+5=0$

$(x-5)(x-1)$

$x-5=0 \quad x-1=0$

$x=5 \quad x=1$

$(x+2)^2 = 5$

$x^2+4x+4=5$

$x^2+4x-1=0$

$(x+1)(x-1)$

$x^2-1=0$

does not factor.

$(x+2)^2 = 5$

$x+2 = \pm\sqrt{5}$

$x = -2 \pm \sqrt{5}$

$-2+2.23$ $\quad .23$

$x = -2+\sqrt{5}$

$x = -2-\sqrt{5}$

$-2-2.23$ $\quad -4.23$

$(x-5)^2 = 7$

$x-5 = \pm\sqrt{7}$

$x = 5 \pm \sqrt{7}$

$2(x-1)^2 + 4 = 12$

$-4 \quad -4$

$\frac{2(x-1)^2}{2} = \frac{8}{2}$

$(x-1)^2 = 4$

$x-1 = \pm\sqrt{4}$

$x-1 = \pm 2$

$x = 1 \pm 2$

$x = 1+2 \quad x = 1-2$

$x = 3 \quad x = -1$

Creating a perfect square

$(x+3)^2 = (x+3)(x+3)$

$= x^2 + 3x + 3x + 9$

ax^2+bx+c

$x^2 + (6)x + 9$

$\left(\frac{6}{2}\right)^2 \quad (3)^2 = 9$

to create a perfect square, add $\left(\frac{b}{2}\right)^2$ to both sides

$\left(\frac{8}{2}\right)^2 = (4)^2 = 16$

$x^2 + 8x + \underline{16}$

$(x+4)(x+4)$

$(x+4)^2$

$\left(\frac{12}{2}\right)^2 = (6)^2 = 36$

$x^2 + 12x + \underline{36}$

$(x+6)(x+6)$

$(x+6)^2$

$\left(\frac{-14}{2}\right)^2 = (-7)^2 = 49$

$x^2 - 14x + \boxed{49}$

$(x-7)(x-7)$

$(x-7)^2$

$\left(\frac{-3}{2}\right)^2 = \frac{9}{4}$

$x^2 - 3x + \frac{9}{4}$

$\left(x - \frac{3}{2}\right)^2$

$x^2+4x-1=0$

$x^2+4x+4=1+4$ $\qquad \left(\frac{4}{2}\right)^2=(2)^2=4$

$(x+2)^2=5$

$x+2=\pm\sqrt{5}$ $\qquad (a=1)$

$x=-2\pm\sqrt{5}$

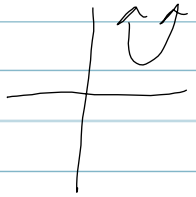
$2x^2+8x+14=0$

$\frac{2x^2}{2}+\frac{8x}{2}=\frac{-14}{2}$ $\qquad \left(\frac{4}{2}\right)^2=(2)^2=4$

$x^2+4x+4=-7+4$

$(x+2)^2=-3$

$x+2=\pm i\sqrt{3}$ $\qquad x=-2\pm i\sqrt{3}$



$3x^2+5x-7=0$

$\frac{3x^2}{3}+\frac{5x}{3}-\frac{7}{3}=\frac{0}{3}$

$x^2+\frac{5}{3}x-\frac{7}{3}=0$

$\frac{\frac{5}{3}}{2}$ or $\left(\frac{5}{3}\cdot\frac{1}{2}\right)^2=\left(\frac{5}{6}\right)^2$

$\frac{25}{36}$

$x^2+\frac{5}{3}x+\frac{25}{36}=\frac{-7}{3}+\frac{25}{36}$ $\qquad \frac{-7}{3}\cdot\frac{12}{12}$

$\left(x+\frac{5}{6}\right)^2=\frac{84+25}{36}=\frac{109}{36}$

$\left(x+\frac{5}{6}\right)^2=\frac{109}{36}$

$x+\frac{5}{6}=\pm\sqrt{\frac{109}{36}}$

$x+\frac{5}{6}=\pm\frac{\sqrt{109}}{6}$

$x=\frac{-5}{6}\pm\frac{\sqrt{109}}{6}$