Quadratic formula

$ax^2+bx+c=0 \Rightarrow$ two solutions

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

Solve some equations (OHW1)

$$8x+1=5x-9$$

$(8-5)x$

Subtr $5x$

$$3x+1=-9$$

Subtr 1

$$3x=-10$$

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

Div by 3

$$\boxed{x=-\frac{10}{3}}=-3.33\ldots$$

~~$\frac{2+x}{2+x^2}$~~

$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$

$$\frac{a/b}{c/d} = \left(\frac{a}{b}\right)\left(\frac{d}{c}\right)$$

Solve

$\frac{2}{5}x(-11) = 8$

Add 11

$\left(\frac{2}{5}\right)x = 19$

Way 1 / Way 2

Div by $\frac{2}{5}$

Mult by 5

$2x = 95$

Div by 2

$x = \frac{95}{2}$

$4/9 \quad \frac{5}{95}$

$$x = \frac{19}{\frac{2}{5}} = \frac{\frac{19}{1}}{\frac{2}{5}} = \left(\frac{19}{1}\right)\left(\frac{5}{2}\right) = \frac{95}{2}$$

$19 = \frac{19}{1}$

$$\frac{a/b}{c/d} = \frac{a/b}{c/d}\left(\frac{1}{1}\right)$$

$\frac{bd}{bd} = 1$

$$= \left(\frac{a/b}{c/d}\right)\left(\frac{bd}{bd}\right)$$

$$= \frac{\frac{a}{b} \cdot bd}{\frac{c}{d} \cdot bd} = \frac{ad}{cb}$$

Solve

$$\frac{2x-1}{3} + \frac{x-1}{2} - \frac{2x+1}{5} = \frac{4}{3}$$

35-12

Mult by 3

Way 1

$$3\left(\frac{2x-1}{3} + \frac{x-1}{2} - \frac{2x+1}{5}\right) = 3\left(\frac{4}{3}\right)$$

$$(2x-1) + \frac{3(x-1)}{2} - \frac{3(2x+1)}{5} = 4$$

Mult by 2.5 (=10)

$$10(2x-1) + 15(x-1) - 6(2x+1) = 40$$

$20x - 10 + 15x - 15 - 12x - 6 = 40$

$23x - 31 = 40$

$23x = 71$

$x = \frac{71}{23}$

$?\cdot 2=30$

$?=15$

Way 2

mult denoms: $3\cdot 2\cdot 5=30$

$$\frac{20x-10}{30}+\frac{15x-15}{30}-\left(\frac{12x+6}{30}\right)=\frac{40}{30}$$

$$\frac{2x-1}{3}=\frac{\quad}{30}$$

11

$$\frac{2x-1}{3}\left(\frac{10}{10}\right)=$$

$$\frac{20x-10+15x-15-12x-6}{30}=\frac{40}{30}$$

$$\frac{23x-31}{30}=\frac{40}{30}$$

$$\frac{23x}{30}=\frac{71}{30}$$

$$23x=71$$

$$x=\frac{71}{23}$$

Solve for x

$$x(w+z)=m(x+z)$$

$$xw+xz=mx+mz$$

factor $xw+xz-xm=mz$

$$x(w+z-m)=mz$$

$$x=\frac{mz}{w+z-m}$$

Ohm's Law

$$V=IR$$

V: voltage

I: current (amps)

R: resistance (ohms, Ω)

$$\frac{V}{R}=I$$

Solve

$$4 - x^2 = 0$$

$$4 = x^2$$

Take $\pm\sqrt{}$

$$\pm\sqrt{4} = \sqrt{x^2}$$

$$\pm 2 = x$$

$2^2 = 2 \cdot 2 = 4$

$(-2)^2 = (-2)(-2) = 4$

Solve

$$4 + x^2 = 0$$

$$x^2 = -4$$

$i = \sqrt{-1}$

$$x = \pm\sqrt{-4} = \pm 2i$$

Euler's identity: $e^{i\theta} = \cos(\theta) + i\sin(\theta)$

$$e^{i\pi} = -1$$

$x^2+x-6=0$

$(x+3)(x-2)=0$

$x+3=0$ $\quad x-2=0$

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

$a=1,\ b=1,\ c=-6$

$$x=\frac{-1\pm\sqrt{1^2-4(1)(-6)}}{2(1)}$$

$$=-\frac{1}{2}\pm\frac{\sqrt{25}}{2}$$

$$=\frac{-1\pm5}{2}$$

$+$ $\quad -$

$x=\frac{4}{2}=2$ $\quad x=\frac{-6}{2}=-3$

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(7) $6x^2-13x-5=0$

$a=6,\ b=-13,\ c=-5$

$\sqrt{169+120}$

$$x=\frac{-(-13)\pm\sqrt{(-13)^2-4(6)(-5)}}{2(6)}$$

$$=\frac{13}{12}\pm\frac{\sqrt{289}}{12}=\frac{13\pm17}{12}$$

$+ \rightarrow \frac{30}{12}=\frac{15}{6}$

$- \rightarrow \frac{-4}{12}=-\frac{1}{3}$