SOLUTIONS ICP 10/19/15

$$1x + 4 = -4x - 14$$

$$1x + 4 = -4x - 14$$

$+4x \qquad +4x$

$$5x + 4 = -14$$

$$5x + 4 = -14$$

$-4 \qquad -4$

$$5x = -18$$

$$\frac{5x}{5} = \frac{-18}{5}$$

$$x = \frac{-18}{5} = -3.6$$

Check

$-3.6 + 4 = 0.4$

$-4(-3.6) - 14 =$

$14.4 - 14 = 0.4$

Solution to

$y = 1x + 4$

$y = -4x - 14$

$(-3.6, 0.4)$

SOLUTION TO ICP 10/19/15

$\frac{1}{2}x+4 = -\frac{4}{3}x-14$

(Note use $2 \cdot 3 = 6$ to clear fraction)

$6\left(\frac{1}{2}x+4\right) = 6\left(-\frac{4}{3}x-14\right)$

$3x+24 = -8x-84$

$+8x \qquad +8x$

$11x+24 = -84$

$11x+24 = -84$

$-24 \qquad -24$

$11x = -108$

$\frac{11x}{11} = \frac{-108}{11}$

$x = \frac{-108}{11} = -9\frac{9}{11}$

check

$\frac{1}{2}\left(\frac{-108}{11}\right)+4 = \frac{-10}{11}$

$-\frac{4}{3}\left(\frac{-108}{11}\right)-14 = \frac{-10}{11}$

Solution to

$y = \frac{1}{2}x+4$

$y = -\frac{4}{3}x-14$

$\left(\frac{-108}{11}, \frac{-10}{11}\right)$

$\left(-9.\overline{81}, -0.\overline{90}\right)$

SOLUTION TO ICP 10/19/15

$\frac{1}{2}(x+4) = \frac{4}{8}x+2$

Note Use (2)(8) to clear fractions

$\frac{1}{2}x+2 = \frac{4}{8}x+2$

$8\left(\frac{1}{2}x+2\right) = 8\left(\frac{4}{8}x+2\right)$

$4x+16 = 4x+16$

$-4x \qquad -4x$

$16 = 16$

These are two copies of the same line

$y = \frac{1}{2}(x+4)$

$y = \frac{4}{8}x+2$

have ∞ many solutions

$(x, \frac{1}{2}x+2)$

SOLUTION TO ICP 10/19/15

NOTE USE $(2)(8)=16$ to clear fractions

$$\frac{1}{2}(x+4) = \frac{4}{8}x+6$$

$$16\left(\frac{1}{2}x+2\right) = \left(\frac{4}{8}x+6\right)16$$

$$8x+32 = 8x+96$$

$$\begin{array}{r} 8x+32 = 8x+96 \\ -8x \quad\quad -8x \\ \hline 32 \neq 96 \end{array}$$

Since $32 \neq 96$ this has NO Solutions

These are NO Solutions to $\frac{1}{2}(x+4) = \frac{4}{8}x+6$

System ④

$y = 2x$

$y = 2x + 9$

these are parallel lines

because slopes are equal

but y-intercepts ≠

$y = 2x$
$y = 2x + 9$ } System of inconsistent lines

None = # of solutions

System 6

$$y = 2x$$
$$4x - 2y = 0$$

Note $4x - 2y = 0 \rightarrow$

$$4x - 2y = 0$$
$$+2y \quad +2y$$
$$4x = 2y$$
$$\frac{4x}{2} = \frac{2y}{2}$$
$$2x = y$$

∞ many solutions
$(x, 2x)$

So $y = 2x$
$4x - 2y = 0$

$y = 2x$
$y = 2x$ →

this is a system of consistent and dependent lines

Solutions to ICP

System (S) $y = -5x$

$10x + 2y = 20$

Note $10x + 2y = 20 \rightarrow$ $10x + 2y = 20$

$-10x \qquad -10x$

$2y = -10x + 20$

$\frac{2y}{2} = \frac{-10x}{2} + \frac{20}{2}$

$y = -5x + 10$

Note $y = -5x$

$10x + 2y = 20$

$y = -5x$

$y = -5x + 10$

This is a system of parallel lines (INCONSISTENT)

System 7

$$y = \frac{2}{5}x + 1$$
$$y = -\frac{5}{2}x + 9$$

Note Use $(5)(2) = 10$ to clear fractions

Step ① $\frac{2}{5}x + 1 = -\frac{5}{2}x + 9$

Step ② $10\left(\frac{2}{5}x + 1\right) = 10\left(-\frac{5}{2}x + 9\right)$

$4x + 10 = -25x + 90$

$4x + 10 = -25x + 90$

$+25x \qquad +25x$

$29x + 10 = 90$

$-10 \qquad -10$

$29x = 80$

$\frac{29x}{29} = \frac{80}{29}$

$x = \frac{80}{29}$

Step ③

$y = \frac{2}{5}\left(\frac{80}{29}\right) + 1$

$= \frac{32}{29} + 1$

$= \frac{32}{29} + \frac{29}{29}$

$y = \frac{61}{29}$

$y = -\frac{5}{2}\left(\frac{80}{29}\right) + 9$

$= -\frac{200}{29} + 9$

$= -\frac{200}{29} + \frac{261}{29}$

$= \frac{61}{29}$

$\approx (2.759, 2.103)$

Solution

$\left(\frac{80}{29}, \frac{61}{29}\right)$

classification

consistent & independent

System 8

$$y = \frac{2}{5}x + 1$$

$$5x - 4y = 12$$

Step ①

$$5x - 4\left(\frac{2}{5}x + 1\right) = 12$$

$$5x - 4\left(\frac{2}{5}x + 1\right) = 12$$

$$5x - \frac{8}{5}x - 4 = 12$$

$$\frac{25x}{5} - \frac{8}{5}x - 4 = 12$$

$$\frac{17x}{5} - 4 = 12$$

$$+4 \quad +4$$

$$\frac{17}{5}x = 16$$

$$5\left(\frac{17x}{5}\right) = \left(\frac{16}{1}\right)5$$

$$17x = 80 \rightarrow \frac{17x}{17} = \frac{80}{17}$$

$$x = \frac{80}{17}$$

Step ②

$$y = \frac{2}{5}\left(\frac{80}{17}\right) + 1$$

$$y = \frac{32}{17} + 1$$

$$= \frac{32}{17} + \frac{17}{17}$$

$$y = \frac{49}{17}$$

Solution

$$\left(\frac{80}{17}, \frac{49}{17}\right)$$

$$\approx (4.706, 2.882)$$

System classification

consistent & independent

System 8 Method (2)

$y = \frac{2}{5}x + 1$

$5x - 4y = 12$

↓ rewrite in $y = mx + b$

$5x - 4y = 12$

$-5x \qquad -5x$

$-4y = -5x + 12$

$\frac{-4y}{-4} = \frac{-5x}{-4} + \frac{12}{-4}$

$\boxed{y = \frac{5}{4}x - 3}$

$y = \frac{2}{5}x + 1$

$y = \frac{5}{4}x - 3$

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

use $(5)(4) = 20$ to clear fractions

Step 1 $20\left(\frac{2}{5}x + 1\right) = 20\left(\frac{5}{4}x - 3\right)$

$8x + 20 = 25x - 60$

$8x + 20 = 25x - 60$

$-8x \qquad -8x$

$20 = 17x - 60$

$+60 \qquad +60$

$80 = 17x$

$\frac{80}{17} = \frac{17x}{17}$

$\boxed{x = \frac{80}{17}}$

Step 2

$y = \frac{2}{5}\left(\frac{80}{17}\right) + 1$

$= \frac{32}{17} + 1$

$= \frac{32}{17} + \frac{17}{17} = \frac{49}{17}$

Solution to system $\left(\frac{80}{17}, \frac{49}{17}\right)$

System ⑨

$$y = \frac{2}{5}x + 1$$

$$10x - 4y = 12$$

⇒ System consistent & independent

Step ①

$$10x - 4\left(\frac{2}{5}x + 1\right) = 12$$

$$10x - \frac{8}{5}x - 4 = 12$$

$$+4 \qquad +4$$

$$\frac{50x}{5} - \frac{8}{5}x = 16$$

$$\frac{42}{5}x = 16$$

$$5\left(\frac{42}{5}x\right) = (16)5$$

$$42x = 80$$

$$\frac{42x}{42} = \frac{80}{42}$$

$$\boxed{x = \frac{40}{21}}$$

Step ②

$$y = \frac{2}{5}\left(\frac{40}{21}\right) + 1$$

$$= \frac{16}{21} + 1$$

$$= \frac{16}{21} + \frac{21}{21}$$

$$y = \frac{37}{21}$$

$$\boxed{\left(\frac{40}{21}, \frac{37}{21}\right)}$$

Solution ↑

$$\simeq (1.905, 1.762)$$

System 9 method ②

$y = \frac{2}{5}x + 1$

$10x - 4y = 12$

Rewrite in $y = mx + b$

$10x - 4y = 12$

$-10x \quad -10x$

$-4y = -10x + 12$

$\frac{-4y}{-4} = \frac{-10x}{-4} + \frac{12}{-4}$

$y = \frac{10x}{4} - 3$

$\boxed{y = \frac{5}{2}x - 3}$

$y = \frac{2}{5}x + 1$

$y = \frac{5}{2}x - 3$

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

use $(5)(2) = 10$ to clear fractions

Step ①

$10\left(\frac{2}{5}x + 1\right) = 10\left(\frac{5}{2}x - 3\right)$

$4x + 10 = 25x - 30$

$4x + 10 = 25x - 30$

$-4x \quad -4x$

$10 = 21x - 30$

$+30 \quad +30$

$40 = 21x$

$\frac{40}{21} = \frac{21x}{21}$

$\boxed{x = \frac{40}{21}}$

Step ②

$y = \frac{2}{5}\left(\frac{40}{21}\right) + 1$

$= \frac{16}{21} + 1$

$= \frac{16}{21} + \frac{21}{21}$

$\boxed{y = \frac{37}{21}}$

$\rightarrow$ Solution $\left(\frac{40}{21}, \frac{37}{21}\right)$