Day 24

3.2 Solve System of Eqs. by Substitution

* Best to use if one eq. is already solved for a variable

(ex) $\begin{cases} y = 8x \\ y - 4x = 12 \end{cases}$

Replace the "y" with "8x" ← then solve this eq.

$8x - 4x = 12$

$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

$y = 8 \cdot 3$

$y = 24$

Answer: $(3, 24)$ (x, y)

(ex2) $\begin{cases} 2x + 3y = -2 \\ x = y + 4 \end{cases}$

$2(y+4) + 3y = -2$

$2y + 8 + 3y = -2$

$5y + 8 = -2$

$-8 \quad -8$

$\frac{5y}{5} = \frac{-10}{5}$

$y = -2$

Plug back into eq. #2 to Find X

eq #2 $x = y + 4$

$x = -2 + 4$

$x = 2$

$(2, -2)$

ex 3 $\begin{cases} x+y=3 \\ 5x+3y=-1 \end{cases}$ ← solve for x "get x alone"

$x+y=3$

$-y \quad -y$

$x = 3-y$

$5(3-y)+3y=-1$

$15-5y+3y=-1$

$-15 \quad -15$

$-2y=-16$

$\frac{-2y}{-2} = \frac{-16}{-2}$

$y=8$

$x=3-8$

$x=-5$

$(-5,8)$

ex 4 $\begin{cases} -3x+2y=18 \\ x+3y=5 \end{cases}$

$-3y \quad -3y$

$x=5-3y$

$-3(5-3y)+2y=18$

$-15+9y+2y=18$

$+15 \quad +15$

$\frac{11y}{11} = \frac{33}{11}$

$y=3$

$x=5-3\cdot 3$

$x=-4$

$(-4,3)$

ex $\begin{cases} 2x+8y=6 \\ x=-4y+3 \end{cases}$

$2(-4y+3)+8y=6$

$-8y+6+8y=6$

$6=6$

TRUE

IF letters cancel and you get a true statement → MANY SOLUTIONS

→ DEPENDENT system coinciding line

ex $\begin{cases} y = x - 6 \\ y - x = -3 \end{cases}$

$x - 6 - x = -3$

$-6 \neq -3$

NO Solution

IF letters cancel + you get False statement

System is inconsistent

p. 128

13) $\begin{cases} d = .50m \\ d = 15 \end{cases}$

d: donation
m: miles biked

14) $\begin{cases} 7v + 5s = 31 \\ v + s = 5 \end{cases}$

v: vans
s: sedans

15)

p: pay
d: delivery

17)