

121 #5, 1 #5 1-7, 10, 12, 25, 30, 34, 39, 41, 45, 59, 61, 63, 74

#5 1-6 Fill in the blank

- ① A collection of two or more eq'ns. is a system of eq'ns.
- ② A system of eq'ns with at least one solution is consistent.
- ③ A system of eq'ns with no solution is inconsistent.
- ④ " " " " " " ONE solution is independent.
- ⑤ " " " " " " infinitely many solutions is dependent.
- ⑥ Two systems with the same solution set are equivalent systems.

#5 7-10 Determine whether the given point is in the solution set.

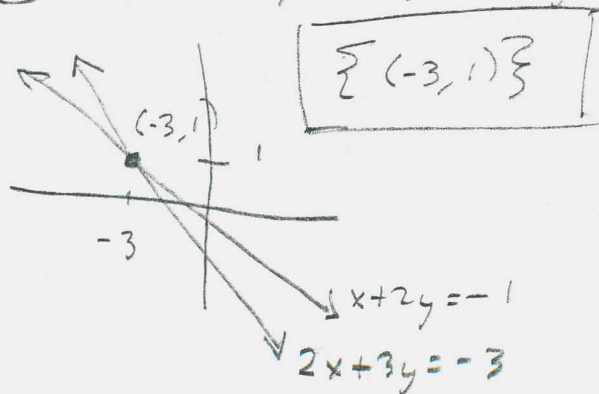
⑦ $(1, 3)$ YES

$$\begin{aligned} x+y &= 4 & 1+3 &= 4 \checkmark \\ x-y &= -2 & 1-3 &= -2 \checkmark \end{aligned}$$

⑩ $(3, 2)$ NO

$$\begin{aligned} 3x-y &= 7 & 3(3)-2 &= 7 \checkmark \\ 2x+4y &= 16 & 2(3)+4(2) &= 14 \\ & & & \text{NO} \end{aligned}$$

⑫ Solve by inspecting the graph.



Check:

$$\begin{aligned} -3+2(1) &= -1 \checkmark \\ 2(-3)+3(1) &= -6+3 = -3 \checkmark \end{aligned}$$

121 S 5.1 #s 25, 30, 34, 39, 41, 45, 59, 61, 63, 74

#s 23-36 Solve by substitution. Dependent, independent, or inconsistent?

(25) $x + y = 1 \implies y = 1 - x$

$2x - 3y = 8$ so, $2x - 3(1 - x) = 8$

$2x - 3 + 3x = 8$

$5x - 3 = 8$

$5x = 11$

$x = \frac{11}{5}$

$y = 1 - \frac{11}{5}$

$= \frac{5 - 11}{5}$

$= -\frac{6}{5} = y$

$\left\{ \left(\frac{11}{5}, -\frac{6}{5} \right) \right\}$

INDEPENDENT

(30) $2x = 10 - 5y \implies x = \frac{10 - 5y}{2}$

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

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

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

$10 - 5y + 5y = 10$

$10 = 10$

Always

versions of sol'n set =

$\left\{ (x, y) \mid 2x = 10 - 5y \right\}$

$\left\{ (x, y) \mid \frac{1}{5}x + \frac{1}{2}y = 1 \right\}$

$\left\{ \left(\frac{10 - 5y}{2}, y \right) \mid y \in \mathbb{R} \right\}$

DEPENDENT

(34) $2x + y = 9 \implies y = 9 - 2x$

$4x + 2y = 10$

so, $4x + 2(9 - 2x) = 10$

$4x + 18 - 4x = 10$

$18 = 10$

Never

\emptyset

INCONSISTENT

#s 37-50 solve by addition. Dependent?
Independent? Inconsistent?

12) $S5.1 \neq S$ 39, 41, 45, 59, 61, 63, 74

(39) $x - y = 5$ E1

$3x + 2y = 10$ E2

NEW SYSTEM:

$x - y = 5$

$y = -1$

$-3E1 + E2:$

$-3E1 - 3x + 3y = -15$

E2 $3x + 2y = 10$

$5y = -5$

$y = -1$

BACK-SUBSTITUTE:

$x - (-1) = 5$

$x + 1 = 5$

$x = 4$

$\{(4, -1)\}$
Independent

E1 + E2:

$x - y = 7$

$-x + y = 5$

$0 = 12$

Never

(41) $x - y = 7$ E1

$-x + y = 5$ E2

\emptyset Inconsistent

(45) $.05x + .1y = .6$ E1

$x + 2y = 12$ E2

\rightarrow $100E1: 5x + 10y = 60$ E1

E2: $x + 2y = 12$ E2

$-\frac{1}{5}E1 + E2:$

$-\frac{1}{5}E1 - x - 2y = -12$

$x + 2y = 12$

$0 = 0$

$0 = 0$

Always

Possible Sol'n Sets:

$\{(x, y) \mid x + 2y = 12\}$

$\{(x, y) \mid .05x + .1y = .6\}$

DEPENDENT

121 SS.1 #s 59, 61, 63, 74

(59) Althea makes \$16,000 more than Vaughn. Together they make \$82,000. How much does each make?

Let $A = \text{Althea's salary } (\$)$
 $V = \text{Vaughn's } \dots \dots$

Then $A = V + 16000$

$A + V = 82000$

So, $V + 16000 + V = 82000$

$2V + 16000 = 82000$

$2V = 66000$

$V = 33000$

$A = 33000 + 16000$

$= 49000 = A$

$\{(49000, 33000)\}$

(61) She has \$25000 to spend.

Lent part to Jim (a) 10% APR

" " " " Ricky (b) 8% APR

Received \$2200 in interest, total

Let $J = \# \text{ of } \$ \text{ lent to Jim}$

$R = \dots \dots \dots \text{Ricky}$

Then $J + R = 25000 \quad E1$

$.1J + .08R = 2200 \quad E2$

$E1 \quad J + R = 25000 \quad E1$

$100E2 \quad 10J + 8R = 22000 \quad E2$

$-10E1 + E2$

$-10E1 \quad -10J - 10R = -250000$

$E2 \quad 10J + 8R = 220000$

NEW SYSTEM

$J + R = 25000$

$R = 15000$

So $J + 15000 = 25000$

$J = 10000$

$-2R = -30000$

$R = 15000$

$\{(10000, 15000)\}$

121 \$5.1 #5 63, 74

(63) 2 adults & 5 kids cost \$33

1 " " 3 " " " \$18.50

How much do tickets cost (Adults & children charged differently)

Let A = cost of adult ticket (\$)

C = " " child " (\$)

Then $2A + 5C = 33$

$$1A + 3C = 18.5 \Rightarrow A = 18.5 - 3C$$

$$2(18.5 - 3C) + 5C = 33$$

$$37 - 6C + 5C = 33$$

$$-C = -4$$

$$C = \$4$$

$$\Rightarrow A = 18.5 - 3(4)$$

$$= 18.5 - 12$$

$$= \$6.5 = A$$

(74) We need 23 g protein, 215 g carbs.

	Rice Krispies	Grapenuts
PROTEIN	2g	3g
CARB	25g	23g

Let G = the # of grapenuts servings

K = " " " Rice Krispies servings

Then $3G + 2K = 23 \Rightarrow 2K = 23 - 3G \Rightarrow K = \frac{23 - 3G}{2}$

$$23G + 25K = 215$$

$$\text{So, } 23G + 25\left(\frac{23 - 3G}{2}\right) = 215$$

$$46G + 25(23 - 3G) = 430$$

$$46G + 575 - 75G = 430$$

$$-29G + 575 = 430$$

$$-29G = -145$$

$$G = 5 \text{ servings}$$

$$K = \frac{23 - 3(5)}{2}$$

$$= \frac{23 - 15}{2}$$

$$K = \frac{8}{2} = 4 \text{ servings}$$