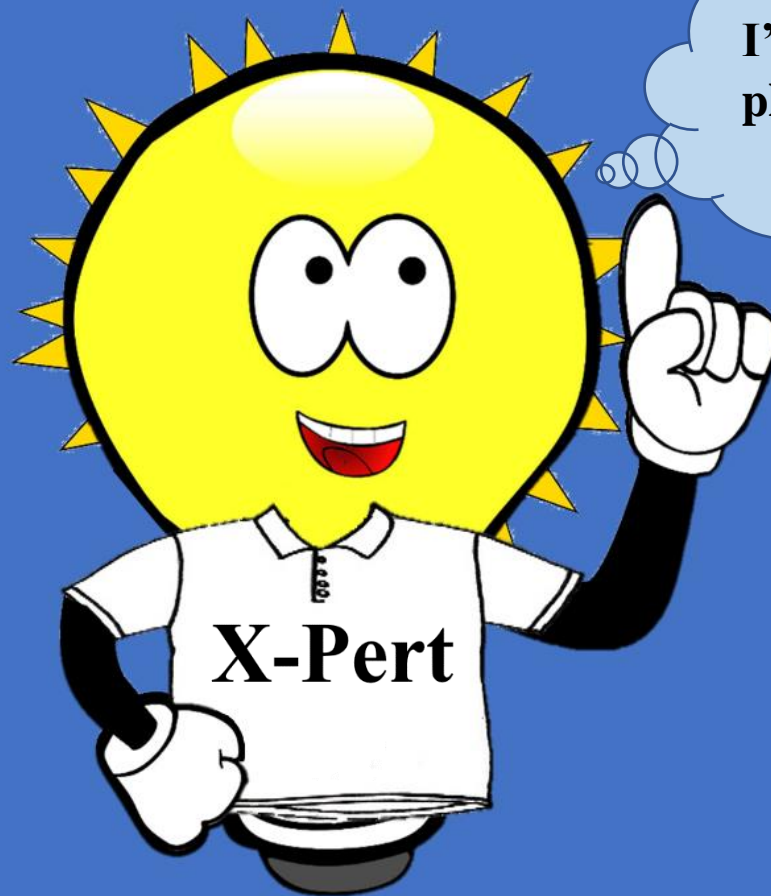


READY-X

Algebraic Reasoning Game



I'm **READY** to play. Are you?

Carole Greenes
Tanner Wolfram

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PRIME Group**

Alge-Grid: What's the a?

Factor Max

Make It Proper

Pattern Grid-unLocks

Play It Positively or Negatively!

Shape-Up

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Author Bios



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Association of Teachers of Mathematics journal, *OnCore*, and author of the online monthly free *MATHgazine Senior* (grades 8-12), *MATHgazine Junior* (grades 5-8), *MATHgazine Elementary* (grades 3-5) and *MATHgazine Primary* (grades K-2). In 2003, Greenes was inducted into the Massachusetts Mathematics Educators’ Hall of Fame. In 2011, she received the NCSM Ross Taylor/Glenn Gilbert National Leadership Award in Mathematics Education. In 2016, she received the Copper Apple Award for Leadership in Mathematics in Arizona, and in 2018 she received the National Council of Teachers of Mathematics Lifetime Achievement Award. Her 2021 and 2022 books/games include: *Alge-Grid: What’s the a?*, *Pattern Grid-unLocks*, *Play It Positively or Negatively?! Factor Max!*, *Make It Proper!*, and *Shape-Up*. She is author of *Carole’s Corner* and *Carole’s Commentary* for the Center for Mathematics and Teaching.



Tanner Wolfram is a graduate, Summa cum Laude, of Barrett, The Honors College at Arizona State University with a major in Physics and minors in both Spanish and Chinese. Tanner is co-author of *Make It Proper*, *Solve It Positively and Negatively!*, *Pattern Grid-unLocks*, *Factor Max*, *Alge-Grid: What’s the a?*, *Make It Proper*, and *Shape-Up* puzzle books distributed by the Center for Mathematics and Teaching, and senior author of the *Facasumi Puzzle Book* for the Arizona Association of Teachers of Mathematics. From Spring 2016 to Fall 2020, Tanner served as Senior Project Assistant in the Practice, Research, and Innovation in Mathematics Education (PRIME) Center at ASU, and is now co-Director of the PRIME Group. During his time with the PRIME Center, Tanner assisted with the NSF-funded App Maker Pro (AMP) project, contributed to and edited eight

MATHadazzle Puzzle Books, co-authored six articles, and co-edited free monthly online *MATHgazines* (*Senior*, *Junior*, *Elementary*, and *Primary*).

READY-X

Reasoning Algebraically and Logically

What is READY-X?

READY-X is an algebraic reasoning game that requires solution of equations and systems of equations.

Gameboard: The board is a 3-by-4 grid with 3 rows, 4 columns, and 12 spaces.

Each space contains one of the letters: R, E, A, D, Y, or X, with some letters repeated in the grid. Within each grid, same letters represent same numbers. Letter values differ with different grids.

Letter values may be 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

At the end of each row and at the bottom of each column is the sum of the numbers in that row or column. Therefore, all rows and columns are addition equations.

That is a total of 7 equations: 4 equations with three variables and 3 equations with four variables.

To complete the grid and determine the value of each letter, R, E, A, D, Y, and X, equations and systems of equations must be solved.

Example:

One Row of a Grid shows: $Y + Y + 2 = 12$.

Then $2Y + 2 = 12$. Then $2Y = 10$, and $Y = 5$

One Column of the same Grid shows: $R + R + Y + R = 29$.

Replace Y with 5. Then $3R + 5 = 29$. Then $3R = 24$, and $R = 8$.

The 40 problems are arranged by difficulty

Section 1: 10 Warm Up

Section 2: 20 Exercise Your Skills

Section 3: 10 Demonstrate Your X-pertise

Possible Solutions are presented at the end of the book.

Note that solutions are labeled “Possible” because, for most problems, there is more than one solution method. You may want to compare solution methods with others.

Ready to become a READY-Xpert? Give it a try!

Section 1:

Warm Up



READY-X 1

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	X	E	17	
	2	D	X	D	13	
	3	Y	X	A	17	
	4	D	X	E	14	
		22	12	27		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 2

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	Y	Y	R	12	
	2	X	X	R	28	
	3	D	D	D	12	
	4	A	E	R	20	
		23	21	28		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 3

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	X	D	17	
	2	A	Y	D	16	
	3	Y	X	D	14	
	4	E	R	D	17	
		14	14	36		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 4

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	Y	R	13	
	2	E	Y	E	19	
	3	A	Y	A	29	
	4	D	Y	X	17	
		18	36	24		

R = ___ **E** = ___ **A** = ___ **D** = ___ **Y** = ___ **X** = ___

READY-X 5

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	Y	X	21	
	2	A	D	X	20	
	3	A	E	R	22	
	4	A	A	R	21	
		32	22	30		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 6

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	D	E	15	
	2	A	A	A	3	
	3	Y	D	Y	18	
	4	X	D	A	15	
		27	13	11		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 7

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	R	D	E	22
	2	R	X	A	15
	3	R	E	Y	15
	4	R	Y	Y	11
		20	29	14	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 8

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	E	A	25	
	2	R	E	R	17	
	3	D	E	D	19	
	4	Y	E	X	20	
		23	28	30		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 9

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	X	R	D	24
	2	Y	R	E	13
	3	X	X	X	21
	4	A	X	R	21
		22	30	27	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 10

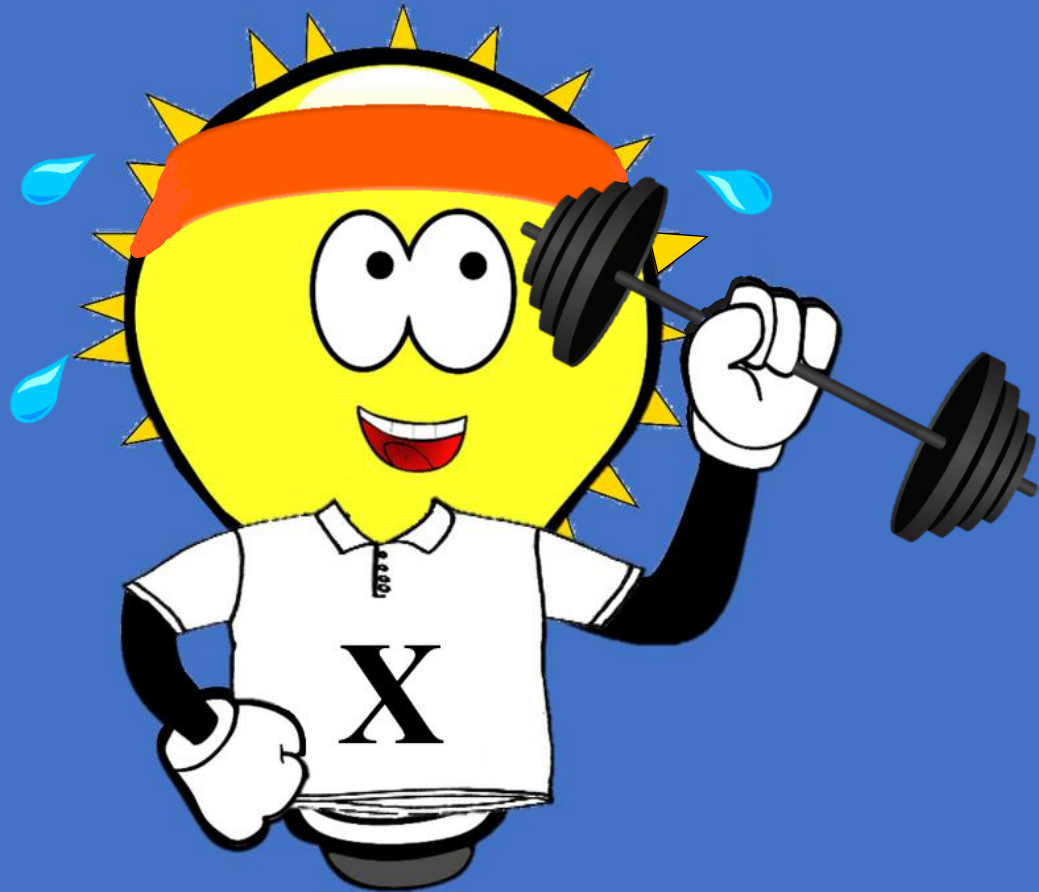
Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	Y	A	X	9	
	2	D	R	X	14	
	3	E	A	X	15	
	4	R	R	R	21	
		24	22	13		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

Section 2:

Exercise Your Skills



READY-X 11

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	E	E	E	30	
	2	D	X	E	20	
	3	D	R	A	11	
	4	X	R	Y	18	
		23	21	35		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 12

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	E	Y	12	
	2	Y	A	A	11	
	3	A	D	A	9	
	4	E	R	X	18	
		16	17	17		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 13

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	A	R	14	
	2	A	E	R	21	
	3	Y	X	A	10	
	4	R	D	R	15	
		16	19	25		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 14

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	E	R	14	
	2	X	A	D	6	
	3	R	R	A	11	
	4	R	X	Y	15	
		10	17	19		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 15

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	X	A	R	16
	2	A	R	R	18
	3	Y	D	X	16
	4	E	A	X	18
		27	25	16	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 16

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	X	R	23	
	2	D	Y	Y	9	
	3	R	X	D	21	
	4	D	E	A	14	
		24	23	20		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 17

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	E	A	18	
	2	Y	D	Y	17	
	3	D	A	D	16	
	4	R	R	X	20	
		24	25	22		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 18

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	D	A	E	19	
	2	X	A	A	24	
	3	A	X	E	20	
	4	R	X	Y	16	
		27	34	18		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 19

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	Y	E	R	12	
	2	D	E	A	20	
	3	D	Y	X	15	
	4	Y	D	D	21	
		22	15	31		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 20

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	E	Y	X	8	
	2	D	E	D	16	
	3	Y	E	A	7	
	4	R	Y	D	15	
		19	10	17		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 21

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	Y	X	R	14	
	2	R	E	R	19	
	3	R	A	X	11	
	4	Y	D	X	12	
		26	12	18		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 22

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	E	A	A	20	
	2	R	E	X	10	
	3	D	E	X	13	
	4	Y	A	Y	11	
		16	22	16		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 23

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	A	D	22	
	2	D	A	D	18	
	3	R	Y	E	18	
	4	D	Y	A	20	
		25	32	21		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 24

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	D	R	11	
	2	R	D	D	9	
	3	X	E	Y	17	
	4	R	E	A	19	
		20	18	18		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 25

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	A	D	D	27
	2	X	X	D	28
	3	D	Y	E	22
	4	X	R	R	21
		35	33	30	

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 26

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	Y	A	29	
	2	R	X	R	17	
	3	D	Y	E	13	
	4	Y	X	R	21	
		25	32	23		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 27

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	E	A	R	9	
	2	R	X	D	22	
	3	E	D	Y	14	
	4	R	Y	E	12	
		16	22	19		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 28

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	D	X	21	
	2	E	A	Y	19	
	3	E	E	X	19	
	4	Y	R	Y	7	
		25	21	20		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 29

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	R	E	E	26	
	2	D	E	R	21	
	3	D	Y	A	15	
	4	R	X	X	14	
		22	33	21		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 30

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	E	X	E	20	
	2	R	A	A	7	
	3	E	R	D	11	
	4	R	Y	R	11	
		20	16	13		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

Section 3: Demonstrate Your X-pertise



I'M BRILIANT!!!

READY-X 31

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	A	Y	E	21	
	2	E	E	R	18	
	3	D	A	X	23	
	4	R	X	A	19	
		28	27	26		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 32

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	A	X	R	17
	2	A	E	X	11
	3	R	X	D	18
	4	D	Y	Y	23
		28	15	26	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 33

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	A	Y	15	
	2	R	Y	A	14	
	3	A	D	D	19	
	4	Y	E	X	9	
		16	21	20		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 34

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	R	A	D	11
	2	X	Y	R	11
	3	D	E	R	9
	4	E	D	E	10
		16	15	10	

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

READY-X 35

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	R	Y	R	18
	2	E	Y	E	24
	3	X	Y	X	22
	4	D	D	A	14
		20	33	25	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 36

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	D	R	E	20	
	2	E	Y	E	21	
	3	R	A	X	13	
	4	A	X	Y	12	
		21	16	29		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 37

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	R	D	A	21
	2	D	E	X	19
	3	X	R	D	15
	4	Y	A	E	23
		20	31	27	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 38

Solve for the values of R, E, A, D, Y, X.

		Columns			
		1	2	3	
Rows	1	A	A	D	10
	2	A	X	X	10
	3	X	R	A	9
	4	Y	E	X	22
		16	19	16	

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 39

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	D	R	A	22	
	2	D	Y	Y	11	
	3	R	X	Y	20	
	4	A	E	X	23	
		25	28	23		

R = ___ E = ___ A = ___ D = ___ Y = ___ X = ___

READY-X 40

Solve for the values of R, E, A, D, Y, X.

		Columns				
		1	2	3		
Rows	1	X	X	A	14	
	2	R	R	D	11	
	3	E	E	Y	20	
	4	Y	E	A	17	
		19	20	23		

R = ___ **E =** ___ **A =** ___ **D =** ___ **Y =** ___ **X =** ___

Solutions

Section 1: Warm Up



READY-X 1

$$R = 8 \quad E = 6 \quad A = 10 \quad D = 5 \quad Y = 4 \quad X = 3$$

Possible Solution

Column 2: $X + X + X + X = 12$. Then $4X = 12$, and $X = 3$.

Row 2: $D + X + D = 13$. Replace X with 3. Then $D + 3 + D = 13$.

Then $2D + 3 = 13$. Then $2D = 10$, and $D = 5$.

Row 4: $D + X + E = 14$. Replace D with 5 and X with 3.

Then $5 + 3 + E = 14$, and $E = 6$.

Column 3: $E + D + A + E = 27$. Replace each E with 6 and D with 5.

Then $6 + 5 + A + 6 = 27$, and $A = 10$.

Row 3: $Y + X + A = 17$. Replace X with 3 and A with 10.

Then $Y + 3 + 10 = 17$, and $Y = 4$.

Row 1: $R + X + E = 17$. Replace X with 3 and E with 6.

Then $R + 3 + 6 = 17$, and $R = 8$.

READY-X 2

$$\mathbf{R = 8 \quad E = 5 \quad A = 7 \quad D = 4 \quad Y = 2 \quad X = 10}$$

Possible Solution

Row 3: $D + D + D = 12$. Then $3D = 12$, and $D = 4$.

Column 3: $R + R + D + R = 28$. Replace D with 4. Then $R + R + 4 + R = 28$.

Then $3R + 4 = 28$. Then $3R = 24$, and $R = 8$.

Row 1: $Y + Y + R = 12$. Replace R with 8. Then $Y + Y + 8 = 12$.

Then $2Y + 8 = 12$. Then $2Y = 4$, and $Y = 2$.

Row 2: $X + X + R = 28$. Replace R with 8. Then $X + X + 8 = 28$.

Then $2X + 8 = 28$. Then $2X = 20$, and $X = 10$.

Column 1: $Y + X + D + A = 23$. Replace Y with 2, X with 10, and D with 4.

Then $2 + 10 + 4 + A = 23$, and $A = 7$.

Row 4: $A + E + R = 20$. Replace A with 7 and R with 8. Then $7 + E + 8 = 20$, and $E = 5$.

READY-X 3

$$\mathbf{R = 5 \quad E = 3 \quad A = 6 \quad D = 9 \quad Y = 1 \quad X = 4}$$

Possible Solution

Column 3: $D + D + D + D = 36$. Then $4D = 36$, and $D = 9$.

Row 1: $X + X + D = 17$. Replace D with 9 . Then $X + X + 9 = 17$. Then $2X + 9 = 17$.

Then $2X = 8$, and $X = 4$.

Row 3: $Y + X + D = 14$. Replace X with 4 and D with 9 . Then $Y + 4 + 9 = 14$, and $Y = 1$.

Row 2: $A + Y + D = 16$. Replace Y with 1 and D with 9 . Then $A + 1 + 9 = 16$, and $A = 6$.

Column 2: $X + Y + X + R = 14$. Replace each X with 4 and Y with 1 .

Then $4 + 1 + 4 + R = 14$, and $R = 5$.

Row 4: $E + R + D = 17$. Replace R with 5 and D with 9 . Then $E + 5 + 9 = 17$, and $E = 3$.

READY-X 4

$$\mathbf{R = 2 \quad E = 5 \quad A = 10 \quad D = 1 \quad Y = 9 \quad X = 7}$$

Possible Solution

Column 2: $Y + Y + Y + Y = 36$. Then $4Y = 36$, and $Y = 9$.

Row 1: $R + Y + R = 13$. Replace Y with 9 . Then $R + 9 + R = 13$. Then $2R + 9 = 13$.
Then $2R = 4$, and $R = 2$.

Row 2: $E + Y + E = 19$. Replace Y with 9 . Then $E + 9 + E = 19$. Then $2E + 9 = 19$.
Then $2E = 10$, and $E = 5$.

Row 3: $A + Y + A = 29$. Replace the Y with 9 . Then $A + 9 + A = 29$. Then $2A + 9 = 29$.
Then $2A = 20$, and $A = 10$.

Column 1: $R + E + A + D = 18$. Replace R with 2 , E with 5 , and A with 10 .
Then $2 + 5 + 10 + D = 18$. Then $D = 1$.

Row 4: $D + Y + X = 17$. Replace D with 1 and Y with 9 .
Then $1 + 9 + X = 17$, and $X = 7$.

READY-X 5

$$\mathbf{R = 5 \quad E = 9 \quad A = 8 \quad D = 2 \quad Y = 3 \quad X = 10}$$

Possible Solution

Column 1: $A + A + A + A = 32$. Then $4A = 32$, and $A = 8$.

Row 4: $A + A + R = 21$. Replace each A with 8. Then $8 + 8 + R = 21$, and $R = 5$.

Row 3: $A + E + R = 22$. Replace A with 8 and R with 5. Then $8 + E + 5 = 22$, and $E = 9$.

Column 3: $X + X + R + R = 30$. Replace each R with 5. Then $X + X + 5 + 5 = 30$.

Then $2X + 10 = 30$. Then $2X = 20$, and $X = 10$.

Row 1: $A + Y + X = 21$. Replace A with 8 and X with 10.

Then $8 + Y + 10 = 21$, and $Y = 3$.

Row 2: $A + D + X = 20$. Replace A with 8 and X with 10.

Then $8 + D + 10 = 20$, and $D = 2$.

READY-X 6

$$\mathbf{R = 9 \quad E = 2 \quad A = 1 \quad D = 4 \quad Y = 7 \quad X = 10}$$

Possible Solution

Row 2: $A + A + A = 3$. Then $3A = 3$, and $A = 1$.

Column 2: $D + A + D + D = 13$. Replace A with 1. Then $3D + 1 = 13$.

Then $3D = 12$, and $D = 4$.

Row 4: $X + D + A = 15$. Replace D with 4 and A with 1. Then $X + 4 + 1 = 15$, and $X = 10$.

Row 3: $Y + D + Y = 18$. Replace D with 4. Then $2Y + 4 = 18$. Then $2Y = 14$, and $Y = 7$.

Column 3: $E + A + Y + A = 11$. Replace each A with 1 and Y with 7.

Then $E + 1 + 7 + 1 = 11$, and $E = 2$.

Row 1: $R + D + E = 15$. Replace D with 4 and E with 2.

Then $R + 4 + 2 = 15$, and $R = 9$.

READY-X 7

$$\mathbf{R = 5 \quad E = 7 \quad A = 1 \quad D = 10 \quad Y = 3 \quad X = 9}$$

Possible Solution

Column 1: $R + R + R + R = 20$. Then $4R = 20$, and $R = 5$.

Row 4: $R + Y + Y = 11$. Replace R with 5. Then $5 + Y + Y = 11$.

Then $5 + 2Y = 11$. Then $2Y = 6$, and $Y = 3$.

Row 3: $R + E + Y = 15$. Replace R with 5 and Y with 3. Then $5 + E + 3 = 15$, and $E = 7$.

Row 1: $R + D + E = 22$. Replace R with 5 and E with 7. Then $5 + D + 7 = 22$, and $D = 10$.

Column 2: $D + X + E + Y = 29$. Replace D with 10, E with 7, and Y with 3.

Then $10 + X + 7 + 3 = 29$, and $X = 9$.

Row 2: $R + X + A = 15$. Replace R with 5 and X with 9. Then $5 + 9 + A = 15$, and $A = 1$.

READY-X 8

$$\mathbf{R = 5 \quad E = 7 \quad A = 9 \quad D = 6 \quad Y = 3 \quad X = 10}$$

Possible Solution

Column 2: $E + E + E + E = 28$. Then $4E = 28$, and $E = 7$.

Row 1: $A + E + A = 25$. Replace E with 7. Then $A + 7 + A = 25$.

Then $2A + 7 = 25$. Then $2A = 18$, and $A = 9$.

Row 2: $R + E + R = 17$. Replace E with 7. Then $R + 7 + R = 17$. Then $2R + 7 = 17$.

Then $2R = 10$, and $R = 5$.

Row 3: $D + E + D = 19$. Replace E with 7. Then $D + 7 + D = 19$. Then $2D + 7 = 19$.

Then $2D = 12$, and $D = 6$.

Column 3: $A + R + D + X = 30$. Replace A with 9, R with 5, and D with 6.

Then $9 + 5 + 6 + X = 30$, and $X = 10$.

Row 4: $Y + E + X = 20$. Replace E with 7 and X with 10.

Then $Y + 7 + 10 = 20$, and $Y = 3$.

READY-X 9

$$\mathbf{R = 8 \quad E = 3 \quad A = 6 \quad D = 9 \quad Y = 2 \quad X = 7}$$

Possible Solution

Row 3: $X + X + X = 21$. Then $3X = 21$, and $X = 7$.

Column 2: $R + R + X + X = 30$. Replace each X with 7. Then $R + R + 7 + 7 = 30$.

Then $2R + 14 = 30$. Then $2R = 16$, and $R = 8$.

Row 1: $X + R + D = 24$. Replace X with 7 and R with 8. Then $7 + 8 + D = 24$, and $D = 9$.

Row 4: $A + X + R = 21$. Replace X with 7 and R with 8. Then $A + 7 + 8 = 21$, and $A = 6$.

Column 3: $D + E + X + R = 27$. Replace D with 9, X with 7, and R with 8.

Then $9 + E + 7 + 8 = 27$, and $E = 3$.

Row 2: $Y + R + E = 13$. Replace R with 8 and E with 3.

Then $Y + 8 + 3 = 13$, and $Y = 2$.

READY-X 10

$$\mathbf{R = 7 \quad E = 9 \quad A = 4 \quad D = 5 \quad Y = 3 \quad X = 2}$$

Possible Solution

Row 4: $\mathbf{R + R + R = 21}$. Then $\mathbf{3R = 21}$, and $\mathbf{R = 7}$.

Column 3: $\mathbf{X + X + X + R = 13}$. Replace \mathbf{R} with $\mathbf{7}$. Then $\mathbf{X + X + X + 7 = 13}$.

Then $\mathbf{3X + 7 = 13}$. Then $\mathbf{3X = 6}$, and $\mathbf{X = 2}$.

Column 2: $\mathbf{A + R + A + R = 22}$. Replace each \mathbf{R} with $\mathbf{7}$. Then $\mathbf{A + 7 + A + 7 = 22}$.

Then $\mathbf{2A + 14 = 22}$. Then $\mathbf{2A = 8}$, and $\mathbf{A = 4}$.

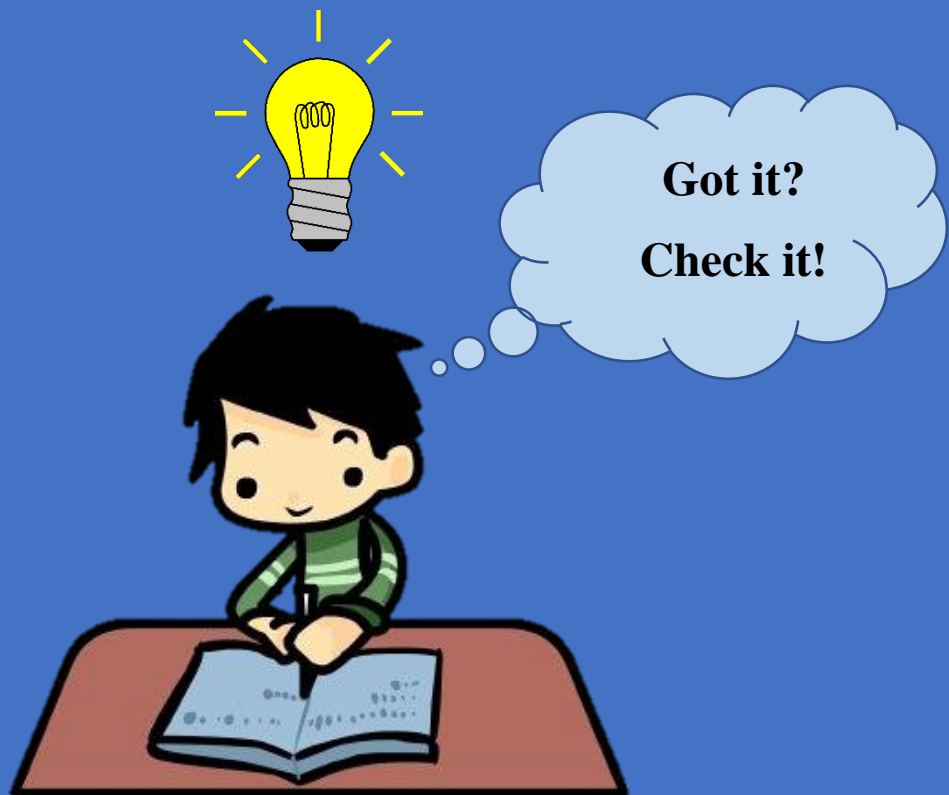
Row 1: $\mathbf{Y + A + X = 9}$. Replace \mathbf{A} with $\mathbf{4}$ and \mathbf{X} with $\mathbf{2}$. Then $\mathbf{Y + 4 + 2 = 9}$, and $\mathbf{Y = 3}$.

Row 2: $\mathbf{D + R + X = 14}$. Replace \mathbf{R} with $\mathbf{7}$ and \mathbf{X} with $\mathbf{2}$. Then $\mathbf{D + 7 + 2 = 14}$, and $\mathbf{D = 5}$.

Row 3: $\mathbf{E + A + X = 15}$. Replace \mathbf{A} with $\mathbf{4}$ and \mathbf{X} with $\mathbf{2}$. Then $\mathbf{E + 4 + 2 = 15}$, and $\mathbf{E = 9}$.

Solutions

Section 2: Exercise Your Skills



READY-X 11

$$\mathbf{R = 2 \quad E = 10 \quad A = 6 \quad D = 3 \quad Y = 9 \quad X = 7}$$

Possible Solution

Row 1: $E + E + E = 30$. Then $3E = 30$, and $E = 10$.

All of Row 2 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{D + D + X + E = 23} \\ - \quad \mathbf{\underline{D + X + E = 20}} \\ \mathbf{D = 3} \end{array}$$

Row 2: $D + X + E = 20$. Replace D with 3 and E with 10. Then $3 + X + 10 = 20$, and $X = 7$.

Column 2: $E + X + R + R = 21$. Replace E with 10 and X with 7.

Then $10 + 7 + R + R = 21$. Then $2R + 17 = 21$. Then $2R = 4$, and $R = 2$.

Row 3: $D + R + A = 11$. Replace D with 3 and R with 2. Then $3 + 2 + A = 11$, and $A = 6$.

Row 4: $X + R + Y = 18$. Replace X with 7 and R with 2. Then $7 + 2 + Y = 18$, and $Y = 9$.

READY-X 12

$$\mathbf{R = 7 \quad E = 5 \quad A = 4 \quad D = 1 \quad Y = 3 \quad X = 6}$$

Possible Solution

All of Row 1 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} A + A + E + Y = 16 \\ - \quad \underline{A + E + Y = 12} \\ \hline A = 4 \end{array}$$

Row 2: $Y + A + A = 11$. Replace each A with 4. Then $Y + 4 + 4 = 11$, and $Y = 3$.

Row 1: $A + E + Y = 12$. Replace A with 4 and Y with 3. Then $4 + E + 3 = 12$, and $E = 5$.

Row 3: $A + D + A = 9$. Replace each A with 4. Then $4 + D + 4 = 9$, and $D = 1$.

Column 3: $Y + A + A + X = 17$. Replace Y with 3 and each A with 4.

$$\text{Then } 3 + 4 + 4 + X = 17, \text{ and } X = 6.$$

Row 4: $E + R + X = 18$. Replace E with 5 and X with 6. Then $5 + R + 6 = 18$, and $R = 7$.

READY-X 13

$$\mathbf{R = 6 \quad E = 8 \quad A = 7 \quad D = 3 \quad Y = 2 \quad X = 1}$$

Possible Solution

All of Row 3 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{R + Y + X + A = 16} \\ - \quad \mathbf{\underline{Y + X + A = 10}} \\ \mathbf{R = 6} \end{array}$$

Row 4: $\mathbf{R + D + R = 15}$. Replace each R with 6. Then $\mathbf{6 + D + 6 = 15}$, and $\mathbf{D = 3}$.

Column 3: $\mathbf{R + R + A + R = 25}$. Replace each R with 6. Then $\mathbf{6 + 6 + A + 6 = 25}$, and $\mathbf{A = 7}$.

Row 2: $\mathbf{A + E + R = 21}$. Replace A with 7 and R with 6. Then $\mathbf{7 + E + 6 = 21}$, and $\mathbf{E = 8}$.

Row 1: $\mathbf{X + A + R = 14}$. Replace A with 7 and R with 6. Then $\mathbf{X + 7 + 6 = 14}$, and $\mathbf{X = 1}$.

Row 3: $\mathbf{Y + X + A = 10}$. Replace X with 1 and A with 7. Then $\mathbf{Y + 1 + 7 = 10}$, and $\mathbf{Y = 2}$.

READY-X 14

$$\mathbf{R = 4 \quad E = 9 \quad A = 3 \quad D = 2 \quad Y = 10 \quad X = 1}$$

Possible Solution

All of Row 1 is in Column 2. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{A + X + E + R = 17} \\ - \quad \mathbf{\underline{X + E + R = 14}} \\ \mathbf{A = 3} \end{array}$$

Row 3: $\mathbf{R + R + A = 11}$. Replace A with 3. Then $\mathbf{2R + 3 = 11}$. Then $\mathbf{2R = 8}$, and $\mathbf{R = 4}$.

Column 1: $\mathbf{X + X + R + R = 10}$. Replace each R with 4. Then $\mathbf{X + X + 4 + 4 = 10}$.

Then $\mathbf{2X + 8 = 10}$. Then $\mathbf{2X = 2}$, and $\mathbf{X = 1}$.

Row 1: $\mathbf{X + E + R = 14}$. Replace X with 1 and R with 4. Then $\mathbf{1 + E + 4 = 14}$, and $\mathbf{E = 9}$.

Row 2: $\mathbf{X + A + D = 6}$. Replace X with 1 and A with 3. Then $\mathbf{1 + 3 + D = 6}$, and $\mathbf{D = 2}$.

Row 4: $\mathbf{R + X + Y = 15}$. Replace R with 4 and X with 1. Then $\mathbf{4 + 1 + Y = 15}$, and $\mathbf{Y = 10}$.

READY-X 15

$$\mathbf{R = 5 \quad E = 7 \quad A = 8 \quad D = 4 \quad Y = 9 \quad X = 3}$$

Possible Solution

Column 3: $R + R + X + X = 16$. Then $2R + 2X = 16$, and $R + X = 8$.

Row 1: $X + A + R = 16$. Replace $(R + X)$ with 8. Then $8 + A = 16$, and $A = 8$.

Row 2: $A + R + R = 18$. Replace A with 8. Then $8 + R + R = 18$. Then $2R + 8 = 18$.

Then $2R = 10$, and $R = 5$.

Row 1: $X + A + R = 16$. Replace A with 8 and R with 5. Then $X + 8 + 5 = 16$, and $X = 3$.

Row 4: $E + A + X = 18$. Replace A with 8 and X with 3. Then $E + 8 + 3 = 18$, and $E = 7$.

Column 2: $A + R + D + A = 25$. Replace each A with 8 and R with 5.

Then $8 + 5 + D + 8 = 25$, and $D = 4$.

Row 3: $Y + D + X = 16$. Replace D with 4 and X with 3. Then $Y + 4 + 3 = 16$, and $Y = 9$.

READY-X 16

$$\mathbf{R = 7 \quad E = 3 \quad A = 6 \quad D = 5 \quad Y = 2 \quad X = 9}$$

Possible Solution

Column 1: $R + D + R + D = 24$. Then $2R + 2D = 24$. Then $R + D = 12$.

Row 3: $R + X + D = 21$. Replace $(R + D)$ with 12. Then $12 + X = 21$, and $X = 9$.

Row 1: $R + X + R = 23$. Replace X with 9. Then $2R + 9 = 23$. Then $2R = 14$, and $R = 7$.

From Column 1: $R + D = 12$. Replace R with 7. Then $7 + D = 12$, and $D = 5$.

Row 2: $D + Y + Y = 9$. Replace D with 5. Then $5 + 2Y = 9$. Then $2Y = 4$, and $Y = 2$.

Column 2: $X + Y + X + E = 23$. Replace each X with 9 and Y with 2.

Then $9 + 2 + 9 + E = 23$, and $E = 3$.

Row 4: $D + E + A = 14$. Replace D with 5 and E with 3. Then $5 + 3 + A = 14$, and $A = 6$.

READY-X 17

$$\mathbf{R = 6 \quad E = 10 \quad A = 2 \quad D = 7 \quad Y = 5 \quad X = 8}$$

Possible Solution

All of Row 1 is in Column 2. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{D + R + E + A = 25} \\ - \quad \mathbf{\underline{R + E + A = 18}} \\ \mathbf{D = 7} \end{array}$$

Row 3: $\mathbf{D + A + D = 16}$. Replace each \mathbf{D} with $\mathbf{7}$. Then $\mathbf{7 + A + 7 = 16}$, and $\mathbf{A = 2}$.

Row 2: $\mathbf{Y + D + Y = 17}$. Replace \mathbf{D} with $\mathbf{7}$. Then $\mathbf{Y + 7 + Y = 17}$. Then $\mathbf{2Y + 7 = 17}$.

Then $\mathbf{2Y = 10}$, and $\mathbf{Y = 5}$.

Column 1: $\mathbf{R + Y + D + R = 24}$. Replace \mathbf{Y} with $\mathbf{5}$ and \mathbf{D} with $\mathbf{7}$. Then $\mathbf{R + 5 + 7 + R = 24}$.

Then $\mathbf{2R + 12 = 24}$. Then $\mathbf{2R = 12}$, and $\mathbf{R = 6}$.

Row 4: $\mathbf{R + R + X = 20}$. Replace each \mathbf{R} with $\mathbf{6}$. Then $\mathbf{6 + 6 + X = 20}$, and $\mathbf{X = 8}$.

Row 1: $\mathbf{R + E + A = 18}$. Replace \mathbf{R} with $\mathbf{6}$ and \mathbf{A} with $\mathbf{2}$. Then $\mathbf{6 + E + 2 = 18}$, and $\mathbf{E = 10}$.

READY-X 18

$$\mathbf{R = 1 \quad E = 3 \quad A = 7 \quad D = 9 \quad Y = 5 \quad X = 10}$$

Possible Solution

Column 2: $A + A + X + X = 34$. Then $2A + 2X = 34$. Then $A + X = 17$.

Row 2: $X + A + A = 24$. Replace $(A + X)$ with 17. Then $A + 17 = 24$, and $A = 7$.

From Column 2: $A + X = 17$. Replace A with 7. Then $7 + X = 17$, and $X = 10$.

Row 3: $A + X + E = 20$. Replace A with 7 and X with 10. Then $7 + 10 + E = 20$, and $E = 3$.

Row 1: $D + A + E = 19$. Replace A with 7 and E with 3. Then $D + 7 + 3 = 19$, and $D = 9$.

Column 1: $D + X + A + R = 27$. Replace D with 9, X with 10, and A with 7.

Then $9 + 10 + 7 + R = 27$, and $R = 1$.

Row 4: $R + X + Y = 16$. Replace R with 1 and X with 10. Then $1 + 10 + Y = 16$, and $Y = 5$.

READY-X 19

$$\mathbf{R = 9 \quad E = 2 \quad A = 8 \quad D = 10 \quad Y = 1 \quad X = 4}$$

Possible Solution

All of Row 4 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} Y + Y + D + D = 22 \\ - \quad \underline{Y + D + D = 21} \\ \hline Y = 1 \end{array}$$

Row 4: $Y + D + D = 21$. Replace Y with 1. Then $1 + 2D = 21$.

Then $2D = 20$, and $D = 10$.

Row 3: $D + Y + X = 15$. Replace D with 10 and Y with 1. Then $10 + 1 + X = 15$, and $X = 4$.

Column 2: $E + E + Y + D = 15$. Replace Y with 1 and D with 10. Then $E + E + 1 + 10 = 15$.

Then $2E + 11 = 15$. Then $2E = 4$, and $E = 2$.

Row 2: $D + E + A = 20$. Replace D with 10 and E with 2. Then $10 + 2 + A = 20$, and $A = 8$.

Row 1: $Y + E + R = 12$. Replace Y with 1 and E with 2 and. Then $1 + 2 + R = 12$, and $R = 9$.

READY-X 20

$$\mathbf{R = 8 \quad E = 4 \quad A = 2 \quad D = 6 \quad Y = 1 \quad X = 3}$$

Possible Solution

All of Row 4 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{E + D + Y + R = 19} \\ - \quad \mathbf{D + Y + R = 15} \\ \hline \mathbf{E = 4} \end{array}$$

Row 2: $D + E + D = 16$. Replace the E with 4. Then $2D + 4 = 16$. Then $2D = 12$, and $D = 6$.

Column 2: $Y + E + E + Y = 10$. Replace each E with 4.

$$\text{Then } \mathbf{2Y + 8 = 10}$$
. Then $\mathbf{2Y = 2}$, and $\mathbf{Y = 1}$.

Row 1: $E + Y + X = 8$. Replace E with 4 and Y with 1. Then $4 + 1 + X = 8$, and $X = 3$.

Row 3: $Y + E + A = 7$. Replace Y with 1 and E with 4. Then $1 + 4 + A = 7$, and $A = 2$.

Row 4: $R + Y + D = 15$. Replace Y with 1 and D with 6.

$$\text{Then } \mathbf{R + 1 + 6 = 15}$$
, and $\mathbf{R = 8}$.

READY-X 21

$$\mathbf{R = 8 \quad E = 3 \quad A = 2 \quad D = 6 \quad Y = 5 \quad X = 1}$$

Possible Solution

Column 1: $Y + R + R + Y = 26$. Then $2Y + 2R = 26$, and $Y + R = 13$

Row 1: $Y + X + R = 14$. Replace $(Y + R)$ with 13. Then $13 + X = 14$, and $X = 1$.

Column 3: $R + R + X + X = 18$. Replace each X with 1. Then $R + R + 1 + 1 = 18$.

Then $2R + 2 = 18$. Then $2R = 16$, and $R = 8$.

From Column 1: $Y + R = 13$. Replace R with 8. Then $Y + 8 = 13$, and $Y = 5$.

Row 3: $R + A + X = 11$. Replace R with 8 and X with 1. Then $8 + A + 1 = 11$, and $A = 2$.

Row 2: $R + E + R = 19$. Replace each R with 8. Then $8 + E + 8 = 19$, and $E = 3$.

Row 4: $Y + D + X = 12$. Replace Y with 5 and X with 1. Then $5 + D + 1 = 12$, and $D = 6$.

READY-X 22

$$\mathbf{R = 5 \quad E = 2 \quad A = 9 \quad D = 8 \quad Y = 1 \quad X = 3}$$

Possible Solution

All of Row 1 is in Column 2. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{E + E + A + A = 22} \\ - \quad \mathbf{E + A + A = 20} \\ \hline \mathbf{E = 2} \end{array}$$

Row 1: $\mathbf{E + A + A = 20}$. Replace E with 2. Then $\mathbf{2 + A + A = 20}$. Then $\mathbf{2 + 2A = 20}$.

Then $\mathbf{2A = 18}$, and $\mathbf{A = 9}$.

Row 4: $\mathbf{Y + A + Y = 11}$. Replace A with 9. Then $\mathbf{Y + 9 + Y = 11}$. Then $\mathbf{2Y + 9 = 11}$.

Then $\mathbf{2Y = 2}$, and $\mathbf{Y = 1}$.

Column 3: $\mathbf{A + X + X + Y = 16}$. Replace A with 9 and Y with 1. Then $\mathbf{9 + X + X + 1 = 16}$.

Then $\mathbf{2X + 10 = 16}$. Then $\mathbf{2X = 6}$, and $\mathbf{X = 3}$.

Row 2: $\mathbf{R + E + X = 10}$. Replace E with 2 and X with 3. Then $\mathbf{R + 2 + 3 = 10}$, and $\mathbf{R = 5}$.

Row 3: $\mathbf{D + E + X = 13}$. Replace E with 2 and X with 3. Then $\mathbf{D + 2 + 3 = 13}$, and $\mathbf{D = 8}$.

READY-X 23

$$\mathbf{R = 9 \quad E = 3 \quad A = 10 \quad D = 4 \quad Y = 6 \quad X = 8}$$

Possible Solution

Column 2: $A + A + Y + Y = 32$. Then $2A + 2Y = 32$. Then $A + Y = 16$.

Row 4: $D + Y + A = 20$. Replace $(A + Y)$ with 16. Then $D + 16 = 20$, and $D = 4$.

Row 2: $D + A + D = 18$. Replace each D with 4. Then $4 + A + 4 = 18$, and $A = 10$.

From Column 2: $A + Y = 16$. Replace A with 10, then $10 + Y = 16$, and $Y = 6$.

Row 1: $X + A + D = 22$. Replace A with 10 and D with 4. Then $X + 10 + 4 = 22$, and $X = 8$.

Column 1: $X + D + R + D = 25$. Replace X with 8 and each D with 4.

Then $8 + 4 + R + 4 = 25$, and $R = 9$.

Row 3: $R + Y + E = 18$. Replace R with 9 and Y with 6. Then $9 + 6 + E = 18$, and $E = 3$.

READY-X 24

$$\mathbf{R = 7 \quad E = 8 \quad A = 4 \quad D = 1 \quad Y = 6 \quad X = 3}$$

Possible Solution

Column 1: $X + R + X + R = 20$. Then $2X + 2R = 20$, and $X + R = 10$.

Row 1: $X + D + R = 11$. Replace $(X + R)$ with 10. Then $D + 10 = 11$, and $D = 1$.

Row 2: $R + D + D = 9$. Replace each D with 1. Then $R + 1 + 1 = 9$, and $R = 7$.

Row 1: $X + D + R = 11$. Replace D with 1 and R with 7. Then $X + 1 + 7 = 11$, and $X = 3$.

**Column 2: $D + D + E + E = 18$. Replace each D with 1. Then $1 + 1 + E + E = 18$,
Then $2 + 2E = 18$, Then $2E = 16$, and $E = 8$.**

Row 3: $X + E + Y = 17$. Replace X with 3 and E with 8. Then $3 + 8 + Y = 17$, and $Y = 6$.

Row 4: $R + E + A = 19$. Replace R with 7 and E with 8. Then $7 + 8 + A = 19$, and $A = 4$.

READY-X 25

$$\mathbf{R = 6 \quad E = 4 \quad A = 7 \quad D = 10 \quad Y = 8 \quad X = 9}$$

Possible Solution

All of Row 2 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{A + X + X + D = 35} \\ - \quad \mathbf{\underline{X + X + D = 28}} \\ \mathbf{A = 7} \end{array}$$

Row 1: $\mathbf{A + D + D = 27}$. Replace A with 7. Then $\mathbf{7 + D + D = 27}$. Then $\mathbf{2D + 7 = 27}$.

Then $\mathbf{2D = 20}$, and $\mathbf{D = 10}$.

Row 2: $\mathbf{X + X + D = 28}$. Replace D with 10. Then $\mathbf{2X + 10 = 28}$. Then $\mathbf{2X = 18}$, and $\mathbf{X = 9}$.

Row 4: $\mathbf{X + R + R = 21}$. Replace X with 9. Then $\mathbf{9 + R + R = 21}$. Then $\mathbf{9 + 2R = 21}$.

Then $\mathbf{2R = 12}$, and $\mathbf{R = 6}$.

Column 3: $\mathbf{D + D + E + R = 30}$. Replace each D with 10 and R with 6.

Then $\mathbf{10 + 10 + E + 6 = 30}$, and $\mathbf{E = 4}$.

Row 3: $\mathbf{D + Y + E = 22}$. Replace D with 10 and E with 4. Then $\mathbf{10 + Y + 4 = 22}$, and $\mathbf{Y = 8}$.

READY-X 26

$$\mathbf{R = 5 \quad E = 3 \quad A = 10 \quad D = 1 \quad Y = 9 \quad X = 7}$$

Possible Solution

Column 2: $Y + X + Y + X = 32$. Then $2X + 2Y = 32$. Then $Y + X = 16$.

Row 4: $Y + X + R = 21$. Replace $(Y + X)$ with 16. Then $16 + R = 21$, and $R = 5$.

Row 2: $R + X + R = 17$. Replace each R with 5. Then $5 + X + 5 = 17$, and $X = 7$.

From Column 2: $Y + X = 16$. Replace X with 7. Then $Y + 7 = 16$, and $Y = 9$.

Row 1: $A + Y + A = 29$. Replace Y with 9. Then $2A + 9 = 29$. Then $2A = 20$, and $A = 10$.

Column 3: $A + R + E + R = 23$. Replace A with 10, and each R with 5.

Then $10 + 5 + E + 5 = 23$, and $E = 3$.

Row 3: $D + Y + E = 13$. Replace Y with 9 and E with 3. Then $D + 9 + 3 = 13$, and $D = 1$.

READY-X 27

$$\mathbf{R = 5 \quad E = 3 \quad A = 1 \quad D = 7 \quad Y = 4 \quad X = 10}$$

Possible Solution

All of Row 3 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{R + D + Y + E = 19} \\ - \quad \mathbf{\underline{D + Y + E = 14}} \\ \mathbf{R = 5} \end{array}$$

Column 1: $\mathbf{E + R + E + R = 16}$. Replace each R with 5.

Then $\mathbf{E + 5 + E + 5 = 16}$. Then $\mathbf{2E + 10 = 16}$. Then $\mathbf{2E = 6}$, and $\mathbf{E = 3}$.

Row 4: $\mathbf{R + Y + E = 12}$. Replace R with 5 and E with 3. Then $\mathbf{5 + Y + 3 = 12}$, and $\mathbf{Y = 4}$.

Row 1: $\mathbf{E + A + R = 9}$. Replace E with 3 and R with 5. Then $\mathbf{3 + A + 5 = 9}$, and $\mathbf{A = 1}$.

Row 3: $\mathbf{E + D + Y = 14}$. Replace E with 3 and Y with 4. Then $\mathbf{3 + D + 4 = 14}$, and $\mathbf{D = 7}$.

Row 2: $\mathbf{R + X + D = 22}$. Replace R with 5 and D with 7. Then $\mathbf{5 + X + 7 = 22}$, and $\mathbf{X = 10}$.

READY-X 28

$$\mathbf{R = 1 \quad E = 6 \quad A = 10 \quad D = 4 \quad Y = 3 \quad X = 7}$$

Possible Solution

All of Row 2 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{E + E + A + Y = 25} \\ - \quad \mathbf{E + A + Y = 19} \\ \hline \mathbf{E = 6} \end{array}$$

Row 3: $\mathbf{E + E + X = 19}$. Replace each E with 6. Then $\mathbf{6 + 6 + X = 19}$, and $\mathbf{X = 7}$.

Column 3: $\mathbf{X + Y + X + Y = 20}$. Replace each X with 7. Then $\mathbf{7 + Y + 7 + Y = 20}$.

Then $\mathbf{2Y + 14 = 20}$. Then $\mathbf{2Y = 6}$, and $\mathbf{Y = 3}$.

Row 4: $\mathbf{Y + R + Y = 7}$. Replace each Y with 3. Then $\mathbf{3 + R + 3 = 7}$, and $\mathbf{R = 1}$.

Row 2: $\mathbf{E + A + Y = 19}$. Replace E with 6 and Y with 3. Then $\mathbf{6 + A + 3 = 19}$, and $\mathbf{A = 10}$.

Row 1: $\mathbf{A + D + X = 21}$. Replace A with 10 and X with 7. Then $\mathbf{10 + D + 7 = 21}$, and $\mathbf{D = 4}$.

READY-X 29

$$\mathbf{R = 6 \quad E = 10 \quad A = 1 \quad D = 5 \quad Y = 9 \quad X = 4}$$

Possible Solution

Column 1: $R + D + D + R = 22$. Then $2R + 2D = 22$. Then $R + D = 11$.

Row 2: $D + E + R = 21$. Replace $(R + D)$ with 11. Then $E + 11 = 21$, and $E = 10$.

Row 1: $R + E + E = 26$. Replace each E with 10. Then $R + 10 + 10 = 26$, and $R = 6$.

From Column 1: $R + D = 11$. Replace R with 6. Then $6 + D = 11$, and $D = 5$.

Row 4: $R + X + X = 14$. Replace R with 6. Then $6 + X + X = 14$. Then $2X + 6 = 14$.

Then $2X = 8$, and $X = 4$.

Column 2: $E + E + Y + X = 33$. Replace each E with 10 and X with 4.

Then $10 + 10 + Y + 4 = 33$, and $Y = 9$.

Row 3: $D + Y + A = 15$. Replace D with 5 and Y with 9. Then $5 + 9 + A = 15$, and $A = 1$.

READY-X 30

$$\mathbf{R = 3 \quad E = 7 \quad A = 2 \quad D = 1 \quad Y = 5 \quad X = 6}$$

Possible Solution

All of Row 3 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} A + E + D + R = 13 \\ - \quad \underline{E + D + R = 11} \\ \hline A = 2 \end{array}$$

Row 2: $R + A + A = 7$. Replace each A with 2. Then $R + 2 + 2 = 7$, and $R = 3$.

Row 4: $R + Y + R = 11$. Replace each R with 3. Then $3 + Y + 3 = 11$, and $Y = 5$.

Column 1: $E + R + E + R = 20$. Replace each R with 3. Then $E + 3 + E + 3 = 20$.

Then $2E + 6 = 20$. Then $2E = 14$, and $E = 7$.

Row 1: $E + X + E = 20$. Replace each E with 7. Then $7 + X + 7 = 20$, and $X = 6$.

Row 3: $E + R + D = 11$. Replace E with 7 and R with 3. Then $7 + 3 + D = 11$, and $D = 1$.

Solutions

Section 3: Demonstrate Your X-pertise



READY-X 31

$$\mathbf{R = 4 \quad E = 7 \quad A = 9 \quad D = 8 \quad Y = 5 \quad X = 6}$$

Possible Solution

All of Row 4 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{E + R + X + A = 26} \\ - \quad \mathbf{\underline{R + X + A = 19}} \\ \mathbf{E = 7} \end{array}$$

Row 2: $\mathbf{E + E + R = 18}$. Replace each \mathbf{E} with $\mathbf{7}$. Then $\mathbf{7 + 7 + R = 18}$, and $\mathbf{R = 4}$.

Column 1: $\mathbf{A + E + D + R = 28}$. Replace \mathbf{E} with $\mathbf{7}$ and \mathbf{R} with $\mathbf{4}$.

$$\text{Then } \mathbf{A + 7 + D + 4 = 28}$$
. Then $\mathbf{A + D = 17}$.

Row 3: $\mathbf{D + A + X = 23}$. Replace $\mathbf{(A + D)}$ with $\mathbf{17}$. Then $\mathbf{17 + X = 23}$, and $\mathbf{X = 6}$.

Row 4: $\mathbf{R + X + A = 19}$. Replace \mathbf{R} with $\mathbf{4}$ and \mathbf{X} with $\mathbf{6}$. Then $\mathbf{4 + 6 + A = 19}$, and $\mathbf{A = 9}$.

From Column 1: $\mathbf{A + D = 17}$. Replace \mathbf{A} with $\mathbf{9}$. Then $\mathbf{9 + D = 17}$, and $\mathbf{D = 8}$.

Row 1: $\mathbf{A + Y + E = 21}$. Replace \mathbf{A} with $\mathbf{9}$ and \mathbf{E} with $\mathbf{7}$. Then $\mathbf{9 + Y + 7 = 21}$, and $\mathbf{Y = 5}$.

READY-X 32

$$\mathbf{R = 9 \quad E = 3 \quad A = 6 \quad D = 7 \quad Y = 8 \quad X = 2}$$

Possible Solution

All of Row 3 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} Y + R + X + D = 26 \\ - \quad \underline{R + X + D = 18} \\ \hline Y = 8 \end{array}$$

Row 4: $D + Y + Y = 23$. Replace each Y with 8. Then $D + 8 + 8 = 23$, and $D = 7$.

Row 3: $R + X + D = 18$. Replace D with 7. Then $R + X + 7 = 18$, and $R + X = 11$.

Row 1: $A + X + R = 17$. Replace $(R + X)$ with 11. Then $A + 11 = 17$, and $A = 6$.

Column 1: $A + A + R + D = 28$. Replace each A with 6 and D with 7.

Then $6 + 6 + R + 7 = 28$, and $R = 9$.

From Row 3: $R + X = 11$. Replace R with 9. Then $9 + X = 11$, and $X = 2$.

Row 2: $A + E + X = 11$. Replace A with 6 and X with 2. Then $6 + E + 2 = 11$, and $E = 3$.

READY-X 33

$$\mathbf{R = 1 \quad E = 3 \quad A = 9 \quad D = 5 \quad Y = 4 \quad X = 2}$$

Possible Solution

All of Row 1 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{D + X + A + Y = 20} \\ - \quad \mathbf{\underline{X + A + Y = 15}} \\ \mathbf{D = 5} \end{array}$$

Row 3: $\mathbf{A + D + D = 19}$. Replace each \mathbf{D} with $\mathbf{5}$. Then $\mathbf{A + 5 + 5 = 19}$, and $\mathbf{A = 9}$.

Column 3: $\mathbf{Y + A + D + X = 20}$. Replace \mathbf{A} with $\mathbf{9}$ and \mathbf{D} with $\mathbf{5}$.

$$\text{Then } \mathbf{Y + 9 + 5 + X = 20}$$
. Then $\mathbf{Y + X + 14 = 20}$. Then $\mathbf{Y + X = 6}$

Column 1: $\mathbf{X + R + A + Y = 16}$. Replace $\mathbf{(Y + X)}$ with $\mathbf{6}$, and \mathbf{A} with $\mathbf{9}$.

$$\text{Then } \mathbf{6 + R + 9 = 16}$$
, and $\mathbf{R = 1}$.

Row 2: $\mathbf{R + Y + A = 14}$. Replace \mathbf{R} with $\mathbf{1}$ and \mathbf{A} with $\mathbf{9}$.

$$\text{Then } \mathbf{1 + Y + 9 = 14}$$
, and $\mathbf{Y = 4}$.

From Column 3: $\mathbf{Y + X = 6}$. Replace \mathbf{Y} with $\mathbf{4}$. Then $\mathbf{4 + X = 6}$, and $\mathbf{X = 2}$.

Row 4: $\mathbf{Y + E + X = 9}$. Replace \mathbf{Y} with $\mathbf{4}$ and \mathbf{X} with $\mathbf{2}$.

$$\text{Then } \mathbf{4 + E + 2 = 9}$$
, and $\mathbf{E = 3}$.

READY-X 34

$$\mathbf{R = 1 \quad E = 2 \quad A = 4 \quad D = 6 \quad Y = 3 \quad X = 7}$$

Possible Solution

All of Row 3 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{R + D + E + R = 10} \\ - \quad \mathbf{\underline{D + E + R = 9}} \\ \mathbf{R = 1} \end{array}$$

Column 3: $\mathbf{D + R + R + E = 10}$. Replace each R with 1.

$$\text{Then } \mathbf{D + 1 + 1 + E = 10}$$
. Then $\mathbf{D + E = 8}$.

Row 4: $\mathbf{E + D + E = 10}$. Replace $\mathbf{(D + E)}$ with 8. Then $\mathbf{E + 8 = 10}$, and $\mathbf{E = 2}$.

From Column 3: $\mathbf{D + E = 8}$. Replace E with 2. Then $\mathbf{D + 2 = 8}$, and $\mathbf{D = 6}$.

Row 1: $\mathbf{R + A + D = 11}$. Replace R with 1 and D with 6. Then $\mathbf{1 + A + 6 = 11}$, and $\mathbf{A = 4}$.

Column 2: $\mathbf{A + Y + E + D = 15}$. Replace A with 4, E with 2, and D with 6.

$$\text{Then } \mathbf{4 + Y + 2 + 6 = 15}$$
, and $\mathbf{Y = 3}$.

Row 2: $\mathbf{X + Y + R = 11}$. Replace Y with 3, and R with 1. Then $\mathbf{X + 3 + 1 = 11}$, and $\mathbf{X = 7}$.

READY-X 35

$$R = 4 \quad E = 7 \quad A = 8 \quad D = 3 \quad Y = 10 \quad X = 6$$

Possible Solution

Columns 3 and 1 have three variables in common. Line up like variables and subtract.

$$\begin{array}{r} X + R + E + A = 25 \\ - \quad X + R + E + D = 20 \\ \hline A - D = 5 \text{ or } A = D + 5 \end{array}$$

Row 4: $D + D + A = 14$. Replace A with $(D + 5)$. Then $D + D + D + 5 = 14$.

Then $3D + 5 = 14$. Then $3D = 9$, and $D = 3$.

From subtraction of Column 1 from Column 3: $A = D + 5$.

Replace D with 3. Then $A = 3 + 5$, and $A = 8$.

Column 2: $Y + Y + Y + D = 33$. Replace D with 3. Then $Y + Y + Y + 3 = 33$.

Then $3Y + 3 = 33$. Then $3Y = 30$, and $Y = 10$.

Row 1: $R + Y + R = 18$. Replace Y with 10. Then $R + 10 + R = 18$. Then $2R + 10 = 18$.

Then $2R = 8$, and $R = 4$.

Row 2: $E + Y + E = 24$. Replace Y with 10. Then $E + 10 + E = 24$. Then $2E + 10 = 24$.

Then $2E = 14$, and $E = 7$.

Row 3: $X + Y + X = 22$. Replace Y with 10. Then $X + 10 + X = 22$. Then $2X + 10 = 22$.

Then $2X = 12$, and $X = 6$.

READY-X 36

$$\mathbf{R = 4 \quad E = 9 \quad A = 1 \quad D = 7 \quad Y = 3 \quad X = 8}$$

Possible Solution

All of Row 4 is in Column 2. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{R + A + X + Y = 16} \\ - \quad \mathbf{\underline{A + X + Y = 12}} \\ \mathbf{R = 4} \end{array}$$

All of Row 1 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{A + D + R + E = 21} \\ - \quad \mathbf{\underline{D + R + E = 20}} \\ \mathbf{A = 1} \end{array}$$

Row 3: $\mathbf{R + A + X = 13}$. Replace R with 4 and A with 1. Then $\mathbf{4 + 1 + X = 13}$, and $\mathbf{X = 8}$.

Row 4: $\mathbf{A + X + Y = 12}$. Replace A with 1 and X with 8. Then $\mathbf{1 + 8 + Y = 12}$, and $\mathbf{Y = 3}$.

Row 2: $\mathbf{E + Y + E = 21}$. Replace Y with 3. Then $\mathbf{E + 3 + E = 21}$. Then $\mathbf{2E + 3 = 21}$.

Then $\mathbf{2E = 18}$, and $\mathbf{E = 9}$.

Row 1: $\mathbf{D + R + E = 20}$. Replace R with 4 and E with 9. Then $\mathbf{D + 4 + 9 = 20}$, and $\mathbf{D = 7}$.

READY-X 37

$$\mathbf{R = 6 \quad E = 10 \quad A = 8 \quad D = 7 \quad Y = 5 \quad X = 2}$$

Possible Solution

All of Row 2 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} A + X + D + E = 27 \\ - \quad \underline{X + D + E = 19} \\ \hline A = 8 \end{array}$$

All of Row 1 is in Column 2. Line up like variables and subtract.

$$\begin{array}{r} E + D + R + A = 31 \\ - \quad \underline{D + R + A = 21} \\ \hline E = 10 \end{array}$$

Row 4: $Y + A + E = 23$. Replace A with 8 and E with 10.

$$\text{Then } Y + 8 + 10 = 23, \text{ and } Y = 5.$$

Row 1: $R + D + A = 21$. Replace A with 8. Then $R + D = 13$.

Column 1: $R + D + X + Y = 20$. Replace $(R + D)$ with 13 and Y with 5.

$$\text{Then } 13 + X + 5 = 20, \text{ and } X = 2.$$

Column 3: $A + X + D + E = 27$. Replace A with 8, X with 2, and E with 10.

$$\text{Then } 8 + 2 + D + 10 = 27, \text{ and } D = 7.$$

From Row 1: $R + D = 13$. Replace D with 7. Then $R + 7 = 13$, and $R = 6$.

READY-X 38

$$\mathbf{R = 3 \quad E = 10 \quad A = 2 \quad D = 6 \quad Y = 8 \quad X = 4}$$

Possible Solution

All of Row 2 is in Column 3. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{D + X + A + X = 16} \\ - \quad \mathbf{\underline{X + A + X = 10}} \\ \mathbf{D = 6} \end{array}$$

Row 1: $\mathbf{A + A + D = 10}$. Replace \mathbf{D} with $\mathbf{6}$. Then $\mathbf{2A + 6 = 10}$. Then $\mathbf{2A = 4}$, and $\mathbf{A = 2}$.

Column 3: $\mathbf{D + X + A + X = 16}$. Replace \mathbf{D} with $\mathbf{6}$ and \mathbf{A} with $\mathbf{2}$.

Then $\mathbf{6 + X + 2 + X = 16}$. Then $\mathbf{2X + 8 = 16}$. Then $\mathbf{2X = 8}$, and $\mathbf{X = 4}$.

Row 3: $\mathbf{X + R + A = 9}$. Replace \mathbf{X} with $\mathbf{4}$ and \mathbf{A} with $\mathbf{2}$. Then $\mathbf{4 + R + 2 = 9}$, and $\mathbf{R = 3}$.

Column 1: $\mathbf{A + A + X + Y = 16}$. Replace each \mathbf{A} with $\mathbf{2}$ and \mathbf{X} with $\mathbf{4}$.

Then $\mathbf{2 + 2 + 4 + Y = 16}$, and $\mathbf{Y = 8}$.

Row 4: $\mathbf{Y + E + X = 22}$. Replace \mathbf{Y} with $\mathbf{8}$ and \mathbf{X} with $\mathbf{4}$. Then $\mathbf{8 + E + 4 = 22}$, and $\mathbf{E = 10}$.

READY-X 39

$$R = 10 \quad E = 8 \quad A = 9 \quad D = 3 \quad Y = 4 \quad X = 6$$

Possible Solution

All of Row 1 is in Column 1. Line up like variables and subtract.

$$\begin{array}{r} D + D + R + A = 25 \\ - \quad \underline{D + R + A = 22} \\ \hline D = 3 \end{array}$$

Row 2: $D + Y + Y = 11$. Replace D with 3. Then $3 + 2Y = 11$. Then $2Y = 8$, and $Y = 4$.

Column 3: $A + Y + Y + X = 23$. Replace each Y with 4. Then $A + 4 + 4 + X = 23$.

$$\text{Then } A + X + 8 = 23. \text{ Then } A + X = 15.$$

Row 4: $A + E + X = 23$. Replace $(A + X)$ with 15. Then $E + 15 = 23$, and $E = 8$.

Row 1: $D + R + A = 22$. Replace D with 3. Then $3 + R + A = 22$. Then $R + A = 19$.

Column 2: $R + Y + X + E = 28$. Replace Y with 4 and E with 8. Then $R + 4 + X + 8 = 28$.

$$\text{Then } R + X = 16$$

From Row 1: $R + A = 19$. From Column 2: $R + X = 16$. Line up like variables and subtract.

$$\begin{array}{r} R + A = 19 \\ - \quad \underline{R + X = 16} \\ \hline A - X = 3 \quad \text{or} \quad A = X + 3 \end{array}$$

Row 4: $A + E + X = 23$. Replace A with $(X + 3)$ and E with 8.

$$\text{Then } X + 3 + 8 + X = 23. \text{ Then } 2X + 11 = 23. \text{ Then } 2X = 12, \text{ and } X = 6$$

From Column 2: $R + X = 16$. Replace X with 6. Then $R + 6 = 16$, and $R = 10$.

From Row 1: $R + A = 19$. Replace R with 10. Then $10 + A = 19$, and $A = 9$.

READY-X 40

$$\mathbf{R = 1 \quad E = 7 \quad A = 4 \quad D = 9 \quad Y = 6 \quad X = 5}$$

Possible Solution

Columns 1 and 2 have three variables in common. Line up like variables and subtract.

$$\begin{array}{r} \mathbf{X + R + E + E = 20} \\ - \mathbf{X + R + E + Y = 19} \\ \hline \mathbf{E - Y = 1 \text{ or } Y = E - 1} \end{array}$$

Row 3: $\mathbf{E + E + Y = 20}$. Replace \mathbf{Y} with $\mathbf{(E - 1)}$. Then $\mathbf{E + E + E - 1 = 20}$.

Then $\mathbf{3E = 21}$, and $\mathbf{E = 7}$.

Row 3: $\mathbf{E + E + Y = 20}$. Replace each \mathbf{E} with $\mathbf{7}$. Then $\mathbf{7 + 7 + Y = 20}$, and $\mathbf{Y = 6}$.

Row 4: $\mathbf{Y + E + A = 17}$. Replace \mathbf{Y} with $\mathbf{6}$ and \mathbf{E} with $\mathbf{7}$. Then $\mathbf{6 + 7 + A = 17}$, and $\mathbf{A = 4}$.

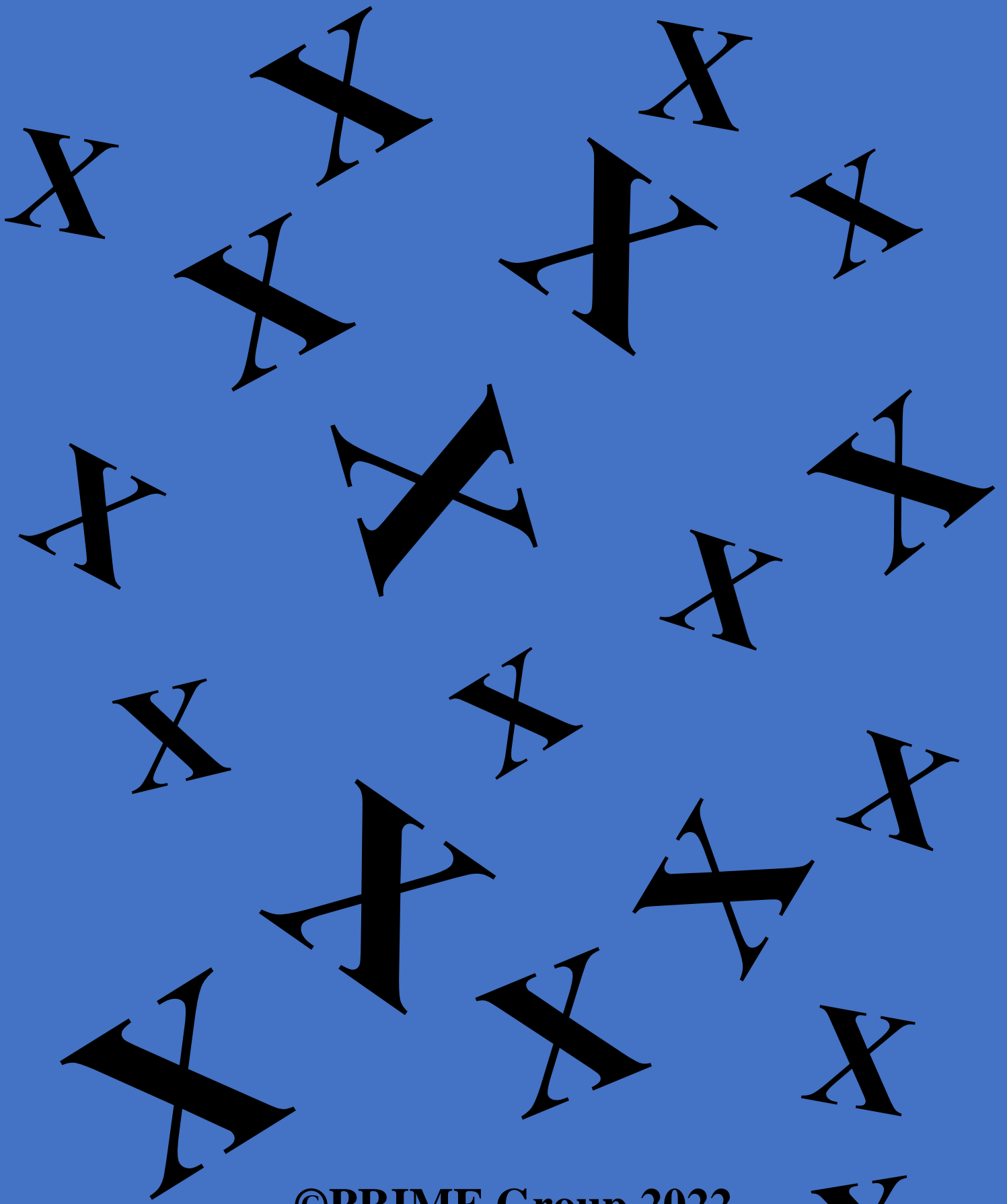
Row 1: $\mathbf{X + X + A = 14}$. Replace \mathbf{A} with $\mathbf{4}$. Then $\mathbf{X + X + 4 = 14}$. Then $\mathbf{2X = 10}$, and $\mathbf{X = 5}$.

Column 3: $\mathbf{A + D + Y + A = 23}$. Replace each \mathbf{A} with $\mathbf{4}$ and \mathbf{Y} with $\mathbf{6}$.

Then $\mathbf{4 + D + 6 + 4 = 23}$, and $\mathbf{D = 9}$.

Row 2: $\mathbf{R + R + D = 11}$. Replace \mathbf{D} with $\mathbf{9}$. Then $\mathbf{R + R + 9 = 11}$. Then $\mathbf{2R + 9 = 11}$.

Then $\mathbf{2R = 2}$, and $\mathbf{R = 1}$.



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