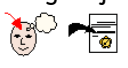





Steps to Success

Lockdown	
Date	<u>02.02.21</u>
Subject/s	<u>Maths</u>
Learning Objective 	To find all the unknowns in an algebraic equation

SA	TA
	

Success Criteria 	I know letters represent numbers		
	I can work systematically and substitute in 1		
	I can then use the inverse to work out the second value		
Support	Independent	Adult Support ()	Group Work

Pre-task

X and Y are whole numbers.

- X is a one digit odd number.
- Y is a two digit even number.
- $X + Y = 25$

Find all the possible pairs of numbers that satisfy the equation.

$$2g + w = 15$$

Write down all the possible values for g and w ,

Fluency

A

For each question, write 3 possible combinations of variables:

1. $a + b = 14$

7. $a - b = 12$

13. $ab = 12$

2. $a + b = 21$

8. $b - a = 5$

14. $ab = 20$

3. $a + b = 26$

9. $a - b = 23$

15. $ab = 30$

4. $a = b + 7$

10. $a - 13 = b$

16. $a = 2b$

5. $a = b + 12$

11. $a = b - 6$

17. $b = 3a$

6. $b = 15 + a$

12. $b = 27 - a$

18. $2a = 3b$

B

For each question, write 3 possible combinations of variables:

1. $3a - b = 12$

7. $2a - b = 10$

13. $2ab = 24$

2. $6a + b = 25$

8. $3a - b = 17$

14. $5ab = 100$

3. $12a + 2b = 48$

9. $7a - 2b = 14$

15. $7ab = 105$

4. $8a = b + 17$

10. $a = 3b - 7$

16. $a = 5b$

5. $4a = 5b + 23$

11. $3a = 4b - 3$

17. $3a = 8b$

6. $6a + 16 = 4b$

12. $7a - 18 = 5b$

18. $10a = 7b$

Answers

A

$$\begin{aligned} 1. \quad 1 + 13 &= 14 \\ 5 + 9 &= 14 \\ 10 + 4 &= 14 \end{aligned}$$

$$\begin{aligned} 2. \quad 20 + 1 &= 21 \\ 7 + 14 &= 21 \\ 16 + 5 &= 21 \end{aligned}$$

$$\begin{aligned} 3. \quad 20 + 6 &= 26 \\ 10 + 16 &= 26 \\ 25 + 1 &= 26 \end{aligned}$$

$$\begin{aligned} 4. \quad 8 + 1 &= 7 \\ 10 + 3 &= 7 \\ 12 + 5 &= 7 \end{aligned}$$

$$\begin{aligned} 5. \quad 13 + 1 &= 12 \\ 20 + 8 &= 12 \\ 15 + 3 &= 12 \end{aligned}$$

$$\begin{aligned} 6. \quad 20 + 15 &= 5 \\ 17 + 15 &= 2 \\ 18 + 15 &= 3 \end{aligned}$$

$$\begin{aligned} 7. \quad 15 - 3 &= 12 \\ 20 - 8 &= 12 \\ 30 - 18 &= 12 \end{aligned}$$

$$\begin{aligned} 8. \quad 10 - 5 &= 5 \\ 6 - 1 &= 5 \\ 20 - 15 &= 5 \end{aligned}$$

$$\begin{aligned} 9. \quad 25 - 2 &= 23 \\ 30 - 7 &= 23 \\ 24 - 1 &= 23 \end{aligned}$$

$$\begin{aligned} 10. \quad 15 - 13 &= 2 \\ 20 - 13 &= 7 \\ 17 - 13 &= 4 \end{aligned}$$

$$\begin{aligned} 11. \quad 4 &= 10 - 6 \\ 10 &= 16 - 6 \\ 14 &= 20 - 6 \end{aligned}$$

$$\begin{aligned} 12. \quad 25 &= 27 - 2 \\ 20 &= 27 - 7 \\ 10 &= 27 - 17 \end{aligned}$$

$$\begin{aligned} 13. \quad 2 \times 6 &= 12 \\ 3 \times 4 &= 12 \\ 1 \times 12 &= 12 \end{aligned}$$

$$\begin{aligned} 14. \quad 2 \times 10 &= 20 \\ 4 \times 5 &= 20 \\ 5 \times 4 &= 20 \end{aligned}$$

$$\begin{aligned} 15. \quad 2 \times 15 &= 30 \\ 3 \times 10 &= 30 \\ 6 \times 5 &= 30 \end{aligned}$$

$$\begin{aligned} 16. \quad 18 &= 2 \times 9 \\ 10 &= 2 \times 5 \\ 8 &= 2 \times 4 \end{aligned}$$

$$\begin{aligned} 17. \quad 9 &= 3 \times 3 \\ 12 &= 3 \times 4 \\ 15 &= 3 \times 5 \end{aligned}$$

$$\begin{aligned} 18. \quad 2 \times 6 &= 3 \times 4 \\ 2 \times 12 &= 20 \times 8 \\ 2 \times 9 &= 30 \times 6 \end{aligned}$$

B

1. $3 \times 5 - 3 = 12$

$3 \times 7 - 9 = 12$

$3 \times 10 - 18 = 12$

9. $7 \times 4 - 2 \times 7 = 14$

$7 \times 6 - 2 \times 14 = 14$

$7 \times 8 - 2 \times 21 = 14$

17. $3 \times 15 = 8 \times 8$

$3 \times 16 = 8 \times 6$

$3 \times 24 = 8 \times 9$

2. $6 \times 2 + 13 = 25$

$6 \times 3 + 7 = 25$

$6 \times 4 + 1 = 25$

10. $8 = 3 \times 5 - 12$

$11 = 3 \times 6 - 12$

$14 = 3 \times 7 - 12$

18. $10 \times 7 = 7 \times 10$

$10 \times 14 = 7 \times 20$

$10 \times 21 = 7 \times 30$

3. $12 \times 1 + 2 \times 18 = 48$

$12 \times 3 + 2 \times 6 = 48$

$12 \times 4 + 2 \times 0 = 28$

11. $3 \times 7 = 4 \times 6 - 3$

$3 \times 11 = 4 \times 9 - 3$

$3 \times 15 = 4 \times 12 - 3$

4. $8 + 3 = 17$

$8 + 4 = 17$

$8 + 5 = 17$

12. $7 \times 9 - 18 = 5 \times 8$

$7 \times 14 - 18 = 5 \times 16$

$7 \times 19 - 18 = 5 \times 23$

5. $4 \times 7 = 5 \times 1 + 23$

$4 \times 12 = 5 \times 5 + 23$

$4 \times 17 = 5 \times 9 + 23$

13. $2 \times 3 \times 4 = 24$

$2 \times 2 \times 6 = 24$

$2 \times 4 \times 3 = 24$

6. $6 \times 2 + 16 = 4 \times 7$

$6 \times 4 + 16 = 4 \times 10$

$6 \times 6 + 16 = 4 \times 13$

14. $5 \times 2 \times 10 = 100$

$5 \times 4 \times 5 = 100$

$5 \times 10 \times 2 = 100$

7. $2 \times 8 - 6 = 10$

$2 \times 9 - 8 = 10$

$2 \times 11 - 12 = 10$

15. $7 \times 5 \times 3 = 105$

$7 \times 3 \times 5 = 105$

$7 \times 15 \times 1 = 105$

8. $3 \times 6 - 1 = 17$

$3 \times 7 - 4 = 17$

$3 \times 8 - 7 = 17$

16. $20 = 5 \times 4$

$15 = 5 \times 3$

$10 = 5 \times 2$

Problem Solving and Reasoning

Use it!



a , b and c are integers between -5 and 5

$$\begin{aligned}a - b &= -3 \\ b + c &= 3\end{aligned}$$

Find the values of a , b and c
How many different possibilities can you find?

Use it!



Use the possible values to complete the equation:

$$a + c = \square$$

Prove it!



x and y are both positive whole numbers.

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

Jade says,



x will always be a multiple of 4

Simon says,



y will always be a factor of 4

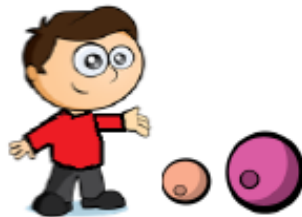
Who is correct?
Prove it!

Use it!



Large beads cost 5p and small beads cost 4p

Mr Smith has 79p to spend on beads.



How many different combinations of small and large beads can Mr Smith buy?

Can you write expressions that show all the solutions?

Answers

$$\begin{aligned} a &= -5 & b &= -2 \\ c &= 5 \\ a &= -4 & b &= -1 \\ c &= 4 \\ a &= -3 & b &= 0 \\ c &= 3 \end{aligned}$$

$$a + c = 0$$

Jade is correct as x will always have to divide into 4 equal parts. E.g, $32 \div 8 = 4$, $16 \div 4 = 4$
Simon is incorrect. $40 \div 10 = 4$ and 10 is not a factor of 4

Children to write their own combinations algebraically

Further Challenge

If

$$A + C = A$$

$$F \times D = F$$

$$B - G = G$$

$$A + H = E$$

$$B / H = G$$

$$E - G = F$$

and $A - H$ represent the numbers from 0 to 7

Find the values of A, B, C, D, E, F, G and H .