SUPER 12s

SUPER 12s CAN BE USED AS AN INDIVIDUALISED MASTERY LEARNING PROGRAM.

2 ALGEBRA
2.12 SIMULTANEOUS EQNS
2.12 LEVEL 2

NAME : _____

Skill description: Solving simultaneous equations by elimination.

Essential Revision

1. Solve for the unknown.

$$y - 3 = 9$$

2. Solve these equations by substitution.

$$x = y + 2$$
$$3x + 2y = 6$$

3. Solve for the unknown.

$$6r = 24$$

4. Solve these equations by substitution.

$$2x + 3y = 11$$
$$x = y + 3$$

5. Solve for the unknown.

$$\frac{y}{8} = 9$$

6. Solve these equations by substitution.

$$x + y = 24$$
$$y = 2x + 6$$

7. Solve for the unknown.

$$t + 4 = 55$$

8. Solve these equations by substitution.

$$x = 5y + 7$$
$$2x - 4y = 8$$

9. Solve for the unknown.

$$8y = 24$$

10. Solve these equations by substitution.

$$y = 2x + 1$$
$$5x + 3y = 14$$

11. Solve for the unknown.

$$\frac{t}{9} = 9$$

12. Solve these equations by substitution.

$$y = x - 4$$
$$2x + 5y = 43$$

Solutions can be found at the end of the booklet.

score $\frac{\quad}{12}$

STRATEGIES TO SOLVE THE PROBLEMS

From the previous level: If all the **variables are on the same side of the equals sign for both equations,** use **elimination.**

$$x - y = 2$$
$$x + 3y = 6$$

Example 1

Solve these simultaneous equations by elimination.

$$x + y = 24$$
$$2x - y = -6$$

Step 1

See if the equations have a positive/negative pair. This means the equations have the same variable with a coefficient equal in magnitude but opposite in sign.

In the example below the y terms are a positive/negative pair.

$$x + y = 24$$
$$2x - y = -6$$

Step 2

Use addition to add each pair of terms.

$$\begin{array}{rl} x + y & = 24 \\ 2x - y & = -6 \\ \hline 3x & = 18 \end{array}$$

The y term has been left blank as it adds to zero (is eliminated).

Step 3

Solve for the unknown.

$$3x = 18$$

$$x = 6$$

Step 4

Now that you have the value for one unknown, we need to substitute this back into one of the original equations to find the value of the other unknown.

$$x = 6$$

$$x + y = 24$$

$$6 + y = 24$$

$$y = 18$$

Final solution

$$x = 6\,, y = 18$$

Example 2

Solve these simultaneous equations by elimination.

$$x - y = 2$$
$$x + 3y = 6$$

Step 1

See if the equations have a positive/negative pair. This means the equations have the same variable with a coefficient equal in magnitude but opposite in sign.

If one pair of variables has coefficients of the same magnitude but is not a positive/negative pair (like the x variables in the above example), multiply each term in one of the equations by -1 to create a positive/negative pair.

$$-1(x - y = 2)$$
$$x + 3y = 6$$

$$-x + y = -2$$
$$x + 3y = 6$$

We now have a positive/negative pair.

$$-x + y = -2$$
$$x + 3y = 6$$

Step 2

Use addition to add each pair of terms.

$$\begin{array}{rrcl} -x & + & y & = -2 \\ x & + & 3y & = 6 \\ \hline & & 4y & = 4 \end{array}$$

The x term has been left blank as it adds to zero (is eliminated).

Step 3

Solve for the unknown.

$$4y = 4$$

$$y = 1$$

Step 4

Now that you have the value for one unknown, we need to substitute this back into one of the original equations to find the value of the other unknown.

$$y = 1$$

$$x - y = 2$$

$$x - 1 = 2$$

$$x = 3$$

Final solution

$$x = 3\,, y = 1$$

QUESTIONS

Solve these equations by elimination.

1.

$$x + y = 6$$
$$-3x + y = 2$$

2.

$$2x + y = 10$$
$$-x + y = -5$$

3.

$$3x + y = 1$$
$$-4x + y = 15$$

4.

$$6x + y = 18$$
$$4x + y = 14$$

5.

$$3x - y = 12$$
$$x + y = 8$$

6.

$$2x + 4y = 14$$
$$4x - 4y = 4$$

7.

$$4x + 5y = 12$$
$$3x - 5y = 9$$

8.

$$x - 2y = 8$$
$$x - 3y = 3$$

9.

$$2x + y = 9$$
$$3x - y = 1$$

10.

$$3x + 2y = 8$$
$$3x - y = 5$$

11.

$$2x + y = 8$$
$$5x - y = 13$$

12.

$$x + y = 1$$
$$x + 4y = -23$$

SOLUTIONS CAN BE FOUND AT THE END OF THE BOOKLET.

score $\frac{\quad}{12}$

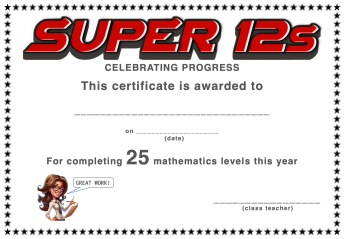
MASTERY TEST

Teacher's signature

I'VE COMPLETED

_____

LEVELS THIS YEAR



Solutions to Essential Revision

1. $y = 12$	2. $x = 2, y = 0$
3. $r = 4$	4. $x = 4, y = 1$
5. $y = 72$	6. $x = 6, y = 18$
7. $t = 51$	8. $x = 2, y = -1$
9. $y = 3$	10. $x = 1, y = 3$
11. $t = 81$	12. $x = 9, y = 5$

Solutions to Questions

1. $x = 1, y = 5$	2. $x = 5, y = 0$
3. $x = -2, y = 7$	4. $x = 2, y = 6$
5. $x = 5, y = 3$	6. $x = 3, y = 2$
7. $x = 3, y = 0$	8. $x = 18, y = 5$
9. $x = 2, y = 5$	10. $x = 2, y = 1$
11. $x = 3, y = 2$	12. $x = 9, y = -8$