SUPER 12s

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

2 ALGEBRA
2.8 REARRANGING EQUATIONS
2.8 LEVEL 5

NAME : _____

Skill description: Rearranging equations that involve brackets.

Essential Revision

1. Solve for the unknown.

$$5x = 35$$

2. Rearrange the equation to make L the subject.

$$Q = mL$$

3. Rearrange the equation to make y the subject.

$$x + y = z$$

4. Rearrange the equation to make θ the subject.

$$l = \frac{\theta}{180}\pi r$$

5. Rearrange the equation to make $\sin A$ the subject.

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

6. Solve for the unknown.

$$y - 4 = 12$$

7. Rearrange the equation to make t the subject.

$$I = \frac{q}{t}$$

8. Rearrange the equation to make b the subject.

$$a + b + c + d = T$$

9. Rearrange the equation to make m the subject.

$$Q = mc\Delta T$$

10. Rearrange the equation to make v_1 the subject.

$$\frac{\sin i}{\sin r} = \frac{v_1}{v_2}$$

11. Solve for the unknown.

$$\frac{x}{6} = 7$$

12. Rearrange the equation to make W the subject.

$$V = \frac{W}{q}$$

Solutions can be found at the end of the booklet.

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

EQUATIONS

At this level, you will be rearranging equations sourced from mathematics and science.

Equation	Explanation
$A = \frac{(a+b)h}{2}$	Area of a trapezium.
$L = (2n-1)\frac{\lambda}{4}$	Standing sound waves.

STRATEGIES TO SOLVE THE PROBLEMS

When rearranging equations, the goal is to:

Isolate the desired variable (unknown)
to one side of the equal sign.

We will see over the next few levels that we follow the order:

- **First:** isolate the term that contains the desired variable (unknown).
- **Second:** isolate the desired variable (unknown).

Example 1

Rearrange the equation to make a the subject.

$$x = a(b + 5)$$

Step 1

Generally, it is best not to expand brackets when the desired variable is outside the bracket. You will sometimes have to factorise (which we will see at a later level).

To isolate the variable a we divide both sides by $(b + 5)$.

$$x = a(b + 5)$$

$$\div (b + 5) = \div (b + 5)$$

$$\frac{x}{b + 5} = a$$

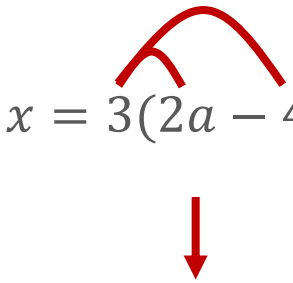
Example 2

Rearrange the equation to make a the subject.

$$x = 3(2a - 4)$$

Step 1

If the desired variable is inside the bracket, multiply out the bracket.



$$x = 6a - 12$$

Step 2

To isolate the term containing the variable a add 12 to both sides of the equation.

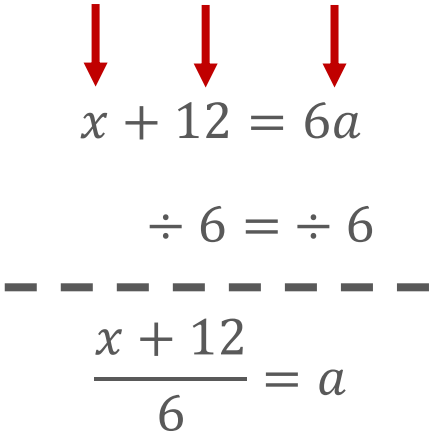
$$x = 6a - 12$$

$$+12 = +12$$

$$x + 12 = 6a$$

Step 3

To isolate the variable a divide both sides of the equation by 6.



$$x + 12 = 6a$$

$$\div 6 = \div 6$$

$$\frac{x + 12}{6} = a$$

Step 4

Simplify by common factors.

$$\frac{x + 12}{6} = a$$

$$\frac{x}{6} + \frac{12}{6} = a$$

$$\frac{x}{6} + 2 = a$$

QUESTIONS

1. Rearrange the equation to make x the subject.

$$a = 2(x - 3y)$$

2. Rearrange the equation to make d the subject.

$$\frac{c}{d} = x(4a + 3)$$

3. Rearrange the equation to make h the subject.

$$A = \frac{(a + b)h}{2}$$

4. Rearrange the equation to make λ the subject.

$$L = (2n - 1)\frac{\lambda}{4}$$

5. Rearrange the equation to make a the subject.

$$g = 3(a - 2b) + 5$$

6. Rearrange the equation to make y the subject.

$$a = 2(x - 3y)$$

7. Rearrange the equation to make x the subject.

$$\frac{c}{d} = x(4a + 3)$$

8. Rearrange the equation to make a the subject.

$$A = \frac{(a + b)h}{2}$$

9. Rearrange the equation to make n the subject.

$$L = (2n - 1)\frac{\lambda}{4}$$

10. Rearrange the equation to make b the subject.

$$g = 3(a - 2b) + 5$$

11. Rearrange the equation to make a the subject.

$$\frac{c}{d} = x(4a + 3)$$

12. Rearrange the equation to make b the subject.

$$A = \frac{(a + b)h}{2}$$

SOLUTIONS CAN BE FOUND AT THE END OF THE BOOKLET.

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

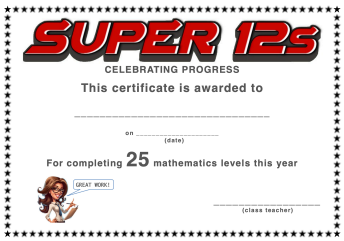
MASTERY TEST

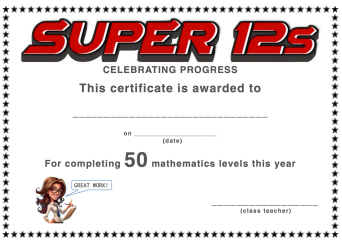
Teacher's signature

I'VE COMPLETED

_____

LEVELS THIS YEAR





Solutions to Essential Revision

1. $x = 7$	2. $L = \frac{Q}{m}$
3. $y = z - x$	4. $\theta = \frac{180l}{\pi r}$
5. $\sin A = \frac{a \sin B}{b}$	6. $y = 16$
7. $t = \frac{q}{I}$	8. $b = T - a - c - d$
9. $m = \frac{Q}{c\Delta T}$	10. $v_1 = \frac{v_2 \sin i}{\sin r}$
11. $x = 42$	12. $W = Vq$

Solutions to Questions

1. $x = \frac{a}{2} + 3y$	2. $d = \frac{c}{x(4a+3)}$
3. $h = \frac{2A}{a+b}$	4. $\lambda = \frac{4L}{2n-1}$
5. $a = \frac{g-5}{3} + 2b$	6. $y = -\frac{a}{6} + \frac{x}{3}$
7. $x = \frac{c}{d(4a+3)}$	8. $a = \frac{2A}{h} - b$
9. $n = \frac{2L}{\lambda} + \frac{1}{2}$	10. $b = -\frac{g}{6} + \frac{a}{2} + \frac{5}{6}$
11. $a = \frac{c}{4dx} - \frac{3}{4}$	12. $b = \frac{2A}{h} - a$