

## 2.2.1 Formula Rearrangement

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**KEY WORDS** subject

<!-- Session 2 native-skill companion -->

### Objective

Practise formula rearrangement within the labelled native lessons. Public original tasks; locally authored answer guidance.

### 1 Key knowledge and worked examples

#### ■ Rearranging formulae and checking the subject · Foundation

Undo operations on both sides in reverse order. In  $A=bh/2$ , multiply both sides by 2 then divide by nonzero  $h$  to obtain  $b=2A/h$ . When the desired variable occurs twice, collect it before dividing. State restrictions introduced by division.

$$A = \frac{bh}{2} \iff b = \frac{2A}{h} \quad (h \neq 0)$$

For  $A=24, h=6$  in  $A=bh/2$ ,  $b=2 \times 24/6=8$ . From  $v=u+at$ ,  $a=(v-u)/t$ ;  $v=19, u=4, t=5$  gives  $a=3$ . From  $y=3x+2$ ,  $x=(y-2)/3$ . From  $p=qx+r$ ,  $x=(p-r)/q$  for  $q \neq 0$ . Substitute the result into the original equation to check it.

Doing an operation to only one side breaks the equality. The subject is a variable, not a numerical answer. Check the rearranged result by putting the found value into the original formula.

AQA A5 includes standard and given formulae from other subjects, in words and symbols. Choose a valid unit conversion before substituting; a rearrangement does not itself change units.

#### ■ Rearranging formulae and checking the subject · Higher

Undo operations on both sides in reverse order. In  $A=bh/2$ , multiply both sides by 2 then divide by nonzero  $h$  to obtain  $b=2A/h$ . When the desired variable occurs twice, collect it before dividing. State restrictions introduced by division.

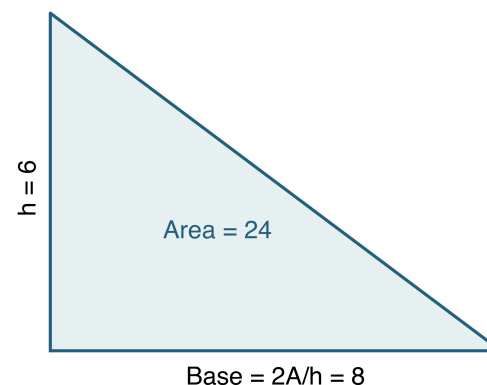
$$A = \frac{bh}{2} \iff b = \frac{2A}{h} \quad (h \neq 0)$$

For  $A=24, h=6$ ,  $b=2 \times 24/6=8$ . From  $v=u+at$ ,  $a=(v-u)/t$ ; for  $v=19, u=4, t=5$  this gives  $a=3$ . From  $y=3x+2$ ,  $x=(y-2)/3$ . From  $p=qx+r$ ,  $x=(p-r)/q$  for  $q \neq 0$ . Higher may factor repeated subjects:  $y=3x+px$  gives  $x=y/(3+p)$  when  $p \neq -3$ .

Doing an operation to only one side breaks the equality. The subject is a variable, not a numerical answer. Check the rearranged result by putting the found value into the original formula.

AQA A5 includes standard and given formulae from other subjects, in words and symbols. Choose a valid unit conversion before substituting; a rearrangement does not itself change units.

Undo the area formula to find the base



*Original native-lesson illustration; labels belong to its worked example.*

### 2 Practice

2.1 (Foundation) Find  $b$  when  $A=24, h=6$  in  $A=bh/2$ .

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**2.2** (Foundation) Find  $a$  for  $v=19, u=4, t=5$  in  $v=u+at$ .

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**2.3** (Foundation) Find  $x$  for  $y=17$  in  $y=3x+2$ .

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### 3 Exam-style questions

**3.1** Decide whether this claim is true. Justify with a concrete calculation or counterexample: To rearrange a formula, an operation may be applied to one side only.

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## Solutions

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**2.1**  $b=2A/h=48/6$ .

**2.2**  $a=(19-4)/5=3$ .

**2.3**  $x=(17-2)/3=5$ .

**3.1** False. From  $x+3=7$ , subtracting 3 on both sides gives  $x=4$ . Subtracting it only on the left would give  $x=7$ , which fails the original equation.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.