The cards below show eight different formulae, given with four different subjects. Cut out the cards and arrange them into groups of equivalent formulae.

$a = b + cd$	$a = b - cd$	$a = c + bd$	$a = \dfrac{b^2}{c} + d$
$a = \dfrac{c^2}{d} + b^2$	$a = \dfrac{b^2 - c^2}{d}$	$a = \dfrac{b + c}{d}$	$a = c - bd$

$b = ad - c$	$b = \sqrt{ac - cd}$	$b = \sqrt{a - \dfrac{c^2}{d}}$	$b = a + cd$
$b = a - cd$	$b = \dfrac{c - a}{d}$	$b = \dfrac{a - c}{d}$	$b = \sqrt{ad + c^2}$

$c = \dfrac{b^2}{a - d}$	$c = \dfrac{a - b}{d}$	$c = a - bd$	$c = ad - b$
$c = \sqrt{ad - b^2 d}$	$c = \sqrt{b^2 - ad}$	$c = \dfrac{b - a}{d}$	$c = a + bd$

$d = \dfrac{b + c}{a}$	$d = \dfrac{a - c}{b}$	$d = \dfrac{c - a}{b}$	$d = \dfrac{b - a}{c}$
$d = a - \dfrac{b^2}{c}$	$d = \dfrac{c^2}{a - b^2}$	$d = \dfrac{b^2 - c^2}{a}$	$d = \dfrac{a - b}{c}$

Teaching notes

The cards have been arranged according to the subject of the formula. You could extend the activity by omitting a section and asking pupils to find the missing formulae. The cards are otherwise arranged randomly so can be given to students to cut out.

You could get students to check their own work with some substitution practice:

1. Assign values to b, c and d. You can choose whether to use integers and/or negative numbers.
2. Ask students to calculate a by substituting into the formula.
3. Students check their work by substituting their value into the other formulae arrangements in the group, to see if they get the correct values for b, c and d.

Answers

$a = b + cd$	$b = a - cd$	$c = \dfrac{a-b}{d}$	$d = \dfrac{a-b}{c}$
$a = b - cd$	$b = a + cd$	$c = \dfrac{b-a}{d}$	$d = \dfrac{b-a}{c}$
$a = c + bd$	$b = \dfrac{a-c}{d}$	$c = a - bd$	$d = \dfrac{a-c}{b}$
$a = \dfrac{b^2}{c} + d$	$b = \sqrt{ac - cd}$	$c = \dfrac{b^2}{a-d}$	$d = a - \dfrac{b^2}{c}$
$a = \dfrac{c^2}{d} + b^2$	$b = \sqrt{a - \dfrac{c^2}{d}}$	$c = \sqrt{ad - b^2 d}$	$d = \dfrac{c^2}{a-b^2}$
$a = \dfrac{b^2 - c^2}{d}$	$b = \sqrt{ad + c^2}$	$c = \sqrt{b^2 - ad}$	$d = \dfrac{b^2 - c^2}{a}$
$a = \dfrac{b+c}{d}$	$b = ad - c$	$c = ad - b$	$d = \dfrac{b+c}{a}$
$a = c - bd$	$b = \dfrac{c-a}{d}$	$c = a + bd$	$d = \dfrac{c-a}{b}$