Names (pair) _____ Date _____

Parameters and Vieta's Formulas

Example

One solution of $x^2 + mx - 12 = 0$ is 3. We substitute it: $9 + 3m - 12 = 0$, so $m = 1$.

The product gives the other solution: $3 \times x_2 = -12$, so $x_2 = -4$. Check with the sum:

$3 + (-4) = -1 = -m$.

1 IN PAIRS One solution is given. Find m and the other solution. **Student A** does the top three equations and **student B** the bottom three. Then check your partner's rows with the sum of the solutions.

	equation	x_1	m	x_2
student A	$x^2 + mx + 6 = 0$	2		
	$x^2 - 5x + m = 0$	-1		
	$2x^2 + mx - 3 = 0$	1		
student B	$x^2 + mx - 10 = 0$	5		
	$x^2 + 4x + m = 0$	-3		
	$3x^2 - 7x + m = 0$	2		

Remember

Substitute the given solution into the equation to get the parameter. Vieta's formulas give the other solution fastest. If a **relation between the solutions** is given, write the sum and the product in terms of the parameter and add the given condition. At the end, always check that $D \geq 0$: otherwise the solutions are not real.

Names (pair) _____ Date _____

2 IN PAIRS Find m so that one solution of $x^2 - 9x + m = 0$ is twice the other.

$x_2 = 2x_1$, $x_1 + x_2 = 3x_1 =$ ☐ $\Rightarrow$ $x_1 =$ ☐ $x_2 =$ ☐

$m = x_1\, x_2 =$ ☐

3 IN PAIRS The solutions of $x^2 + (m-2)x - 3 = 0$ are opposite numbers. Find m and the solutions.

4 IN PAIRS For $x^2 - mx + 4 = 0, {x_1}^2 + {x_2}^2 = 17$. Find m. Check the discriminant.

5 IN PAIRS **Find the mistake.** The solutions of $x^2 + 2x + m = 0$ have product 5. Marko says: *The product is c, so $m = 5$.* Work out the discriminant for $m = 5$. What do you conclude?

★ ON YOUR OWN **Exit card.** One solution of $x^2 - 7x + m = 0$ is 2. Find m and the other solution.