Section 2: Notation and proof

Exercise level 1

The following table contains pairs of statements, A and B.

In each case complete the central column with one of the three symbols $\Rightarrow$, $\Rightarrow$, $\Leftrightarrow$, or with 'none'.

Also in each case, add the letters 'N' (necessary), 'S' (sufficient), or 'N & S' (necessary and sufficient), or 'neither', to indicate the relationship between the statements.

Q. no.	A nec. or suff. for B?	Statement A	$\Rightarrow$, $\Leftarrow$, $\Leftrightarrow$, 'none'?	Statement B	B nec. or suff. for A?
1		$x^2 = 9$		$x < 6$	
2		This month has 29 days		It is February in a leap year	
3		$x = +1$ or $x = -1$		$(x+1)(x-1) = 0$	
4		$\sin x = 1$		$x = 90°$	
5		A polygon is a square		A polygon has 4 sides	
6		$(x+1)(y-1) = 0$		$x = -1$ and $y = +1$	
7		Three straight lines in 2d meet in exactly 2 points		Exactly 2 of 3 straight lines in 2d are parallel	
8		$x^2 = 9$		$x = 3$	
9		n^2 is a multiple of 5		n is a multiple of 5	
10		k is divisible by 3		$k + 1$ is even	
11		The discriminant of a quadratic equation is non-negative		A quadratic equation has 2 unequal roots	
12		$a > b$		$\frac{1}{a} < \frac{1}{b}$	