Question 1. [11 MARKS] EXPRESSIONS

Let $R : \mathbb{N} \to \mathbb{B}$, and define predicates $P, Q : \mathbb{N} \to \mathbb{B}$ by the following tables:

$\mathbb{N}$:	0	1	2	3	4	5	$\cdots$	165	$\cdots$	general term
P :	T	T	T	F	T	T	$\cdots$	T	$\cdots$	$n \neq 3$
Q :	F	T	F	T	F	T	$\cdots$	T	$\cdots$	n is odd

Part (a) [2 MARKS]

Fill in each blank below to make each equivalence correct. For the restricted domain on the second line, enumerate *at least* the first four natural numbers in the set, based on the definitions of P, Q above.

$$\exists n \in \mathbb{N},\ P(n) \wedge Q(n) \wedge R(n)$$

$$\equiv \exists n \in \{\underline{\quad 1, 5, 7, 9, \ldots \quad}\},\ \underline{\quad R(n) \quad}$$

$$\equiv \left(\underline{\quad R(1) \quad}\right) \vee \left(\underline{\quad R(5) \quad}\right) \vee \left(\underline{\quad R(7) \quad}\right) \vee \left(\underline{\quad R(9) \quad}\right) \vee \ldots$$