1. We have the truth table

A	B	$A \implies B$	$\sim A$	$\sim A \vee B$
T	T	T	F	T
T	F	F	F	F
F	T	T	T	T
F	F	T	T	T

Notice that the columns for $A \implies B$ and $\sim A \vee B$ are identical. Therefore $A \implies B$ and $\sim A \vee B$ are logically equivalent.

2. (a) "x and y are both odd but xy is even."

(b) "If xy is odd then x and y are both odd."

(c) "If xy is even then either x is even or y is even."

(d) Suppose x and y are odd. Then $x = 2k + 1$ and $y = 2m + 1$ for some integers k, m. Thus $xy = (2k + 1)(2m + 1) = 4km + 2k + 2m + 1 = 2(2km + m + k) + 1$. Since $2km + m + k$ is an integer, it follows that xy is odd.

(e) Suppose, for a contradiction that x, y are both odd but xy is even. Since x and y are odd, $x = 2k + 1$ and $y = 2m + 1$ for some integers k, m, so that $xy = (2k + 1)(2m + 1) = 4km + 2k + 2m + 1 = 2(2km + m + k) + 1$. Thus xy is odd. A contradiction.

(f) The converse of P is the statement

"if xy is odd then x and y are both odd."

The converse is true. Suppose, for a contradiction that xy is odd and either x or y is even, say x is even. Then $x = 2k$ for some integer k and so $xy = 2ky$ is even, which is a contradiction.