1

A Yes this is. $5+2=7$ is a proposition no variables present so it is. It shows a statement that is either true or false

B **no, there is no statement that is either true or false**

C **Yes, this is a true or false statement. It most likely is false , but still could be proven**

D **yes, this is a true or false that is also true, It is self dependent, but addressable**

2

A

p	q	$\neg q$	$\rightarrow$	p	
T	T	F		T	$\boxed{T}$
T	F	T		T	$\boxed{T}$
F	T	F		F	$\boxed{T}$
F	F	T		F	$\boxed{F}$

B

p	q	r	$(p \vee q)$	$\rightarrow$ r	
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	T	T	T
T	F	F	T	F	F
F	T	T	T	T	T
F	T	F	T	F	F
F	F	T	F	T	T
F	F	F	F	F	T

③

Ⓐ $\boxed{s \vee \neg f}$

Ⓑ $s \to (\neg r \wedge f)$

④

p	q	$(p \to \neg q)$	$\equiv$	$\neg p \vee \neg q$
T	T	F		F
T	F	T	$\equiv$	T
F	T	T		T
F	F	T		T

One reason is that this is the dis j active form shown to be true. Another reason is that the negation of a means that there are more case it can be true, this logically equivalent

⑤

p	q	r	$p \to (q \to r)$		$(p \to q) \to r$	
T	T	T	T	T	T	T
T	T	F	F	F	T	F
T	F	T	T	T	F	T
T	F	F	T	T	F	T
F	T	T	T	T	T	T
F	T	F	T	F	T	F
F	F	T	T	T	T	T
F	F	F	T	T	T	F

r change back and forth more than p so it will be hard for something to be equivalent

6 2^n p and q = 4

$p = 2$ thus 2^n

$2^{(2^n)}$ options for connectives

7 $\neg p \to (p \to q) \equiv T$

$\equiv \neg p \to (\neg p \vee q)$ Disjuctive form

$\equiv \neg(\neg p) \vee (\neg p \vee q)$

$\equiv p \vee (\neg p \vee q)$ D. negation

$\equiv (p \vee \neg p) \vee q$ Associative law

$\equiv T \vee q$ Excudid middle

$\equiv T$ Domination laws