Section 2.1

8. False statement
11. Not a statement
14. Not a statement

Section 2.2

2. P : The matrix A is invertible. ANS:$\sim P$

7. $P : x = 0, Q : y = 0$ ANS: $P \wedge \sim Q$

8. $P : x = 1, Q : y = 0$ ANS: $P \vee Q$

Section 2.3

2. If a function is differentiable, then it is continuous

3. If a function is continuous, then it is integrable

7. If a series converges absolutely, then it converges

Section 2.4

1. A matrix is invertible if and only if its determinant is not zero.

4. a is a rational number if and only if $5a$ is a rational number. Similarly, $5a$ is a rational number if and only if a is a rational number.

Section 2.5

2.

Q	R	Q $\vee$ R	R $\wedge$ Q	(Q $\vee$ R) $\iff$ (R $\wedge$ Q)
F	F	F	F	T
F	T	T	F	F
T	F	T	F	F
T	T	T	T	T

4.

P	**Q**	**∼P**	**P ∨ Q**	**∼ (P ∨ Q)**	**∼(P ∨ Q) ∨ (∼ P)**
F	F	T	F	T	T
F	T	T	T	F	T
T	F	F	T	F	F
T	T	F	T	F	F

10. If $((P \wedge Q) \vee R) \Rightarrow (R \vee S)$ is false, then $((P \wedge Q) \vee R)$ is true and $(R \vee S)$ is false. From here we now know that both R and S are false, since $(R \vee S)$ is false. Next, since we know that R is false, then in the statement $((P \wedge Q) \vee R)$, that $(P \wedge Q)$ is true, which means that both P and Q are true.
P : true
Q : true
R : false
S : false

Section 2.6

2.

P	**Q**	**R**	**(Q ∧ R)**	**(P ∨Q)**	**(P ∨ R)**	**P ∨ (Q ∧ R)**	$(P \vee Q) \wedge (P \vee R)$
F	F	F	F	F	F	F	F
F	F	T	F	F	T	F	F
F	T	F	F	T	F	F	F
F	T	T	T	T	T	T	T
T	F	F	F	T	T	T	T
T	F	T	F	T	T	T	T
T	T	F	F	T	T	T	T
T	T	T	T	T	T	T	T

3.

P	Q	$\sim P$	$(\sim P) \vee Q$	$P \Rightarrow Q$
F	F	T	T	T
F	T	T	T	T
T	F	F	F	F
T	T	F	T	T

4.

P	Q	$\sim P$	$\sim Q$	$(P \vee Q)$	$\sim (P \vee Q)$	$(\sim P) \wedge (\sim Q)$
F	F	T	T	F	T	T
F	T	T	F	T	F	F
T	F	F	T	T	F	F
T	T	F	F	T	F	F

5.

P	Q	R	$\sim P$	$\sim Q$	$\sim R$	$(P \vee Q \vee R)$	$\sim (P \vee Q \vee R)$	$(\sim P) \wedge (\sim Q) \wedge (\sim R)$
F	F	F	T	T	T	F	T	T
F	F	T	T	T	F	T	F	F
F	T	F	T	F	T	T	F	F
F	T	T	T	F	F	T	F	F
T	F	F	F	T	T	T	F	F
T	F	T	F	T	F	T	F	F
T	T	F	F	F	T	T	F	F
T	T	T	F	F	F	T	F	F

6.

P	Q	R	$\sim P$	$\sim Q$	$\sim R$	$(P \wedge Q \wedge R)$	$\sim (P \wedge Q \wedge R)$	$(\sim P) \vee (\sim Q) \vee (\sim R)$
F	F	F	T	T	T	F	T	T
F	F	T	T	T	F	F	T	T
F	T	F	T	F	T	F	T	T
F	T	T	T	F	F	F	T	T
T	F	F	F	T	T	F	T	T
T	F	T	F	T	F	F	T	T
T	T	F	F	F	T	F	T	T
T	T	T	F	F	F	T	F	F

12. They are equivalent

P	Q	$\sim Q$	$P \Rightarrow Q$	$\sim (P \Rightarrow Q)$	$P \wedge \sim Q$
F	F	T	T	F	F
F	T	F	T	F	F
T	F	T	F	T	T
T	T	F	T	F	F

13. Not equivalent, if P is true and R is false. Then $P \vee (Q \wedge R)$ will be true, and $(P \vee Q) \wedge R$ will be false.