Homework 4

Christopher Achenbach

Problems from 2.3

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

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

11. If you fail, then you stop writing.

Problems from 2.4

1. Matrix A is invertible if and only if $\det(A) \neq 0$.

4. $a \in \mathbb{Q}$ if and only if $5a \in \mathbb{Q}$.

Problems from 2.5

3.

p	q	$p \to q$	$\neg(p \to q)$
1	0	0	1
1	1	1	0
0	0	0	1
0	1	1	0

4.

p	q	$p \vee q$	$\neg(p \vee q)$	$\neg p$	$\neg(p \vee q) \vee (\neg p)$
1	0	1	0	0	0
1	1	1	0	0	0
0	0	0	1	1	1
0	1	1	0	1	1

6.

p	q	$\neg p$	$p \wedge \neg p$	$(p \wedge \neg p) \wedge q$
1	0	0	0	0
1	1	0	0	0
0	0	1	0	0
0	1	1	0	0

8.

p	q	r	$\neg r$	$q \wedge \neg r$	$p \vee (q \wedge \neg r)$
1	1	1	0	0	1
1	1	0	1	1	1
1	0	1	0	0	1
0	0	0	1	0	0
0	1	1	0	0	0
0	1	0	1	1	1

11. Suppose p is false.
   Suppose $(r \rightarrow s) \leftrightarrow (p \wedge q)$ is true.
   $(p \wedge q)$ must be false.
   $(r \rightarrow s)$ must be false.
   Therefore, r is true, and s is false.