1.3 Examples

8.a Use De Morgan's laws to find the negation of the statement

Jan is rich and happy.

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Jan is rich and happy.

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

Jan is not rich or not happy.

8.b Use De Morgan's laws to find the negation of the statement

Carlos will bicycle or run tomorrow.

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Carlos will bicycle or run tomorrow.

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Carlos will not bicycle and will not run tomorrow.

6. Use a truth table to verify the first De Morgan law.

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p	q

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p	q
T	T
T	F
F	T
F	F

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p	q	p∧q
T	T	
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p	q	$p \wedge q$	$\neg(p \wedge q)$
T	T	T	
T	F	F	
F	T	F	
F	F	F	

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p	q	p∧q	¬(p∧q)	¬p
T	T	T	F	
T	F	F	T	
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p	q	p∧q	¬(p∧q)	¬p	¬q	¬p∨¬q
T	T	T	F	F	F	
T	F	F	T	F	T	
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F	T	F	T	T	F	T
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p	q	$p \wedge q$	$\neg(p \wedge q)$	$\neg p$	$\neg q$	$\neg p \vee \neg q$
T	T	T	F	F	F	F
T	F	F	T	F	T	T
F	T	F	T	T	F	T
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T	T	T	F	F	F	F
T	F	F	T	F	T	T
F	T	F	T	T	F	T
F	F	F	T	T	T	T