Øving 1

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Seksjon 1.1, s. 14

$\boxed{14}$ (c) You missing the final exam implies not passing the course.

(f) You have the flu and you miss the final exam or you don't miss the final exam and you pass the course.

$\boxed{16}$ (a) $r \wedge \neg q$

(e) $(p \wedge q) \rightarrow r$

Seksjon 1.3, s. 38

$\boxed{12}$ (a) $(\neg p \wedge (p \vee q)) \rightarrow q$

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

$(\neg p \wedge (p \vee q)) \rightarrow q$ er en tautologi.

(b) $((p \to q) \land (q \to r)) \to (p \to r)$

p	q	r	$p \to q$	$q \to r$	$(p \to q) \land (q \to r)$	$p \to r$	$((p \to q) \land (q \to r)) \to (p \to r)$
0	0	0	1	1	1	1	1
0	0	1	1	1	1	1	1
0	1	0	1	0	0	1	1
0	1	1	1	1	1	1	1
1	0	0	0	1	0	0	1
1	0	1	0	1	0	1	1
1	1	0	1	0	0	0	1
1	1	1	1	1	1	1	1

$((p \to q) \land (q \to r)) \to (p \to r)$ er en tautologi.

(c) $(p \land (p \to q)) \to q$

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

$(p \land (p \to q)) \to q$ er en tautologi.

(d) $((p \lor q) \land (p \to r) \land (q \to r)) \to r$

p	q	r	$p \lor q$	$p \to r$	$q \to r$	$(p \lor q) \land (p \to r) \land (q \to r)$	$((p \lor q) \land (p \to r) \land (q \to r)) \to r$
0	0	0	0	1	1	0	1
0	0	1	0	1	1	0	1
0	1	0	1	1	0	0	1
0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1
1	0	1	1	1	1	1	1
1	1	0	1	0	0	0	1
1	1	1	1	1	1	1	1

$((p \lor q) \land (p \to r) \land (q \to r)) \to r$ er en tautologi.

Seksjon 1.4, s. 57

$\boxed{24}$ (d) $\forall x \exists y, \neg P(y)$
$P(x)$: "x kan svømme".

(e) $\forall x \exists y, \neg Q(y)$
$Q(x)$: "x vil være rik".

Seksjon 1.5, s. 69, 71

$\boxed{12}$ $I(x)$: "x har tilgang til internett." $C(x, y)$: "x og y har snakket over internett."

(b) $\exists x \exists y, \neg C(x, y)$

(e) $\forall x \exists y, \neg C(y, x)$