Name:

Entry number:

There are 3 questions for a total of 10 points.

1. (a) (1 point) State true or false: The following compound proposition is a tautology.

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

(a) _____

(b) $(2 \frac{1}{2} \text{ points})$ Give reason for your answer to part (a).

2. (3 points) Let C(p,q,r) denote a compound proposition involving simple propositions p,q, and r. Give a compound proposition C(p,q,r) the truth table of which matches the one given below. (Note that there may be multiple correct answers for this question)

p	\mathbf{q}	\mathbf{r}	$\mathbf{C}(\mathbf{p},\mathbf{q},\mathbf{r})$
Т	Т	Т	Т
Т	Т	F	F
Т	F	Т	F
F	Т	Т	F
Т	F	F	Т
F	Т	F	F
F	F	Т	Т
F	F	F	Т

- 3. (a) (1 point) State true or false: The following two compound propositions and are logically equivalent:
 - $\bullet \ (p \to q) \to (r \to s)$
 - $(p \to r) \to (q \to s)$

(a) _____

(b) $(2 \frac{1}{2} \text{ points})$ Give reason for your answer to part (a).