Logic Supplement

1) This example will help you do exercises 1-13 on pp. 103-4.
Which of the following are statements?
   a) Today is Saturday.
   b) 5 < 7
   c) Did you vote today?
   d) $2^{216,091}-1$ is prime.
   e) Sit down!
   f) “Dawson’s Creek” is a great TV program.

2) This example will help you do exercises 39-47 on p. 104.
Let p represent the statement “This is November” and q represent the statement “It is raining.” Translate each symbolic compound statement into words.
   a) p $\lor$ ~q
   b) ~ (p $\land$ q)
   c) ~ (p $\land$ ~ q)

3) This example will help you do exercises 49-53 on p. 104.
Translate each sentence to symbolic form if
   p: Bill is tall
   q: Maria is tall
   a) Bill is tall and Maria is tall.
   b) It is not true that both Bill and Maria are tall.
   c) Bill is not tall or Maria is not tall.

4) This example will help you do exercises 29-35 on p. 115.
Determine the truth value of p $\lor$ q if p represents the statement 1 + 1 = 3 and q represents the statement 5 < 6

5) This example will help you do exercises 1, 3, 7-17, 21-27 on p. 115.
Consider ~p $\lor$ q. Find its truth value if we know:
   a) q is false and p is false.
   b) q is false and the truth value of p is unknown.

6) This example will help you do exercises 45-57 on p. 116.
Construct a truth table for each compound statement.
   a) p $\lor$ ~p
   b) ~ (p $\lor$ q)
   c) ~p $\lor$ ~q
   d) p $\lor$ (~ r $\lor$ q)

7) This example will help you do exercises 61 and 63 on p. 116.
Use DeMorgan’s Laws to write the negation of the following statement:
Juan is a Republican and Maria is Catholic.
8) This example will help you do exercises 21-25 on p. 122.
Determine the truth value:
a) $1 + 1 = 3 \rightarrow \text{square root of } 9 = 3$
b) $1 + 1 = 3 \rightarrow \text{square root of } 9 = 4$

9) This example will help you do exercises 3, 7, 41-53 on p. 123.
Suppose $p$ and $q$ are both false and $r$ is true. Find the truth value:
a) $r \rightarrow p$
b) $p \rightarrow r$
c) $p \lor (\sim r \rightarrow q)$
d) What about part c if all we know is that $r$ is true?

10) This example will help you do exercises 33-39 on p. 123.
Let $p$ represent “Finite Math is easy” and $q$ represent “You do your homework.”
Write each compound statement in symbols:
a) If you do not do your homework, then Finite Math is not easy.
b) Finite Math is easy if you do your homework.

11) This example will help you do exercises 27-31 on p. 123.
Let $h$ represent “I major in Hospitality Management,” $b$ represent “Switzerland is beautiful,” and $s$ represent “I study indoors.” Express the compound statement in words:
$(h \lor b) \rightarrow \sim s$

12) This example will help you do exercises 55-63 on p. 123.
Construct a truth table for $(p \rightarrow q) \lor (q \rightarrow p)$

13) This example will help you do exercises 55-63 on p. 123.
Is the statement in example 12 a tautology?

14) This example will help you do exercises 45-49 on p. 133.
Identify as true or false:
a) $2$ is odd if and only if Switzerland is in Africa.
b) $8 + 3 \neq 11 \leftrightarrow 3^2 = 9$

15) This example will help you do exercises 13-23 and 27-33 on p. 147.
Use a truth table to determine whether the argument is valid or invalid.
a) $(p \leftrightarrow r) \rightarrow \sim q$

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<table>
<thead>
<tr>
<th>~r</th>
<th>p \lor q</th>
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<tbody>
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<td>T</td>
<td>T</td>
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<td>F</td>
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b) If it is raining, then this is December. It is raining. Therefore, this is December.
c) If you are a derf, then you are a gork. If you are not a gork, then you are a floozle.
You are not a floozle. Therefore, you are not a derf.