

## Logic worksheet

1. Assume the following hypotheses are true:
  - a. If the basketball center is healthy, or the point guard is hot, then the team will win and the fans will be happy.
  - b. If the fans are happy or the coach is a millionaire, then the college will balance the budget.

Use letters to represent each statement, and apply the rules of logic to prove that the following conclusion holds:

If the basketball center is healthy, then the college will balance the budget.

2. In each of the following exercises, assume the given hypotheses are true, and show how/why the indicated conclusion follows.
  - a. Hypotheses:  $\sim r, (\sim r \wedge s) \Rightarrow r$   
Conclusion:  $\sim s$
  - b. Hypotheses:  $\sim t, (r \vee s) \Rightarrow t$   
Conclusion:  $\sim s$
  - c. Hypotheses:  $r \Rightarrow \sim s, t \Rightarrow u, s \vee t$   
Conclusion:  $\sim r \vee u$
3. Write the contrapositive, converse and inverse of each of the following.
  - a. If  $pq$  is odd, then  $p$  is odd and  $q$  is odd.
  - b. If  $a < b$  and  $c$  is positive, then  $ac < bc$ .
4. Negate each of the implications in Q.3 above.