0.1 Mathematical Statements

1. Write the negation of the following statements.

$$P : \text{The integer 3 is odd.}$$

2. Make the two following statements one compound statement.

$$P : \text{The integer 3 is odd.}$$

$$Q : \text{The integer 57 is prime.}$$

3. Use the next two statements to make one implication.

$$P : \text{You earn an A on the final exam.}$$

$$Q : \text{You receive an A for your final grade.}$$

4. Write the converse of the implication from part (3).

5. Write the contrapositive of the implication from part (3).

6. Use the symbols $\neg, \rightarrow, \forall$ (for all) and $\exists$ (there exists) to transcribe the following statements into logical notation.

   (a) If $y = 1$, then $xy = x$ for any x.
   (b) There is no solution to $x^2 = y$ unless $y > 0$.
   (c) $x < z$ is a necessary condition for $x < y$ and $y < z$.
   (d) If $x < y$ then for some z such that $z < 0$, $xz > yz$.
   (e) There is an x such that for every y an z, $xy = xz$.