pp. 106, Exercise Set 3.1

4. *a.* $Q(2)$: $2^2 \leq 30$ - true because $2^2 = 4$ and $4 \leq 30$,
   $Q(-2)$: $(-2)^2 \leq 30$ - true because $(-2)^2 = 4$ and $4 \leq 30$
   $Q(7)$: $7^2 \leq 30$ - false because $7^2 = 49$ and $49 \nleq 30$,
   $Q(-7)$: $(-7)^2 \leq 30$ - false because $(-7)^2 = 49$ and $49 \nleq 30$
   c. truth set $= \{n \in \mathbf{Z}^+ \mid n^2 \leq 30\} = \{1, 2, 3, 4, 5\}$

10. Counterexample 1: Let $a = 1$, and note that $(a-1)/a = (1-1)/1 = 0$ is an integer.
    Counterexample 2: Let $a = -1$, and note that $(a-1)/a = (-1-1)/(-1) = 2$ is an integer.

32. *b.* This statement translates as "For all real numbers x, if $x > 2$ then $x^2 > 4$," which is true.

    d. This statement translates as "For all real numbers x, $x^2 > 4$ if, and only if, $|x| > 2$." This is true because $x^2 > 4$ if, and only if, $x > 2$ or $x < -2$, and $|x| > 2$ means that either $x > 2$ or $x < -2$.

pp. 116, Exercise Set 3.2

3. *b.* $\exists$ a computer C such that C does not have a CPU.
   d. $\forall$ bands b, b has won fewer than 10 Grammy awards.

4. *b.* Some people are unhappy.
   d. All estimates are inaccurate. *Or*: No estimates are accurate.

17. $\exists$ an integer d such that $6/d$ is an integer and $d \neq 3$.

27. *Converse*: $\forall$ integers d, if $d = 3$ then $6/d$ is an integer.
    Inverse: $\forall$ integers d, if $6/d$ is not an integer, then $d \neq 3$.
    Contrapositive: $\forall$ integers d, if $d \neq 3$ then $6/d$ is not an integer.
    Theconverse and inverse of the statement are both true, but both the statement and its contrapositive are false. For example, when $d = 2$, then $d \neq 3$ but $6/d = 3$ is an integer.

42. If a person does not pass a comprehensive exam, then that person cannot obtain a master's degree. *Or*: If a person obtains a master's degree then that person passed a comprehensive exam.