Math 2300
Section 4.1

Definition of **even**

$$\forall n \in \mathbb{Z}, n \; is \; even \; IFF \; \exists k \in \mathbb{Z} \ni n = 2k$$

Definition of **odd**

$$\forall n \in \mathbb{Z}, n \; is \; odd \; IFF \; \exists k \in \mathbb{Z} \ni n = 2k + 1$$

Definition of **prime**

n is prime ⇔

$$n > 1 \wedge \forall r, s \in \mathbb{Z}^+, n = rs \implies r = 1 \vee s = 1$$

Definition of **composite**

n is composite ⇔ $n > 1 \wedge \exists r, s \in \mathbb{Z}^+ \ni n = rs \wedge 1 < r < n \wedge 1 < s < n$

4.2

Definition of **rational**

r is rational ⇔ $\exists m, n \in \mathbb{Z} \ni r = \frac{m}{n} \wedge n \neq 0$

4.3

Definition of **divides**

$$Let \; n, d \in \mathbb{Z} \wedge d \neq 0, then \; d|n \Leftrightarrow \exists k \in \mathbb{Z} \ni n = dk$$

Directions for Writing Proofs of Universal Statements (p.154)

1. Copy the statement of the theorem to be proved on your paper.
2. Clearly mark the beginning of your proof with the word Proof.
3. Make your proof self-contained.
4. Write your proof in complete, grammatically correct sentences.
5. Keep your reader informed about the status of each statement in your proof.
6. Give a reason for each assertion in your proof.
7. Include the "little words and phrases" that make the logic of your arguments clear.
8. Display equations and inequalities.

Common Mistakes (p. 156)

1. Arguing from examples.
2. Using the same letter to mean two different things.
3. Jumping to a conclusion.
4. Circular reasoning.
5. Confusion between what is known and what is still to be shown.
6. Use of any rather than some.
7. Misuse of the word if.