Discrete Mathematics
Week 5

Abeyah Calpatura

4.1

Exercises

Abeyah Calpatura
#7, 13, 24, 28

#7 *Solution:* There exist real numbers a and b such that $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$.

$$a = 16 \text{ and } b = 0$$
$$\sqrt{16+0} = \sqrt{16} + \sqrt{0}$$
$$4 = 4$$

#13 *Solution:* For every integer n, if n is odd, then $\frac{n-1}{2}$ is odd.

Negation: There exists an integer n such that n is odd and $\dfrac{n-1}{2}$ is even.

Counterexample: $n = 1$

$\dfrac{1-1}{2} = 0$ which is even.

Conclusion: The statement is false.

#24 *Solution:* For every real number x, if $x > 1$, then $x^2 > x$.

Quantification Implicit If x is a real number and $x > 1$, then $x^2 > x$.

First sentence of proof: "Suppose x is a real number greater than 1."

Last sentence of proof: "$x^2 > x$"

#28 *Solution:*

a. $\forall$ integers m and n, if m and n are odd, then $m + n$ is even,
as $\forall$ odd integers m and n, $m + n$ is even,
and as If m and n are any odd integers, then $m + n$ is even.

b.