**Math 231 – HW 6 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Remember -- FORMAT is as important as CONTENT – get them both right!***

Epp 2nd Ed. 3.2 8, 13, 17, 19, 21, 24

3.3 3, 4, 7, 14, 16

**3.2**

**(8)** The zero product property says that if a product of two real numbers is zero, then one of the numbers must be zero.

(a) Write this property formally using quantifiers and variables.

(b) Write the contrapositive of your answer to part a.

(c) Write the contrapositive informally – no quantifiers, no variables.

**(13)** Give a formal proof of the statement: The product of any two rational numbers is a rational number.

Theorem:

Proof:

**(17)** Given any two distinct rational numbers r and s, with r<s, find a rational number x such that r<x<s. You do not need to give a formal proof, but show me how x is rational.

**(19)** Give a formal proof that the square of any odd integer is odd.

Theorem:

Proof:

**(21)** Give a formal proof that if n is an odd integer, then n2+n is even.

Theorem:

Proof:

**(24)** Suppose a, b, c, and d are integers, and a is not equal to c. Suppose also that x is a real number that satisfies the given equation. Must x be rational? If so, express x a ratio of two integers.



**3.3**

**(3)** Is (3k+1)(3k+2)(3k+3) divisible by 3, if k is an integer? Explain!

**(4)** Is 2m(2m+4) divisible by 4, if m is an integer? Explain!

**(7)** Is 6a(a+b) a multiple of 3a, if a and b are integers? Explain!

**(14)** Give a formal proof of the statement. For all integers a, b, and c, if a|b and a|c, then a|(b+c).

Theorem:

Proof:

**(16)** Give a formal proof of the statement. The sum of any three consecutive integers is divisible by 3. Use n as your first integer.

Theorem:

Proof: