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CS-225: Discrete Structures in CS
Homework 4, Part 1

Exercise Set 4.1: Problem 15

n, if n is even then n^2+1 = prime

$0^2+1=1$
1 is not a prime number

Exercise Set 4.2: Problem 5

a & b are odd, sum is even
$a+b=2r+2s$ by substitution
$t=2(r+s)$ by factoring out 2
By substitution, $a+b=2t$
Hence $a+b$ is even

Exercise Set 4.2: Problem 26

Counterexample
$a=2, b=3, c=4$
$2+3+4=9$
$2+3+4=2r$
$r=\frac{9}{2}$
$r=4.5$
9 is not even

Exercise Set 4.3: Problem 25

$3r^2-2r+4$
3, 2, 4 are integers therefor they are rational
The double of a rational number is rational, the $-(2r)$ is rational
r is a rational number then r^2 is rational, also $3r^2$ is rational
the sum of rational numbers is rational then $3r^2-(2r)+4$ is rational

Exercise Set 4.4: Problem 26

True

$a|b|c$
$c=(ab)r$ associative property
$c=a(bs)$
$c=(ab)S=(ba)S=b(as)$
$c=at$ & $c=bu$ $u=bs$
$t=as$

Hence, if $a|bc$ then $a|c$ and $b|c$