Discrete Structures

10/1/23 HW 7 Josiah Schmitz

4.1.4 a. Yes, because any even number times an integer results in an even number. b. Yes, because adding an odd number, in this case 3, to an even number makes it odd. c. Yes. $r^2+2rs+s^2$ can be factored into $(r+s)(r+s)$. Because $1<(r+s)<n$, the sum, n, is composite.

4.1.16 $n=64$. $n^2+1=65$. $65=5\cdot13$. Because neither factor, 5 or 13, equals 65, n^2+1 is not prime.

4.4.13 Yes. $n^2-1=16k^2+24k+8$. $(16k^2+24k+8)/8=2k^2+3k+1$. Because $(2k^2+3k+1)(8)=n^2-1$, 8 divides n^2-1.

4.4.21 True Any even integer can be written as $2n$. Take two even integers, $2n$ and $2m$. $(2n)(2m)=4nm$. Because this product can be written as dk, where d is 4 and nm is an integer, this statement is true.

4.4.37b. $5,733=3^2\cdot7^2\cdot13$ c. $3\cdot5^2\cdot7^2$