michael Chillemi quiz 2 10/16

1. Assume p: a and b are two even positive integers

If a & b are even, it does not mean they =

~~Assume~~ q: Sum of a and b is even number

So even positive number means $a = b = 2n$

So Sum of a and b is $(2n) + (2n) = (4n) = 2(2n)$

-3

is ~~t~~even.

2. ~~[illegible]~~

$P(1) \quad 1^2 \geq 1 \qquad n^2 \geq n$

$1 \geq 1$ ✓

one is equal to one you use the exhaustive proof. ✓

3. suppose $m^2 = n^2$ $m^2 = n^2$ does not imply $m-n \neq 0$!

therefore $m - n \neq 0$ or $m + n \neq 0$ ✗

Contradiction! ? $(m-n)(m+n) \neq 0$

So $m + n \neq 0$ and $m - n \neq 0$ $m^2 + mn - nm - n^2 \neq 0$

$m \neq -n$ and $m \neq n$ $m^2 - n^2 \neq 0$

if $m = n$ or $m = -n$ then $m^2 \neq n^2$

-2

$m^2 = n^2$

thus $m^2 = n^2$ if and only if $m = n$ or $m = -n$

4. assume n is a integer and n is odd by the definition there is an integer k such that

$\therefore n = 2k+1$ ✓

$n^3+5 = (2k+1)^3+5 = (8k^3+12k^2+6k+1)+5$

$= 8k^3+12k^2+6k+6 = 2(4k^3+6k^2+3k+3)$ ✓

thus we can find $l = 4k^3+6k^2+3k+3$ such that $n^3+5 = 2l$

it means n^3+5 is even. ✓

5. 13 mod 3

$13/3 = 4.\overline{3}$

$4 \times 3 = 12$

$13 - 12 = 1$

$\boxed{13 \text{ mod } 3 = 1}$ ✓

6. $^{-}97$ mod 11

-1

$-97 = 11(-9)+2$

$-97/11 = -8.\overline{81}$

$$11 \overline{)\,-97\,}$$

-9

99

2

$11 \cdot {}^{-}8 = -88$

$-97 + {}^{+}88 = 9$

$\boxed{-97 \text{ mod } 11 = \cancel{9}}$

7. 21, 43, 55   Pairwise relatively prime

$21 = 3 \cdot 7$ gcd(21, 43) = 1

$43 = 43 \cdot 1$ gcd(21, 55) = 1

$55 = 5 \cdot 11$ gcd(34, 55) = 1

All are relativratively prime because gcd is equal to 1.