HW Minimal

Problem 1.

Problem 2

Every odd integer is the difference of two squares.

odd integer..... is $a^2 - b^2 = (a+b)(a-b)$

If $n = 11$, then $a = 6$, $b = 5$.

$n = 2k+1$, $a = k+1$, $k = b$

Then $(k+1)^2 - k^2 = k^2 + 2k + 1 - k^2 = 2k+1 = n$

Problem 3

sum of irrational number and a rational number is irrational $\rightarrow$

let's do them rational

r - irrational number

i - rational number

$s = r + i$ is an irrational number

Problem 4

$\sqrt{2}$ = irrational number

$\sqrt{2}$ and $\sqrt{2}$, the rational number 2.

Problem 5

Use proof by contraposition to show that if $x + y \geq 2$, x, y - real numbers, then $x \geq 1$ or $y \geq 1$.

If it's not True $x \geq 1$ or $y \geq 1$, then it's not True $x + y \geq 2$.

$x < 1$; $y < 1$

$x + y < 2$

Problem 6

If n is an integer and $n^3 + 5$ is odd, then n is even using

a) a proof by contraposition.

b) a proof by contradiction.

$n = 2k + 1$ for k

a) $n^3 + 5 = (2k+1)^3 + 5 = 8k^3 + 12k^3 + 6k + 6 = 2(4k^3 + 6k^2 + 3k + 3)$, $n^3 + 5$ is even

b) Wrong.