

Quiz 3

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$$1.) a+b=19 \rightarrow a \geq 10 \vee b \geq 10$$

Contraposition

$$a < 10 \wedge b < 10 \rightarrow a+b \neq 19$$

This gives us the largest possible value when $a=9$ & $b=9$ at $a+b=18$
so either a or b must be at least 10.

$$2.) n \text{ is even} \Leftrightarrow n^2 \text{ is even} \equiv n \text{ is even} \rightarrow n^2 \text{ is even}$$

split in 2

direct

 $n \text{ is even then } n=2k$

$$\text{meaning } n^2 = 4k^2 = 2(2k^2) = 2z$$

Contraposition n^2 is even $\rightarrow n$ is even $\equiv n$ is odd $\rightarrow n^2$ is odd

$$n = 2k+1 \quad n^2 = (2k+1)^2 = 4k^2 + 4k + 1 \\ = 2(2k^2 + 2k) + 1 = 2z + 1$$

Since if n is even then n^2 is even, and n is odd then n^2 is odd, this proves that n is even if and only if n^2 is even.

$$3.) \text{i.) } A \cap B = \{a, e, h, k\} \quad \text{iii.) } A \cap B \cap C = \{a, e\}$$

$$\text{ii.) } A \cup C = \{a, c, e, h, i, k, m\}$$

$$\text{iv.) } A - B = \{c\}$$

$$\text{v.) } \begin{aligned} A - (B - C) \\ = \{a, c, e\} \end{aligned}$$

$$B - C = \{b, d, f, g, l\}$$