(a) $\gcd(1266, 888) = \gcd(888, 378)$ since $1266 \% 888 = 378$

$\gcd(888, 378) = \gcd(888, 132)$ since $888 \% 378 = 132$

$\gcd(378, 132) = \gcd(132, 114)$ $378 \% 132 = 114$

$\gcd(132, 114) = \gcd(114, 18)$ ⋮

$\gcd(114, 18) = \gcd(18, 6)$ ⋮

$\gcd(18, 6) = \gcd(6, 0)$ ⋮

(b) Let $u > v$

$u \bmod v \Leftrightarrow u = kv + r$ where $r \in [0, v)$

Because $k \geq 1$ (because $u > V$)

and $r < V$, so $r < kV$

Then: $r \leq kV$, $r \leq r$

$\Rightarrow r + r \leq kV + r \Rightarrow 2r \leq kV + r$

$\Rightarrow \frac{r}{2} \leq \frac{kV}{2}$

$\Rightarrow r \leq kV$

since $k \geq 1$ and $u > r$ (K at least 1 beacuse $u > V$)

$\therefore$ $u \bmod v < \frac{u}{2}$

(c) assume $a > b$, then after $\gcd(a, b)$

a is at most $a/2$ based on part (b)

also the $\gcd(b, a)$ need most $\log_2 b$ times since

it always reduce at least half of the origin number.

so $\gcd(a, b)$ needs $1 + \log_2 b$ times.

since $k \leq \log_2 b$.