Diskrete Mathe Tutorium 27.03.2007

Note Title 27.03.2007

21.) $m \mid n \iff \gamma_m(p) \leq \gamma_n(p) \;\forall p$

$$m = \prod_{p \in \mathbb{P}} p^{\gamma_m(p)}$$
$$n = \prod_{p \in \mathbb{P}} p^{\gamma_n(p)}$$

Definition

$$T(m) = \{\prod p^{k_p} : k_p \leq \gamma_m(p)\}$$
$$T(n) = \{\prod p^{k_p} : k_p \leq \gamma_n(p)\}$$
$$T(m,n) = \{\prod p^{k_p} : k_p \leq \min(\gamma_m(p), \gamma_n(p))\}$$
$$\max T(m,n) = \prod p^{k_p} \quad \max k_p \leq \min(\gamma_m(p), \gamma_n(p))\}$$

Beispiel: $144 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$

$89 = 89$ = Primzahl

↳ zu finden durch ausprobieren

```
input m,n;

int a = 0;
int b = 0;
int a1 = 1;
int b1 = 0;

while (m != 0)
{
  k = m % n;
  q = m / n;
  m = n;
  n = k;

  k = a1;
  a1 = a - q * a1;
  a = k;

  k = b1;
  b1 = b - q * b1;

  b = k;
}

return m,a,b; //m = ggT
```

Bsp 22.)

24.) $am + bn = 1$

$$x \mid m \Leftrightarrow x \mid a \cdot m$$

$$\exists k: m = k \cdot x \Rightarrow a \cdot m = (a \cdot k) \cdot x$$

$$x \mid k_1 \wedge x \mid k_2$$

$$\left.\begin{array}{l} \Rightarrow k_1 = x \cdot q_1 \\ \Rightarrow k_2 = x \cdot q_2 \end{array}\right\} \Rightarrow k_1 + k_2 = x(q_1 + q_2)$$

Annahme: $ggT(m,n) = x$

$$x \mid m \quad x \mid n \Rightarrow x \mid a \cdot m,$$

$$x \mid b \cdot n$$

$$\Rightarrow x \mid am + b \cdot n$$

$$x \mid 1 \qquad \Rightarrow x = 1$$