Euclidean Algorithm

Algorithm for finding GCD

- This method is the *Euclidean Algorithm* named of *Euclid* who describes this algorithm in his book *Elements.*
- *This same method for finding the greatest common divisor was also described in the sixth century by the Indian mathematician Aryabhata, who called this method*

“the pulverizer”

- If *e* and *d* are integers and *e=dq+r*, where *q* and *r* are integers, then *(e,d)=(d,r)*
- *Example: 20 and 8 are integers,*
- *20=8(1) + 12 then (20,8) = (8,12)*
- *20=8(2) + 4 then (20,8) = (8,4)*

Ok, let's try the Euclidean Algorithm

- (75,45)
- 75 = 45*1 + 30
- 45 = 30*1 + 15
- 30 = 15*2 + 0
- therefore (75,45)=15

- (222,102)
- 222 = 102*2 + 18
- 102 = 18*5 + 12
- 18 = 12*1 + 6
- 12 = 6*2 + 0
- therefore (222,102)=6

- (1234,981)
- 1234 = 981*1 + 253
- 981 = 253*3 + 222
- 253 = 222*1 + 31
- 222 = 31*7 + 5
- 31 = 5*6 + 1
- 5 = 1*5 + 0
- therefore (1234,981)=1