

Divisibility

$$a=4 \quad b=2 \quad m=2$$

$$\begin{array}{r} 2 \\ 2 \overline{) 4} \\ \underline{4} \\ 0 \end{array}$$

$$\begin{array}{r} m \\ b \overline{) a} \\ \underline{a} \\ 0 \end{array}$$

$$b \mid a$$

b is divisor of a

$$13 \mid 182$$

$$\begin{array}{r} 14 \\ 13 \overline{) 182} \\ \underline{182} \\ 0 \end{array}$$

$$17 \mid 289$$

$$\begin{array}{r} 17 \\ 17 \overline{) 289} \\ \underline{289} \\ 0 \end{array}$$

$$17 \mid 0$$

$$\begin{array}{r} 0 \\ 17 \overline{) 0} \\ \underline{0} \\ 0 \end{array}$$

Division Algo

$$\begin{array}{r} 4 \\ 15 \overline{) 70} \\ \underline{60} \\ 10 \end{array}$$

$$\begin{array}{r} q \\ n \overline{) a} \\ \underline{qn} \\ r \end{array}$$

$$0 \leq r < n$$

$$a=11$$

$$n=7$$

$$\begin{array}{r} 1 \\ 7 \overline{) 11} \\ \underline{7} \\ 4 \end{array}$$

$$\begin{aligned} & qn+r \\ &= 1 \times 7 + 4 \end{aligned}$$

Euclidean Algo

(A)

$$d = \gcd(a, b)$$

$$a = 100 \quad b = 50$$

$$d = \gcd(100, 50)$$

$$a = q_1 b + r_1 \Rightarrow 100 = \overset{q_1}{2} \times \overset{b}{50} + \overset{r_1}{0}$$

$$d = 50$$

(B)

$$a = 1071 \quad b = 462$$

$$\gcd(1071, 462)$$

①

$$a = q_1 b + r_1$$

$$1071 = \underset{q_1}{2} \times \underset{b}{462} + \underset{r_1}{147}$$

Divide b by r_1

②

$$b = q_2 r_1 + r_2$$

$$462 = 3 \times 147 + 21$$

Divide r_1 by r_2

③

$$r_1 = q_3 r_2 + r_3$$

$$147 = 7 \times 21 + 0$$

$$d = 21$$