

## GCD

## Worksheet 1

Name:

Date: 9-28-17

1. Find the GCD(315, 825) using Euclidean algorithm.

$$\textcircled{1} \quad 825 = 2(315) + 195$$

$$\textcircled{2} \quad 315 = 1(195) + 120$$

$$\textcircled{3} \quad 195 = 1(120) + 75$$

$$\textcircled{4} \quad 120 = 1(75) + 45$$

$$\textcircled{5} \quad 75 = 1(45) + 30$$

$$\textcircled{6} \quad 45 = 1(30) + \textcircled{15}$$

$$\textcircled{7} \quad 30 = 2(15) + 0$$

$$\text{GCD}(315, 825) = 15$$

2. Find  $s$  and  $t$  such that  $s315 + t825 = \text{gcd}(835, 315)$ .

$$\text{GCD}(315, 825) = 15 = 45 - 1(30) \quad \text{by 6}$$

$$= 45 - 1[75 - 45] \quad \text{by 5}$$

$$= 45 - 75 + 45$$

$$= 2(45) - 75$$

$$= 2[120 - 75] - 75 \quad \text{by 4}$$

$$= 2(120) - 3(75)$$

$$= 2(120) - 3[195 - 120] \quad \text{by 3}$$

$$= 2(120) - 3(195) + 3(120)$$

$$= 5(120) - 3(195)$$

$$= 5[315 - 195] - 3(195) \quad \text{by 2}$$

$$= 5(315) - 8(195)$$

$$= 5(315) - 8[825 - 2(315)] = 5(315) - 8(825) + 16(315) \uparrow$$

$$= 21(315) - 8(825)$$

$$\boxed{s=21, t=-8}$$