

1-(a)

$$\gcd(123456, 23456)$$

$$\underline{123456} = \underline{23456} \cdot (5) + (\underline{6176})$$

$$\underline{23456} = \underline{6176} \cdot (3) + (\underline{4928})$$

$$6176 = 4928 \cdot (1) + (\underline{1248})$$

$$4928 = 1248 \cdot (3) + (\underline{1184})$$

$$1248 = 1184 \cdot (1) + (\underline{64})$$

$$1184 = 64 \cdot (18) + (\underline{32})$$

$$64 = \underline{32} \cdot (2) + 0.$$

$$\begin{aligned} \text{Q1. } \gcd(a, b) &= \gcd(b, r_1) = \gcd(r_1, r_2) \dots \\ &= \gcd(r_{n-1}, r_n) = r_{n-1}. \end{aligned}$$

$$r_{n-1} = 32 \text{ o.e.z.}$$

$$\gcd(a, b) = 32.$$

1-(b)

Q2 (b)

2-(a)에서 7와 18의 최대 공약수

$$32 = 1184 - 64 \cdot 18$$

$$= 1184 - (1248 - 1184) \cdot 18$$

$$= (1248)(-18) + 1184 \cdot 19$$

$$= (1248)(-18) + (4928 - 1248 \cdot 3) \cdot 19$$

$$= (4928 \cdot 19) + 1248 \cdot (-75)$$

$$= (4928 \cdot 19) + (6176 - 4928) \cdot (-75)$$

$$= 6176 \cdot (-75) + 4928 \cdot (94)$$

$$= 6176 \cdot (-75) + (23456 - 6176 \cdot 3) \cdot 94$$

$$= 23456 \cdot (94) + (6176) \cdot (-357)$$

$$= 23456 \cdot (94) + (123456 - 23456 \cdot 5) \cdot (-357)$$

$$= 123456 \cdot (-357) + 23456 \cdot (1879)$$

$$\therefore ax + by = \gcd(a, b) = 32 \text{ 인 } (x, y) \text{ 쌍은}$$

$$(-357, 1879)$$