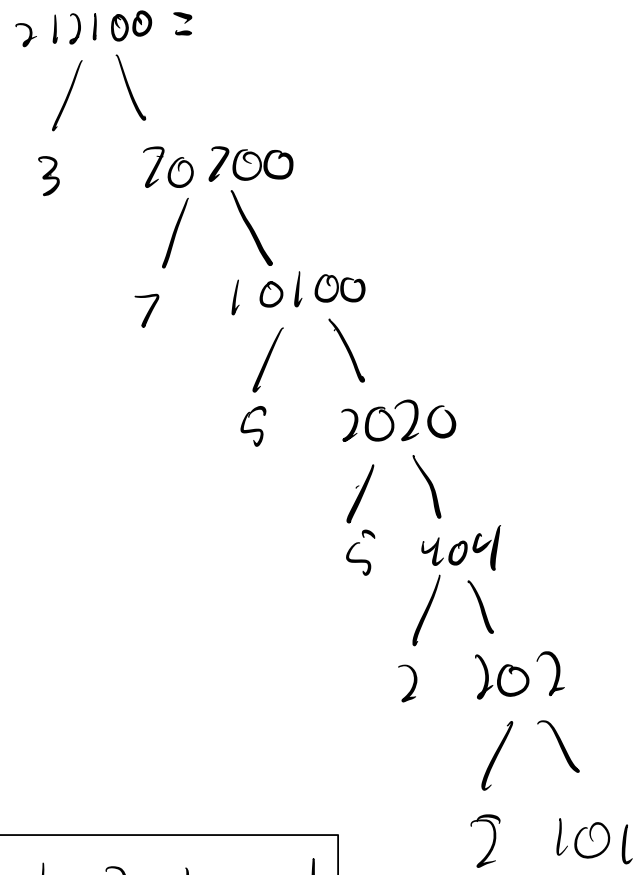
(1)



$2^2 3^1 5^2 7^1 101^1$

(2) $(2+1)(1+1)(2+1)(1+1)(1+1)$

$3 \cdot 2 \cdot 3 \cdot 2 \cdot 2 = \boxed{72}$

$x = \text{st k}\left(\frac{b}{a}\right)$

(3)

$77 = 5 \cdot 14 + 7$

$14 = 2 \cdot 7 + 0$

7

1	0	77	
0	1	14	
1	-5	7	5
-2	10	0	2

$y = \text{c-k}\left(\frac{a}{d}\right)$

$(1, -5)$

$(1)77 - (5)14 = 7$ ←

Not possible as 7 is not a multiple of 69 so it can not be made to equal 69

4

Using math from previous equation

$7 \cdot 10 = 70$ thus $10\left(1(77) - 5(14)\right) = 7 \cdot 10 = 70$

$10(77) - 50(14) = 70$

$d = 7$ $\quad x = s + k\left(\frac{b}{d}\right)$ $\quad (s, t) = (10, -50$

$y = t - k\left(\frac{a}{d}\right)$

$x = 10 + k\left(\frac{12}{7}\right)$ $\quad y = -50 - k(11)$

5

$79x + 41y = 6358$

$79 = 1 \cdot (41) + 38$

$41 = 1 \cdot 38 + 3$

$38 = 12 \cdot 3 + 2$

$3 = 1 \cdot 2 + 1$

$2 = 2 \cdot 1 + 0$

$1 = 3 + (1 \cdot 2)$ $\quad 1 = 3 - (38 - 12 \cdot 3)$

$= 13 \cdot 3 - 38 = 13(41 - 38) - 38 = 1$

$= 13 \cdot 41 - 14 \cdot 38 = 1$

$13 \cdot 41 - 14(79 - 41) = 1$

$1 = 27 \cdot 41 - 14 \cdot 79$

$6358 = 6358 \cdot (\quad \searrow \quad)$

$6358 = 171666 \cdot 41 - 89012(79)$

$$x = 171666 - k\left(\frac{79}{1}\right) = \boxed{171666 - 79k}$$

$$\boxed{y = 49012 - 41k} \qquad k \in \mathbb{Z}$$

(6)

$7 = 15 + 2$	$1 = 5 - 2\cdot 2$
$5 = 2\cdot 2 + 1$	$1 = 5 - 2(7 - 1\cdot 5)$
$2 = 2\cdot 1 + 0$	$1 = 5 - 2\cdot 7 + 2\cdot 5)$
	$1 = 3\cdot 5 - 2\cdot 7$

$$99\cdot 1 = 99(3\cdot 5 - 2\cdot 7)$$

$$\boxed{99 = 297(5) + 198(-7)}$$