AMAT 326 Quiz#5 Name: BG

① Find (112, 126)

$126 = 112 \cdot 1 + \boxed{14}$ ← g.c.d. of 112 and 126

$112 = 14 \cdot 8 + 0$

② Find an integral solution of $112x + 126y = 56$

$14 = 126 - 112$ from ① and $56 = 14 \cdot 4$

So $56 = 126(4) + 112(-4) \Rightarrow$

one solution is $x_0 = -4,\ y_0 = 4$

③ Find <u>all</u> integral solutions of $112x + 126y = 56$

The general solution is

$$x = x_0 + \frac{b}{d}k = -4 + \frac{126}{14}k = -4 + 9k$$

$$y = y_0 - \frac{a}{d}k = 4 - \frac{112}{14}k = 4 - 8k$$

for any choice of the integer k.

④ Find <u>the</u> solution with the smallest $x \geq 0$

Divide $x_0 = -4$ by 9: $-4 = 9(-1) + 5$

So choose $K = -(-1) = 1$ and get <u>$x = 5$</u>.

The corresponding value of

$y = 4 - 8(1) = \underline{-4}$.