# Practical Session 5: Kid Krypto

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Answer the following questions:

1. **Use Kid Krypto with values $a = 10, b = 2, A = 15, B = 5$ to encrypt $x = 112$**

   - Number computation:

   $$M = ab - 1 = 10 \cdot 2 - 1 = 19$$

   $$e = AM + a = 15 \cdot 19 + 10 = 295$$

   $$d = BM + b = 5 \cdot 19 + 2 = 97$$

   $$n = \frac{ed - 1}{M} = \frac{295 \cdot 97 - 1}{19} = 1506$$

   - Message encryption:

   $$y = \text{remainder}(\frac{xe}{n}) = \text{remainder}(\frac{112 \cdot 295}{1506}) = 1414$$

2. **Can all integers be used to set up Kid Krypto? If so, why?**

   No

3. **If you answer no in the previous question, say which numbers cannot be used and why?**

   - $M$ cannot be zero ($n = \frac{ed-1}{M}$), thus, $a$ nor $b$ can be equal to 1
   - In addition to $M$, $n$ cannot be zero since $y = \frac{xe}{n}$