

- Choose $m = 2163$ and $n = 824$ and we ask if we can solve:

$$2163x + 824y = 103. \quad (1)$$

We know we can, because we did it two slides ago! In fact we have $x = -3, y = 8$ as a particular solution.

- Can we find **all** the solutions of (1)?
- Divide (1) by 103 and we get (the same equation!)

$$21x + 8y = 1. \quad (2)$$

Now ask: can we solve this equation when the right-hand side is zero? Yes!

- $x = 8t, y = -21t$ solves $21x + 8y = 0$ for any integer t .
- Therefore we pick

$$x = -3 + 8t, y = 8 - 21t.$$

- Check:

$$21(-3 + 8t) + 8(8 - 21t) = -63 + 168t + 64 - 168t = 1. \quad (3)$$