

For each of the following random variables, decide: **is it binomial, geometric, or neither?**

Flip 100 independent coins, each lands heads with prob  $1/3$ .

You win \$5 each time a coin comes up heads.

$$\# \text{ heads} = \text{Bin}(100, 1/3)$$

$$\# \text{ dollars won} = 5 \cdot \text{Bin}(100, 1/3)$$

1 out of every 10 cereal boxes contains a prize. You keep buying boxes until you get one.

$$\# \text{ boxes bought} = \text{Geom}(1/10)$$

A box contains **10 red** balls and **5 green** balls.

You pick 3 balls from the box **with replacement**

$$\# \text{ red balls picked} = \text{Bin}(3, 10/15)$$

You pick 3 balls from the box **without replacement**

$$\# \text{ red balls picked} = \text{neither}$$

A device fails each day with probability  $1/100$

$$\# \text{ days until first failure (including day it fails)} = \text{Geom}(1/100)$$

$$\# \text{ days until first failure (not including day it fails)} = \text{Geom}(1/100) - 1$$