

# A

## Negative Binomial Random Variable

# A



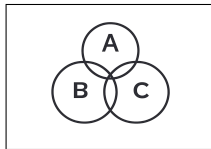
$$p = 0.5$$

$$r = 2$$

$$n = 3$$

$$P(X = n) = \binom{n-1}{r-1} p^r (1-p)^{n-r}$$

$$P(X = 3) = ?$$

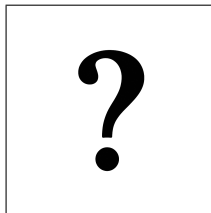


$$P(X = 3) = \binom{3-1}{2-1} (0.5)^2 (0.5)^{3-2}$$

$$P(X = 3) = \binom{2}{1} (0.5)^3$$

$$P(X = 3) = 2 \times 0.125$$

$$P(X = 3) = \boxed{0.25}$$



$$p = 0.1$$

$$r = 8$$

$$n = 50$$

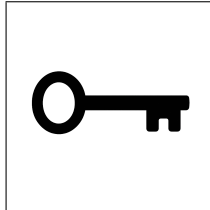
$$P(X = n) = \binom{n-1}{r-1} p^r (1-p)^{n-r}$$

$$P(X = 50) = ?$$

# A

## Negative Binomial Random Variable

# A



$$p = 0.1$$

$$r = 8$$

$$n = 50$$

$$P(X = n) = \binom{n-1}{r-1} p^r (1-p)^{n-r}$$

$$P(X = 50) = ?$$

---

$$P(X = 50) = \binom{50-1}{8-1} (0.1)^8 (0.9)^{50-8}$$

$$P(X = 50) = \binom{49}{7} (0.1)^8 (0.9)^{42}$$

$$P(X = 50) = \binom{49}{7} = 85,900,584$$

$$P(X = 50) \approx 85,900,584 \times 10^{-8} \times 0.9^{42}$$

$$P(X = 50) \approx \boxed{0.0103}$$