

C

Negative Binomial Random Variable

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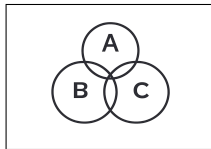
$$p = 0.5$$

$$r = 2$$

$$n = 3$$

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

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

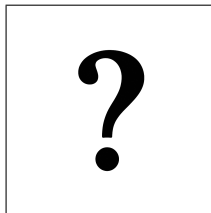


$$P(X = 3) = \binom{3-1}{2-1} (0.5)^2 (0.5)^{3-2}$$

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

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

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



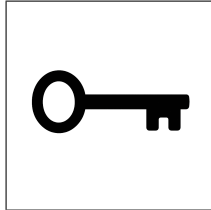
$$p = \frac{4}{52} = \frac{1}{13}$$

$$r = 3$$

$$X = \{3, 4, 5, \dots\}$$

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$$p = \frac{4}{52} = \frac{1}{13}$$

$$r = 3$$

$$X = \{3, 4, 5, \dots\}$$

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

$$P(X = x) = \binom{x-1}{2} \left(\frac{1}{13}\right)^3 \left(\frac{12}{13}\right)^{x-3}$$

$$P(X = 39) = \binom{38}{2} \left(\frac{1}{13}\right)^3 \left(\frac{12}{13}\right)^{36}$$

$$P(X = 39) = 703 \frac{1}{13^3} \left(\frac{12}{13}\right)^{36}$$

$$P(X = 39) \approx \boxed{0.0179}$$