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# Negative Binomial Random Variable

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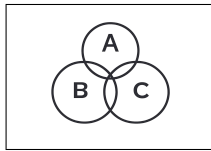
$$p = 0.5$$

$$r = 2$$

$$n = 3$$

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

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

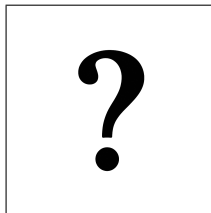


$$P(X = 3) = \binom{3-1}{2-1} (0.5)^2 (0.5)^{3-2}$$

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

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

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



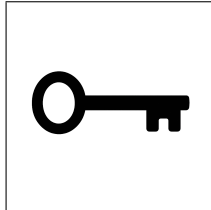
$$p = 0.75$$

$$P(X = 2) = ?$$

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$$p = 0.75$$
$$P(X = 2) = ?$$

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$$P(X = 2) = (1 - p)^{2-1} p = (0.25) (0.75) = \boxed{0.1875}$$