16. A fair dice is thrown repeatedly.

(i) Find the probability of getting two fives in the first ten throws.

(ii) Hence find the probability of getting the third five on the eleventh throw.

"5" = Success

$P(5) = p = \frac{1}{6}$

$q = \frac{5}{6}$

$n = 10$

$r = 2$

$P(r \text{ successes}) = \binom{n}{r} p^r q^{n-r}$

(i) $P(\text{2 fives in 10 throws}) = \binom{10}{2}\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^8$

$= 0.288$

(ii) $P(\text{3rd five on eleventh throw}) = P(\text{2 fives in 10 throws}) \times P(5)$

$= \binom{10}{2}\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^8 \times \left(\frac{1}{6}\right)$

$= 0.0485$