$$M_X(t) = \frac{1}{7}e^{t} + \frac{1}{7}e^{2t} + \frac{3}{7}e^{8t} + \frac{2}{7}e^{9t}$$

$$\boxed{e^x = \sum_{k=0}^{\infty} \frac{x^k}{k!}}$$

$$M_X(t) = \sum_{k=0}^{\infty} \frac{1/7\, t^k + 1/7\,(2t)^k + 3/7\,(8t)^k + 2/7\,(9t)^k}{k!} = \sum_{k=0}^{\infty} t^k \frac{1/7 + 1/7\, 2^k + 3/7\, 8^k + 2/7\, 9^k}{k!}$$

$$\boxed{M_X(t) = E(e^{tX})}$$

$$M_X(t) = E\left(\sum^{\infty} \frac{(tX)^k}{k!}\right) = \sum_{k=0}^{\infty} t^k \frac{E(X^k)}{k!}$$

$$\sum_{k=0}^{\infty} t^k \frac{E(X^k)}{k!} = \sum_{k=0}^{\infty} t^k \frac{1/7 + 1/7\, 2^k + 3/7\, 8^k + 2/7\, 9^k}{k!} \implies \boxed{E(X^k) = 1/7 + 1/7\, 2^k + 3/7\, 8^k + 2/7\, 9^k}$$

$$E(X^k) = 1/7 + 1/7\, 2^k + 3/7\, 8^k + 2/7\, 9^k = \frac{1}{7}\cdot 1^k + \frac{1}{7}\cdot 2^k + \frac{3}{7}\cdot 8^k + \frac{2}{7}\cdot 9^k$$

czyli rozkład to

n	1	2	8	9
$P(X=n)$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{3}{7}$	$\frac{2}{7}$