

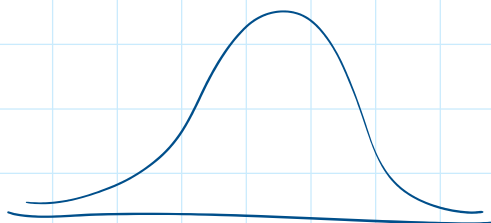
## Moment Generating Functions (mgf)

$$M_X(t) = E(e^{tX}) = 1 + E(X)t + E(X^2)\frac{t^2}{2!} + E(X^3)\frac{t^3}{3!} + \dots$$

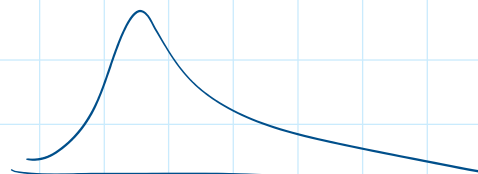
$\hookrightarrow \sum_x e^{tx} P(X=x)$

- To find  $E(X^k)$ , differentiate  $M_X(t)$   $k$  times and evaluate at  $t=0$ .
- If  $Y = aX + b$ , then  $M_Y(t) = e^{bt} M_X(at)$ .
- The mgf uniquely specifies the distribution. If two random variables have the same mgf, then they have the same distribution.

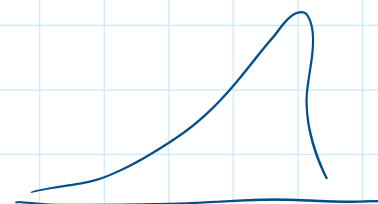
## SKEWNESS



zero skewness



positive skewness



negative skewness