

# FORMULA SHEET

STAT 620 – Dr. Myung

## Continuous R.V.

$X$	PDF	CDF	$E(X)$	$\text{Var}(X)$	MGF
$U(a, b)$	$\frac{1}{b-a}, a \leq x \leq b, a < b$	$\begin{cases} 0, & x < a \\ \frac{x-a}{b-a}, & a \leq x \leq b \\ 1, & x > b \end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{tb}-e^{ta}}{t(b-a)}, t \neq 0$
$\text{Exp}(\theta)$	$\frac{1}{\theta}e^{-\frac{x}{\theta}}, x \geq 0$	$\begin{cases} 0, & x < 0 \\ 1 - e^{-\frac{x}{\theta}}, & x \geq 0 \end{cases}$	$\theta$	$\theta^2$	$(1-t\theta)^{-1}, t < 1/\theta$
$\text{Gamma}(\alpha, \theta)$	$\frac{1}{\theta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\theta}, x \geq 0$		$\alpha\theta$	$\alpha\theta^2$	$(1-t\theta)^{-\alpha}, t < 1/\theta$
$\chi^2(r)$	$\frac{1}{\Gamma(r/2)2^{r/2}} x^{\frac{r}{2}-1} e^{-\frac{x}{2}}, x > 0$		$r$	$2r$	$(1-2t)^{-r/2}, t < 1/2$
$N(\mu, \sigma^2)$	$\frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}, -\infty < x < \infty$		$\mu$	$\sigma^2$	$e^{\mu t + \frac{1}{2}\sigma^2 t^2}$
$\text{Beta}(\alpha, \beta)$	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1} (1-x)^{\beta-1}, 0 < x < 1$		$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta+1)(\alpha+\beta)^2}$	