AP EXAM FORMULAS

(Chapters 1-7)

DESCRIPTIVE STATISTICS		
Formula	**Description**	**Calculator**
$\bar{x} = \dfrac{\sum x_i}{n}$	Mean	1-Var Stats
$s_x = \sqrt{\dfrac{1}{n-1}\sum (x_i - \bar{x})^2}$	Standard Deviation	
$\hat{y} = b_0 + b_1 x$	LSRL	LinReg (a + bx)
$b_1 = \dfrac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x - x_i)^2}$	Slope of LSRL	
$b_0 = \bar{y} - b_1 \bar{x}$	y-intercept of LSRL	
$r = \dfrac{1}{n-1}\sum \left(\dfrac{x_i - \bar{x}}{s_x}\right)\left(\dfrac{y_i - \bar{y}}{s_y}\right)$	Correlation	
$b_1 = r\dfrac{s_y}{s_x}$	Slope of LSRL	

PROBABILITY		
Formula	**Description**	**Calculator**
$P(A \cup B) = P(A) + P(B) - P(A \cap B)$	Addition Rule	---
$P(A \mid B) = \dfrac{P(A \cap B)}{P(B)}$	Conditional Probability	---
$E(X) = \mu_x = \sum x_i p_i$	Mean of a Random Variable	---
$\text{Var}(X) = \sigma_x^2 = \sum (x_i - \mu_x)^2 p_i$	Variance of a Random Variable	---
If X has a Binomial distribution with parameters n and p, then:		
$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$	Binomial Probability $\binom{n}{k} = \dfrac{n!}{k!(n-k)!}$	binompdf (n, p, k) binomcdf if X < k
$\mu_x = np$	Mean (Expected Value) of Random Variable X	---
$\sigma_x = \sqrt{np(1-p)}$	Standard Deviation of Random Variable X	---
$\mu_{\hat{p}} = p$	Mean of a Sample Proportion	---
$\sigma_{\hat{p}} = \sqrt{\dfrac{p(1-p)}{n}}$	Standard Deviation of a Sample Proportion	---
If $\bar{x}$ is the mean of a random sample size n from an infinite population with mean μ and standard deviation σ, then:		
$\mu_{\bar{x}} = \mu$	Mean of a Sample Mean	----
$\sigma_{\bar{x}} = \dfrac{\sigma}{\sqrt{n}}$	Standard Deviation of a Sample Mean	---