Math finance formula sheet 2

1.)
$$1 + q + q^2 + \cdots + q^n = \frac{1 - q^{n+1}}{1 - q}$$

2.)
$$w = \frac{\Sigma^{-1}\mathbf{1}}{\mathbf{1}^T\Sigma^{-1}\mathbf{1}^T}$$

3.)
$$M = \begin{pmatrix} \mathbf{m}^T\Sigma^{-1}\mathbf{m} & \Sigma^T\Sigma^{-1}\mathbf{m} \\ \mathbf{1}^T\Sigma^{-1}\mathbf{m} & \mathbf{1}^T\Sigma^{-1}\mathbf{1} \end{pmatrix}$$

4.)
$$w = \frac{\Sigma^{-1}(\mathbf{m} - r\mathbf{1})}{\mathbf{1}^T\Sigma^{-1}(\mathbf{m} - r\mathbf{1})}$$

5.) $e_1 = (1,0)^T$, $e_2 = (0,1)^T$
$$w = [(\mu\ 1)M^{-1}e_1](\Sigma^{-1}\mathbf{m}) + [(\mu\ 1)M^{-1}e_2](\Sigma^{-1}\mathbf{m})$$

6.) $\mu = \mu_r + \frac{\mu_M - \mu_r}{\sigma_M}\sigma$

7.)
$$s_0 = \frac{\sigma_2^2 - \rho_{12}\sigma_1\sigma_2}{\sigma_1^2 + \sigma_2^2 - 2\rho_{12}\sigma_1\sigma_2}$$

8.)
$$(a)\ \ \mu_0 = \frac{\mu_1\sigma_2^2 + \mu_2\sigma_1^2 - \rho_{12}\sigma_1\sigma_2(\mu_1 + \mu_2)}{\sigma_1^2 + \sigma_2^2 - 2\rho_{12}\sigma_1\sigma_2}; \qquad (b)\ \ \sigma_0 = \frac{\sigma_1^2\sigma_2^2 - \rho_{12}^2\sigma_1^2\sigma_2^2}{\sigma_1^2 + \sigma_2^2 - 2\sigma_1\sigma_2\rho_{12}}$$

9.) $\mu = \mu_0 \pm A^{-1}\sigma$
$$A^2 = \frac{\sigma_1^2 + \sigma_2^2 - 2\rho_{12}\sigma_1\sigma_2}{(\mu_1 - \mu_2)^2}$$

10.)
$$F(t,T) = (S(t) - \delta B(t,\tau))\frac{1}{B(t,T)}$$

11.)
$$V_X(t) = [F(t,T) - X]B(t,T)$$

12.)
$$F(0,T) = \rho\frac{B_f(0,T)}{B_d(0,T)}$$