

Sheet 1Answers

1. (i) Possession of a shares. $\Delta = a$

(ii) Money in bank. $\Delta = 0$

2. $n = 1$ or $n = -2r/\sigma^2$

3. $m = (1-n)(r + \frac{1}{2}\sigma^2 n)$

7. (i) $\Delta = N(d_+)$

(ii) $\Delta = N(d_+) - 1$

9. $\Delta = a - 2bSe^{-\alpha t - \frac{1}{2}\beta t^2 - \sigma^2 t}$

10. $F = e^{-(\sigma^2 + r)t}$

$$G = e^{-(3\sigma^2 + 2r)t}$$

$$\Delta = 2Se^{-(\sigma^2 + r)t} - 3S^2e^{-(3\sigma^2 + r)t}$$

$$S = \frac{2}{3}e^{(2\sigma^2 + r)t}$$

11. $X = e^{rt}$, $Y = e^{-(\sigma^2 + r)t}$, $Z = -e^{-(6\sigma^2 + 3r)t}$

$$\Delta = 2Se^{-(\sigma^2 + r)t} - 4S^3e^{-(6\sigma^2 + 3r)t}$$

$$S = \frac{1}{\sqrt{2}}e^{(\frac{5}{2}\sigma^2 + r)t}$$

$$a = -r, \quad b = -\alpha$$