Finance 5360 Quiz A: 8/6/15 Name Key

Summer Heat Inc. is considering building a new plant at a cost of $100 million. The facility would generate its first net cash flow of $27 million one year from today. In subsequent years, net cash flows would grow by 5% per year through the plant's closing 20 years from today. If sales fall short of expectations, the facility can be sold three years from today for $55 million. If sales from the new plant exceed expectations, it can be expanded at a cost of $50 million four years from today. The expansion would be expected to generate its first cash flow of $10 million five years from today. Subsequent cash flows would grow by 1% per year through the plant's closing 20 years from today. The standard deviation of returns on the new facility will equal 25% over its life, 34% over the next three years, and 29% over the next four years. The standard deviation of returns on the expansion will equal 45% over the next three years, 48% over the next four years, and 50% once in place. The cost of capital on the new plant is 12% and on the expansion is 15%. Finally, the risk-free interest rate varies by maturity as follows: 1-year = 0.5%; 2-year = 0.9%; 3-year = 1.2%; 4-year = 1.5%; 5-year = 1.9%; 10-year = 2.8%; 20-year = 3.5%.

How does the possibility of <u>selling the new plan</u>t if sales fall short of expectations affect the value of the new plant to Summer Heat?

+5 $P = PV(K)(1-N(d_2)) - S^x(1-N(d_1))$

+5 $PV(K) = \dfrac{\overset{+10}{55}}{(\underset{+10}{1.012})^{3\,+5}}$

+5 $d_2 = d_1 - \sigma\sqrt{T}$

+5 $d_1 = \dfrac{\ln\left(\frac{S^x}{PV(K)}\right)}{\sigma\sqrt{T}} + \dfrac{\sigma\sqrt{T}}{2}$

$\sigma = .34$ +10

$T = 3$ +5

+5 $S^x = \left(\dfrac{\overset{+2}{27}}{\underset{+2}{.12} - \underset{+2}{.05}}\right)\left(1 - \left(\dfrac{1.05}{1.12}\right)^{\overset{+2}{20}}\right) - \left(\dfrac{27}{.12-.05}\right)\left(1 - \left(\dfrac{1.05}{1.12}\right)^{\overset{+2}{3}}\right)$

Look up $N(d_1)$ + $N(d_2)$ on table or calculate using Excel