Quiz A: 8/9/16 Name Key

All Bad Choices (ABC) Inc. is considering building a new factory that will require an investment of $150 million today and $100 million a year from today. ABC expects that the new factory will produce its first cash flow two years from today. ABC expects this first cash flow to range between $10 and $50 million with an expected value of $35 million per year through 20 years from today. If cash flows are lower than expected, the factory can be sold any time over the next five years for $95 million. And if cash flow are greater than expected, the factory can be expanded any time over the next three years at a cost of $125 million. ABC expects that the expansion would generate cash flows between $5 million and $25 million with an expected cash flow of $20 million per year through 20 years from today. The standard deviation of returns on the new factory equals 35% over its entire life, 40% over the next five years, and 45% over the next three years. The standard deviation of returns on the expansion equals 50% over the life of the expansion, 60% over the next five years, and 65% over the next three years. The risk-free rate varies by maturity to maturity as follows: 1 = 0.56%; 2 = 0.72%; 3 = 0.86%; 5 = 1.13%; 7 = 1.41%; 10 = 1.59%; 20 = 1.91%; 30 = 2.32%. The cost of capital equals 10% for the project and 13% for the expansion.

-begins sale years from today

How does the possibility of <u>selling the factory</u> if sales are lower than expected affect the value of the new plant? Note: You only need to set up all the necessary equations and plug in all the variables. You don't have to solve anything.

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

+5 $PV(K) = \dfrac{95}{(1.0113)^5}$ (+10 above 95, +10 below, +5)

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

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

$\sigma = .4$ +10

$T = 5$ +5

+5 $S^x = \left(\dfrac{35}{.1}\right)\left(1-\left(\dfrac{1}{1.1}\right)^{19}\right)\left(\dfrac{1}{1.1}\right) - \left(\dfrac{35}{.1}\right)\left(1-\left(\dfrac{1}{1.1}\right)^{4}\right)\left(\dfrac{1}{1.1}\right)$ (+2 above 35, +2 below, +2 on 19, +2 on 4, +2)

Look up $N(d_1)$ & $N(d_2)$ on tables or Excel