Scale:

75=75
73=74
72=74
6?=?1 (unclear)
41=68 (unclear)
47=71
61=68
58=67
53=64
52=64
45=60
42=59
41=58
39=57
33=54
26=51
19=47
16=46
10=43
9=42

Quiz A for 9:45 Class: 08/09/13   Name __Key__

Your firm is considering investing $15 million in a new facility to produce Wi-Fi phones. This new facility would roughly double the size of your firm since you currently have assets with a market value of $20 million. Your firm expects the facility to produce its first net, after-tax annual cash flow of $3 million one year from today. Subsequent annual after-tax cash flows would shrink by 5% per year through 10 years from today. The standard deviation of returns on the new facility would equal 35% over the next two years and 25% thereafter. This is higher than the standard deviation of returns on your firm's existing assets: 21% over the next two years and 15% thereafter. If sales are lower than expected, the facility can be sold two years from today for $7 million. The risk-free interest rate varies by maturity as follows: 1 – year = 1%, 2 – year = 1.9%, 3 – year = 2.1%, 4 – year = 2.4%, 5 – year = 2.5%.

Set up the calculations needed to determine whether the facility should be built if the cost of capital for the facility equals 12% per year. You do not need to solve anything. +4

$$NPV = -15 + \left(\frac{3}{.12-(-.05)}\right)\left(1 - \left(\frac{1-.05}{1.12}\right)^{10}\right) + P \quad \text{⑲}$$

$$+4 \left(P = PV(CF)(1-N(d_2)) - S(1-N(d_1)) \quad \text{④}\right)$$

$$+4 \left(S = S^x = \left(\frac{3}{.12-(-.05)}\right)\left(1 - \left(\frac{1-.05}{1.12}\right)^{10}\right) - \left(\frac{3}{.12-(-.05)}\right)\left(1 - \left(\frac{1-.05}{1.12}\right)^2\right) \quad \text{⑱}\right)$$

$$+3 \left(d_1 = \frac{\ln\left(\frac{S}{PV(CF)}\right)}{.35\sqrt{2}} + \frac{.35\sqrt{2}}{2} \quad \text{⑬}\right)$$

$$+3 \left(d_2 = d_1 - .35\sqrt{2} \quad \text{③}\right)$$

$$+3 \left(PV(CF) = \frac{7}{(1.019)^2} \quad \text{⑱}\right)$$

$$\Rightarrow \text{look up } N(d_1) + N(d_2) \text{ on tables or w/ Excel}$$