

Name: ANSWER KEY

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Actuarial Science Program
DEPARTMENT OF MATHEMATICS

Math 370 (Z)
Exam 2/FM Preparation

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Fall 2007

Stock Pricing, Short Sales, and Yield Curves
Summary Quiz

- (1) The stock of Company X sells for 100 per share assuming an annual effective interest rate of 10%. Annual dividends will be paid at the end of each year forever, with the first dividend to be paid two years from now. The first dividend is 2.20, with each subsequent dividend $j\%$ greater than the previous year's dividend. Calculate j .

(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

$$100 = \left(\frac{2.20}{.10 - j} \right) V_{.10}^1 \Rightarrow j = .08 \text{ or } \underline{\underline{8\%}}$$

- (2) On January 1, 2006, Abby sold stock A short for 80 with a margin requirement of 60%. On December 31, 2006, the stock paid a dividend of 3. During the year, interest on the margin was accrued at 4% effective. On January 1, 2007, Abby covered the short sale at a price of 75, earning an $X\%$ return. Calculate X .

(A) -1.2 (B) 1.2 (C) 4.2 (D) 8.2 (E) 11.2

$$\frac{80 - 75 + .04(48) - 3}{48} = \underline{\underline{.0817}}$$

- (3) Yield rates to maturity for zero coupon bonds are currently quoted at 6% for one-year maturity, 7% for two-year maturity, and 7.5% for three-year maturity. Find the present value, two years from now, of a one-year 1000-par-value zero-coupon bond.

(A) 902 (B) 922 (C) 942 (D) 962 (E) 982

$$PV_{t=2} = \frac{1000}{(1.075)^3 / (1.07)^2} = \underline{\underline{921.60}}$$