

Short Answer (15 points each)

1. List one disadvantage of a sole proprietorship compared to other forms of business.

+15 one of: harder to raise capital, unlimited liability, life limited to life of owner, difficult to transfer ownership

2. Based on the attached financial statements, did it take Ford more or less time to collect receivables in 2015 compared to 2014? (Calculations required)

and assuming Ford's accounts receivables days was 240 in 2014 (not actual #)

$$2015 = \frac{90,691 + 11,284}{149,558 / 365} = 248.87; 2014 = 240$$

⇒ more +5

3. Based on the attached financial statements, did a larger or smaller percentage of Ford's capital come from debt in 2015 compared to 2014? (Calculations required)

assuming Ford's debt-to-capital ratio in 2014 was 0.9 (not the actual #)

$$2015 = \frac{12,839 + 120,015}{12,839 + 120,015 + 26,657} = 0.83; 2014 = .9$$

⇒ smaller +5

4. If interest rates rise, in what direction does the present value of an annuity change?

+15 fall

5. Assume interest rates rise by 2%. The price of which of the following bonds should fall the most?
 a) bond matures in 5 years and pays no coupons, b) bond matures in 5 years and pays a 2% coupon, c) bond matures in 5 years and pays a 10% coupon, d) bond matures in 10 years and pays no coupons, e) bond matures in 10 years and pays a 2% coupon, f) bond matures in 10 years and pays a 10% coupon.

+15 d)

Problems (75 points each)

see 2:30 A

Note: Unless I specifically state "calculations required", you can just set up all problems and tell me what you are solving for in each step. If you are using the result of an unsolved equation in a later step, just make that clear. One way to do this, set up the equation and call your result "A" or "B", etc. If you prefer, you can solve everything.

- 4+. Audiomech trades for \$650 and the Market ETF trades for \$700. The one-year risk-free rate equals 1% and the two-year risk-free rate equals 2%.

Year	<u>1</u>		<u>2</u>	
State of Economy	<u>Weak</u> <i>Strong</i>	<u>Strong</u> <i>Weak</i>	<u>Weak</u> <i>Strong</i>	<u>Strong</u> <i>Weak</i>
Market ETF	50	100	600	900
AudioMech	100	150	500	800

Identify the trades today (per share of Audiomech) that create an arbitrage profit today, show the cash flows created by all trades for all states of the economy in all time periods, and show your total cash flows for all states of the economy in all time periods. Use a "+" to indicate inflows and "-" to indicate outflows. Calculations required.

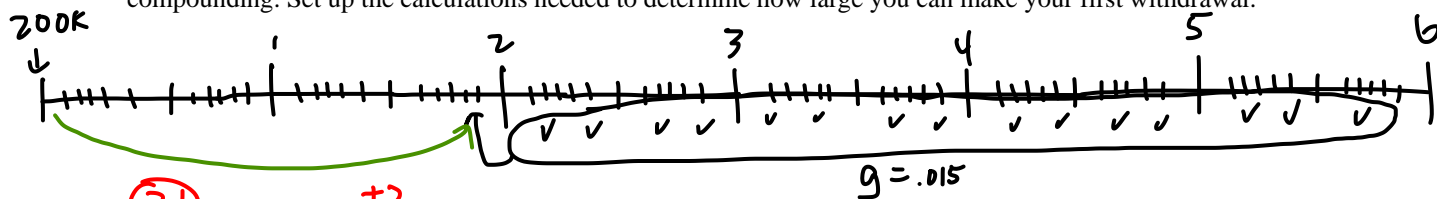
Important: you don't have to build the entire table.

Equivalent portfolio: Market + \$50 rf in yr 1 - \$100 rf in yr 2

No arbitrage price = $700 + \frac{50}{1.01} - \frac{100}{(1.02)^2} = 653.388 \Rightarrow$ buy Audiotech CF_2

Trans	CF_0	CF_1		CF_2	
		<u>W</u>	<u>S</u>	<u>W</u>	<u>S</u>
<i>+6 Buy Audiotech</i>	<i>-650 +5</i>	<i>+100</i>	<i>+150</i>	<i>+500</i>	<i>+800 +5</i>
<i>+6 Short sell mkt</i>	<i>+700 +5</i>	<i>-50</i>	<i>-100</i>	<i>-600</i>	<i>-900 +5</i>
<i>+6 Shortsell 1yr risk-free</i>	<i>+49.505 +5</i>	<i>-50</i>	<i>-50</i>	\emptyset	$\emptyset +5$
<i>+6 Buy 2yr risk-free</i>	<i>-96.117 +5</i>	\emptyset	\emptyset	<i>+100</i>	<i>+100 +5</i>
Total	+3.388 +6	\emptyset	\emptyset	\emptyset	$\emptyset +5$

1-2. You have just deposited \$200,000 into an account. Two years and two months from today you would like to make the first of a series of quarterly withdrawals from an account that will grow by 1.5% each. You plan to make your final withdrawal five years and eight months from today. The account earns an APR of 5.5% with monthly compounding. Set up the calculations needed to determine how large you can make your first withdrawal.

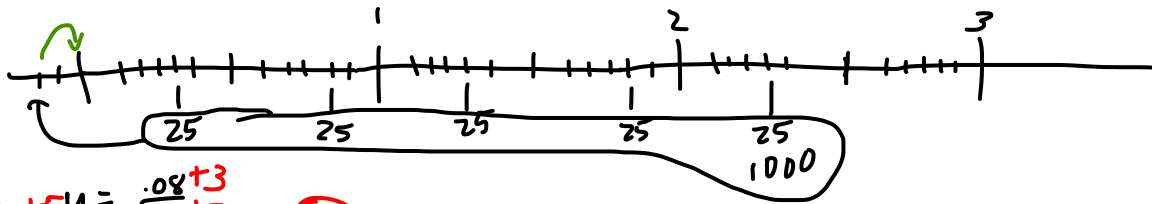


$$V_{1411m} = \left(\frac{C}{r(\frac{1}{4}) - 0.015} \right) \left(1 - \left(\frac{1.015}{1+r(\frac{1}{4})} \right)^{15} \right) = 200,000 \left(1+r(\frac{1}{12}) \right)^{23} \Rightarrow \text{solve for } C$$

$$r(\frac{1}{12}) = \frac{0.055}{12}$$

$$r(\frac{1}{4}) = \left(1+r(\frac{1}{12}) \right)^3 - 1$$

23. A bond matures for \$1000 two years and four months from today. The coupon rate on the bond (which pays semiannual coupons) is 5%. Set up the calculations needed to determine the clean price on the bond if the yield to maturity equals 8%.



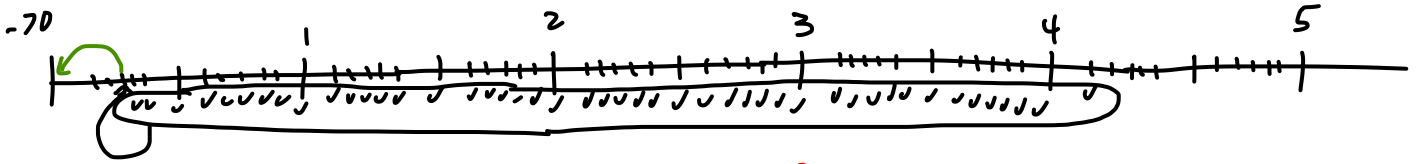
$$\textcircled{11} \quad +5y = \frac{.08}{2} \quad +3$$

$$V_{-2m} = \underbrace{\left(\frac{25}{y} \right) \left(1 - \left(\frac{1}{1+y} \right)^5 \right)}_{+5} + \underbrace{\frac{1000}{(1+y)^5}}_{+5} \quad \textcircled{17}$$

$$+5V_0 = V_{-2m} (1+y)^{2/6+9} \quad \textcircled{14}$$

$$+5CP = V_0 - \frac{2}{6} (25) \quad \textcircled{16}$$

3 4. Small Effect Corp is considering investing \$35 million in a new factory that will generate net monthly cash flows beginning four months from today. The first cash flow will equal \$2 million and subsequent cash flows will shrink by 1% each through the final cash flow which will occur four years and 1 month from today. The project's cost of capital equals 12.5%. Set up the calculations needed to determine the internal rate of return on the factory.



$$\begin{aligned}
 &+4 \text{ NPV} = 0 = -70 + \left(\frac{2}{r(\frac{1}{12}) - (-0.01)} \right) \left(1 - \left(\frac{1}{1+r(\frac{1}{12})} \right)^{46} \right) \left(\frac{1}{1+r(\frac{1}{12})} \right)^3 \Rightarrow \text{solve for } r(\frac{1}{12}) \\
 &+7 \text{ } r(1) = \left(1+r(\frac{1}{12}) \right)^{12} - 1
 \end{aligned}$$

(27)
(17)