

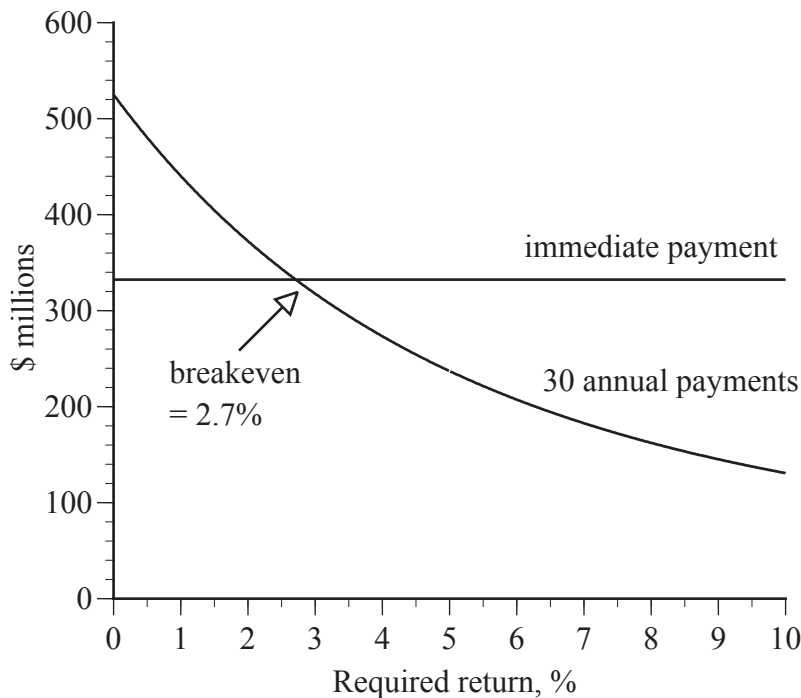
Midterm Answers

No calculators allowed; if calculations are needed, write the explicit equation(s), identifying the variables. Do not write “ $Y = aX$; solve for X .” You can write “ $100 = 10X$; solve for X .” BE SURE TO EXPLAIN YOUR REASONING. If you want extra time, you can buy time at a price of 1 point a minute; for example, if your test is handed in 10 minutes after the scheduled finish time, 10 points will be subtracted from your test score.

1. $(13,000,000/140,000)^{(1/50)} = 1.095$ (9.5%). We should also consider the rent savings and the mortgage payments, property taxes, maintenance, and other expenses.
2. The present value of the \$443 million immediate prize is $(1 - 0.25)\$443$ million = \$332.25 million. The present value of the 30 payments is

$$P = (1 - 0.25)\$10,536 + \frac{(1 - 0.25)\$10,536(1.05)}{1 + R} + \frac{(1 - 0.25)\$10,536(1.05)^2}{(1 + R)^2} + \dots + \frac{(1 - 0.25)\$10,536(1.05)^{29}}{(1 + R)^{29}}$$

This works out to be \$440.26 million for a 1% required return, \$372.38 million for a 2% required return, \$317.66 million for a 3% required return, \$273.28 million for a 4% required return, and \$237.06 million for a 5% required return. So, for any required return greater than (roughly) 3%, the immediate \$443 million is more financially attractive.



3. [David Goldman and Evan Kalimtgis, Who Pays Cap Gains? Not the Rich, The Wall Street Journal, January 2, 1996] The advantage of a portfolio of volatile securities is that it generates capital gains, which do not have to be realized and taxed, and capital losses, which can be realized to obtain a tax break. A strategy of postponing gains and harvesting losses is profitable.
4. [Hulbert, Mark, 2017, A bear market could hit U.S. stocks any time now, MarketWatch, August 15.]
 - a. P/E: $(P1/P0)24.6 = 15.7$ implies $P1/P0 = 15.7/24.6 = 0.64$, or 36% lower. (The S&P 500 would have had

to be 57% lower for the dividend yield to equal its historical average.))

b. Hulbert neglects interest rates. The 10-year Treasury yield was 2.22%, which was 52% below its historical average of 4.58%.

5. A 44% earnings growth rate over 9 years is pretty optimistic. However, even if its earnings were to grow by 44% annually, if its price were constant, investors' return would be 0% over 9 years (unless the company paid dividends, which it didn't). (JDSUniphase turned out to be a terrible investment.)
6. Time is money. AMS receives almost all of the student's money in advance of when the payment is due to the college and is able to invest it in the meantime. Presumably, students could do this on their own. The only conceivable advantage of these early monthly payments is that they compel the student to put aside money that will later be needed for tuition.
7. The upward sloping term structure indicates that investors expect interest rates to increase over time. If so, rolling over short-term debt may be as expensive (or more so) than issuing long-term debt.
8. $(1 + .025/30)^{360} = 1.3497$, an effective annual rate of 34.97%
9. Duration is the average wait until receiving the cash flow. Therefore, the asset with the longer duration is
 - a. the stock with an annual dividend that is currently \$1 and will grow by 10% annually.
 - b. same

10. [Zvi Body & Robert Merton, Finance, Upper Saddle River, NJ: Prentice-Hall, 2001, p. 121]

The answer is typically true, but not always. There are some required returns for which the 30-year loan is better. For example, with a 20% required return, the PVs are \$61,556 for the 30-year loan and \$62,632 for the 15-year loan. At any required return above 17.91%, the 30-year loan has the lower PV.

The conclusion is certainly wrong in general, in that the loan with the lower APR is not necessarily better; for example, a 1-day loan at 1% versus a 30-year loan at 1.1%.