Industry, Perseverance, & Frugality,
make Fortune yield.

Ben Franklin

NOTE: Compute all dollar-denominated answers to the nearest dollar, and compute all other answers to four decimal places (*i.e.,* 7.62%). For the multiple choice questions, give the correct choice and very briefly explain your answer.

1. You've found your dream house/apartment/room, and you apply for a $500,000 mortgage from your local bank after seeing an ad on your Instagram feed for a 7.50%, 30-year mortgage. After you show your W-2 (wage statement) to the loan officer, the bank concludes that you may not be able to afford the monthly payment. They therefore offer you a rate of 7.00% (APR) but you must also pay an upfront fee of 3 "points." A point, in loan parlance, means 1% of the loan amount. Thus, if you borrow $100,000 and pay 3 points, you must pay $3,000. Even though you receive only the loan proceeds *less* the points paid, you must repay the *entire* amount using the amortization schedule for that amount.

   Points paid are economically equivalent to additional interest on the loan, except the interest is paid upfront. (You should convince yourself that the result is the same whether the bank deducts the points from the loan proceeds or you write a separate check for them.)

   (a) What is your true interest rate (use APR) as a result of paying the 3 points assuming that you pay off the loan over the original 30 year term? *[Rate].* **Hint:** *The PMT is calculated using the loan amount, but the amount you receive is the loan amount* less *the points.*

   (b) Suppose that your income qualifies you for either mortgage. In helping you to decide between the two mortgages, one back-of-the-envelope calculation that often appears online, is the breakeven point, that is, how long before you recover the points paid with the lower monthly payment. If you plan to stay in your home for a period exceeding the breakeven point, then the breakeven approach suggests that paying the points is superior. What is the breakeven point for these two mortgages? Using some of the principles we covered this semester, very, very briefly critique the breakeven methodology. What is other information that could be relevant to the analysis?

   (c) Assume that you choose the 7.00% plus 3 points mortgage and that you pay off the remaining loan balance at the end of three years instead of over 30 years. What is the true interest rate (use APR) that you have paid over the three years?

   Hint: Assume you repay the loan after one day. You will have borrowed the

net proceeds (after points) but must repay the entire $500,000 balance and one day's interest. You can see that's indeed a hefty interest rate. If, however, the loan is repaid over 30 years as in (a) above, the extra interest is spread out over the 30 years. Your true interest rate over 3 years is going to fall between the rate in (a) and the rate you pay when you borrow the net proceeds and repay $500,000 one day later.

There are a couple of ways to tackle this problem. The easiest is to use *IRR*. Input the cash flows—the points, the loan proceeds, the 36 payments, and the loan repayment (the loan balance at the end of the 3 years)—using the correct sign convention, positive for inflows and negative for outflows. *IRR* will give you the correct answer. To solve it with Excel using the *NPER, RATE, PV, PMT, and FV* formulas, remember that your PV is the net loan proceeds (after points), your PMT remains the same, but the FV is the amount that you owe to the bank after 36 payments–you must calculate that.

2. FLS Inc. is preparing its 2022 statement of cash flows. For each item below, indicate whether it will be (1) a decrease or increase to (2) operating, investing, or financing CFs.
   (a) Buy warehouse and land
   (b) Payment of an account receivable
   (c) Issuing more shares of stock
   (d) Depreciation expense of the new warehouse
   (e) Payment of some dividends
   (f) Payment of interest
   (g) Sale of goods on credit to a customer (increase in AR)
   (h) Sale of bonds (borrowing)
   (i) Redemption of some of its shares outstanding
   (j) Payment of an account payable for services received from a law firm
   (k) Increase in a payable for services rendered by another law firm
3. Open Costco's (COST) 2022 financial statements on the class web page. For the questions below, please indicate the formula you used, the numbers used in the computation, and the source of the numbers, *e.g.*, income statement, CF statement. The notes to the financials may be useful.
   (a) What is COST's current ratio?

(b) What is COST's interest coverage ratio?

(c) What is the book value of a share of COST? What is the current market value?

(d) What items may be missing from COST's BS that may account in the difference of the book and market values?

(e) What is COST's PE ratio?

(f) How much dividends did COST pay in 2022?

(g) What was the total value of shares COST repurchased in 2022? What was the average price per share? Good use of shareholder money?

(h) What's COST's gross profit margin (GPM)?

(i) What's COST's EBITDA and EBITDA margin?

(j) What's COST's operating profit margin?

(k) What's COST's net profit margin?

(l) What is COST's cash flow from operations (CFO)?

(m) What's COST's free cash flow (FCF)?

(n) What are COST's days receivable outstanding (DRO) and days payable outstanding (DPO)? Any comments?

(o) What is COST's return on equity (ROE)?

(p) What is COST's return on invested capital (ROIC)?