2024 Fall Math 140 Week-In-Review

Week 12: Sections 6.1 and 6.2

Some Key Words and Terms: Interest, Simple Interest, Principal/Present Value, Accumulated Amount/Future Value, Interest Rate, Time, Compound Interest, Compounding Periods, TVM Solver, Savings/Investing, Total Interest Earned, Continuously Compounded, Effective Interest Rate/Effective Yield, Annuity, Loan, Down Payment, Total Paid on the Loan, Total Interest Paid, Total Amount Paid.

Compound Interest:

Compounding Periods: You just have to know the m-value associated W/ the words monthly $\rightarrow m=12$ daily $\rightarrow m=365$ weekly $\rightarrow m=52$ quarterly $\rightarrow m=4$

Total Interest Paid:

Total Amount Paid:

Examples:

1. Your car breaks down and you have to take out a short term loan. The loan offers a simple interest rate of 23% for 8 months. If you need to borrow \$1,800, how much will you owe at the end of the loan? T = P = 1800

2. You borrow \$20 from your friend while you're out and tell them you'll pay them back \$30 in two weeks. If this is treated as a loan with simple interest, what is the simple interest rate you offered to pay? $\Lambda = D + T = D + P = 826$

$$A = P + I \qquad I = Prt \qquad P = $20 A = $30 A = $30 t = 2weeks = $\frac{2}{52}$ years = $\frac{1}{26}$ years
 $10 = 20(r)(\frac{1}{26}) 20 \qquad 20 $(\frac{1}{2}) = (\frac{1}{26}r)26 (3 = r (as a derival) so [300% interest]$$$$

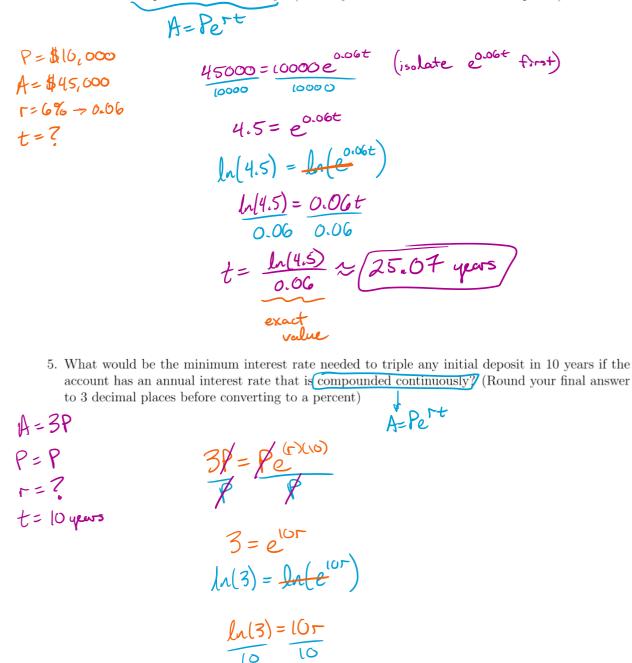
3. You decide to deposit \$2,500 in a savings account that earns 4.2% annual interest <u>compouned</u> weekly. If you make no other deposits, how much money will be in the account after 15 years?

$$N = m \circ t = (52)(15) (your TVM will multiply these)$$

$$I\% = 4.2 \qquad must use the negative batter to for the east of the east of$$

6

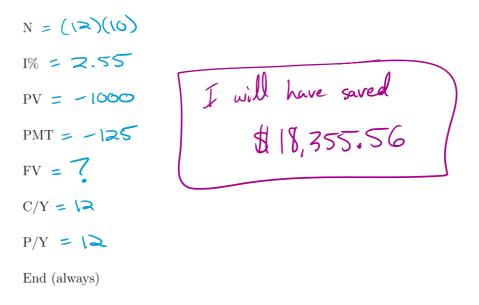
4. How long will it take a one-time investment of \$10,000 to grow to \$45,000 at an annual interest rate of 6% compounded continuously? (Round your final answer to 2 decimal places)



$$\Gamma = \frac{ln(3)}{10} \approx 0.10986...$$

6. From the following accounts, which would be the best for a savings account? • Account A: 5.6% annual interest, compounded monthly largest rest AEff(• Account B: 5.5% annual interest, compounded weekly • Account A: 5.7% annual interest, compounded continuously 05-1 ►EFF(5.6,12) -> reff = 5.745992838.....% Ai B: ►EFF(5.5,52) → Teff = 5.6509 ?---- % $C: e^{0.057} - | \Rightarrow r_{eff} = 0.0586558... - 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865.... + 07 - 5.865... + 07 - 5.8$ we should choose account C 7. From the following accounts, which would be the best for a loan • Account A: 6.2% annual interest, compounded daily smallest reff • Account B: 6.23% annual interest, compounded weekly • Account A: 6.18% annual interest, compounded quarterly ►EAF(6.2,365) → reff = 6.39567 ... % A: NEff(6.23, 52) → reff = 6.424189....% B: : NERF (6.18,4) -> (eff = 6.3247...)% we should choose account C 8

8. You decide to start putting money aside for emergencies. You open a savings account with an initial deposit of \$1,000 and make monthly deposits of \$125. The account earns an annual interest of 2.55% compounded monthly. How much money will you have saved after 10 years?



9. After completing your freshman year, you decide to start saving money for a summer trip at the end of you senior year, 3 years away, that will cost \$12,000. How much money would you need to deposit in the account each week if you don't have any money to make an initial deposit and the account earns 3.2% annual interest compounded weekly?

$$N = (3)(52)$$

$$I\% = 3.2$$

$$PV = O$$

$$PMT = ? = -73.313485.... At in the real would deposit at least would deposit at least b 73.32 each week to make the sure to$$

10. Your car breaks down and you have to put the repairs on a credit card. The repairs cost \$2,390 and the credit card charges an annual interest rate of 28% compounded monthly. Your credit card company requires you to make a minimum monthly payment of \$61. How many years will it take to pay off the repairs if you only make the minimum payment every month? (Round your answer to 2 decimal places)

to credit cards are just loans & N = Tratter=? 1% = 28 N=m.t PV = 2390 106.472854 = 12tPMT = -(a)t = 8. 87 years FV = 🔿 $C/Y = \mathbf{X}$ P/Y = 12 End (always)

11. You want to take out a personal loan to make some home repairs. You can handle a monthly payment of up to \$230 per month and plan to take out a 4-year loan at an annual interest rate of 6.2% compounded monthly. What is the maximum loan amount you can apply for?

PV=7 $N = (\lambda a)(4)$ 1% = 6.2the maximum loan is \$9,755.34 PV = 7PMT = - 230 $FV = \bigcirc$ $C/Y = \mathbf{R}$ $P/Y = \sqrt{2}$ End (always) 10

- 12. You decide to buy a house you plan to rent to generate passive income. The house you plan to buy has a listing price of \$315,000. You find a bank that will finance a 20-year loan at 3.4% annual interest compounded monthly. You plan to make a down payment of 15% of the listing price.
 - (a) How much will the down payment be? How much will you have to take out as a loan?

13. You take out a loan 3-year for \$23,500 at an annual interest rate of 7.6% compounded monthly. How much of the 4th payment is applied to the principal and how much is applied to interest?

3rd Vayneat \$ Outstanding balance after N = (3)(12) A Outstanding balance after 4th Paymen 1% = 7.6difference between this is PV - 23,500 how much of the 4th payment PMT = 7= - +32.08 is applied to the principal FV = O1 Calculate PMT on whole loan C/Y =12 @ calculate FV after 3 Payments P/Y = 123) Calculate FV after 4 payments End (always) After 4 PMTS after 3 PMTS N = 4N = 3I= 7.6 T= 7.6 PV = 23500 PV = 23500 PMT= - 732.08 PMT = -732.08 FV = ? = -21,144.76 FV= ?= -21,439,15 $C|Y = \langle \mathbf{X} \rangle$ (14= LZ P14= 12 P/4=12 \$21,144.76 \$21,739.15 Amount 4th PMT to Principal = 21739.15-21144.76 =\$594.39 to principal Payment = \$ 732.08 = (Amount to Principal)+ (Amount to Interest) 732.08 = 594.39 + Anount Interest Amount of 4th PMT to Interest = \$ 137.69