

Math 312 - Exam #2 Practice Problems

1. A 20-year \$10,000 par bond with 8% annual coupons, payable semiannually, redeems at \$11,000 and is priced at P to yield at an annual effective rate of 7.35%. Find P .
Answer: \$11,061.25.
2. You take out a 15-year, \$300,000 mortgage at a 5.4% nominal annual interest rate, convertible monthly. You make level monthly amortization payments for five years, and then refinance with a new 30-year mortgage at a 3.6% nominal annual rate, convertible monthly. Both mortgages require level amortization payments at the end of each month. *Answer: \$1,024.91.*

Find R , the size of each monthly payment under the 30-year refinanced mortgage.
Answer: \$1,024.91.

3. To invest for a future purchase of \$10,000, you purchase a 10-year par-redeemable bond with face value F that pays semiannual coupons at a nominal annual rate of 7% and is priced to yield 5.75%. Upon receipt you reinvest the coupons at 5.2% convertible semi-annually with the goal that the F plus the accumulated value of the coupons is worth \$10,000 in 10 years, on the day of the last coupon payment. What is the annual effective yield for this overall investment? *Answer: II.*

- I) 5.65%
- II) 5.69%
- III) 5.73%
- IV) 5.77%
- V) 5.81%

4. A 15-year \$1000 bond that redeems at \$1100 and pays 3.5% annual coupons is priced at \$1029.28. Find the book value of the bond immediately after the 10th coupon payment. *Answer: \$1,071.98.*
5. To fix the roof on your business, you borrow \$20,000 for 7 years from your local credit union. You agree to make interest only payments to the credit union at the end of every quarter plus fully repay the principal at the end of 7 years. To save for principal repayment of the principal you deposit X into a separate account at the end of every quarter for the next 4 years, followed by end-of-quarter deposits of $1.5X$ for the remaining 3 years.

If this separate account earns $i^{(12)} = 5.4\%$, find X to the nearest dollar. *Answer: I.*

- I) \$497
- II) \$503
- III) \$509

- IV) \$515
- V) \$521

6. A 10-year \$1000 par bond redeems at par and pays semiannual coupons at a nominal rate of 8%. The premium amortized in the 6th payment is \$11.47 and the premium amortized in the 12th payment is \$13.20. Find the nominal annual yield on the bond, convertible semi-annually. *Answer: V.*

- I) 2.29%
- II) 2.37%
- III) 4.42%
- IV) 4.58%
- V) 4.74%

7. An investor is asked to invest \$1000 and is promised in return a payment of \$380 in one year, \$256 in two years, and then \$540 in three years. Find her IRR. *Answer: 8%.*

8. You are given the following information about the activity in two different investment accounts:

- Account K:

Date	Fund Value Before Deposit/Withdrawal	Deposit	Withdrawal
January 1, 2019	100.0		
July 1, 2019	125.0		X
October 1, 2019	110.0	2X	
December 31, 2019	125.0		

- Account L:

Date	Fund Value Before Deposit/Withdrawal	Deposit	Withdrawal
January 1, 2019	100.0		
July 1, 2019	125.0		X
December 31, 2019	105.8		

During 2019, the dollar-weighted return for investment account *K* equals the time-weighted return for investment account *L*, both of which are denoted by *i*. Find *i*. *Answer: 15%.*

9. An investor pays \$100,000 today for a 4-year investment that returns cash flows of \$60,000 at the end of each of years 3 and 4. The cash flows can be reinvested at 4.0% per annum effective. If the rate of interest at which the investment is to be valued is 5.0%, what is the NPV of this investment today? *Answer: C.*

A) -\$1398

B) -\$699

C) \$699

D) \$1398

E) \$2629