

Name (print neatly): \_\_\_\_\_ Score: \_\_\_\_\_/50

**Hand-in Homework 4****Chapter 5: Amortization and Sinking Funds****Chapter 6: Bonds**

due: Tuesday, April 28, 2015

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*Submit answers on this sheet. Staple pages together.*

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*To receive full credit, show all work necessary to justify answers and all steps of proofs and derivations clearly, in logical sequence, using notation developed in class. Reference formulas and theorems from the book explicitly where needed. Partial credit will be given only for significant progress toward a solution.*

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1. Mia takes out a loan of \$5000 with 24% nominal rate of interest, converted monthly. She makes payments of \$100 at the end of every month. Find the amount of principal in the seventh payment.

2. Jules borrows \$25,000 for 20 years at an effective annual rate of interest of 10%. He could repay the loan using the amortization method with payments of  $\pi$  at the end of each year. Instead, Jules repays the loan using a sinking fund that pays an annual effective rate of interest of 12%. The deposits in the sinking fund are equal to  $\pi$  minus the interest on the loan and are made at the end of each year for 20 years.

(a) Show that  $\pi = \$2936.49$ .

(b) Determine the balance in the sinking fund immediately after the repayment of the loan.

3. Butch has a loan to be repaid with thirty annual payments of \$400 each. With the tenth payment, Butch pays an extra \$2000. He then repays the balance over ten years with a revised annual payment. If the effective annual rate of interest is 5.25%, find the amount of the revised annual payment.

4. Barry invests in a \$1000  $n$ -year bond, redeemable at  $C$ , with semiannual coupons. The ratio of the semi-annual coupon rate to the desired semiannual yield rate,  $\frac{r}{i}$ , is 1.03125. The present value of the redemption value of the bond is \$381.50. If  $v^n = 0.5889$ , what is the price of Barry's bond? (Not to be confused with the price of Barry Bonds.)

5. Chantal has a 6% \$1000 bond, redeemable at par, maturing in 8 years and having semiannual coupons. However, she wishes to replace it with a 5.5% \$1000 par-value bond, also with semiannual coupons. Both bonds are bought to yield 5% nominal interest convertible semiannually. In how many years should the new bond mature? (Both bonds have the same price as well as the same yield.) Answer to the nearest half-year.