

WIR PROBLEM SET #11 APRIL 28, 2020 SECTIONS 6.1–6.3, EXAM 3 REVIEW
Please note that while this week-in-review contains some review for Exam 3, it is **not** comprehensive. Use review worksheets on eCampus and past week-in-reviews for more practice.

Work-out Problems

Study tip: Show all your work!

Exercise 1. Congratulations! You just graduated high school! Your rich aunt has given you a high school graduation gift of \$700,000. The gift, however, is in the form of a 37-year bond with an annual interest rate of 2.5% compounded annually. The bond will be worth \$700,000 in 37 years. What is this gift worth at the present time? (Round to the nearest cent.)

Exercise 2. You are now officially an Aggie! You're going to work hard for the next 4 years, and already plan to celebrate your graduation from Texas A&M University by going on a vacation backpacking in Europe. You put \$200 in your account today, and decide to set aside \$150 at the end of each month for the trip. If you started depositing the money when you were a freshman at the end of each month into a savings account paying interest at the rate of 8% per year, compounded monthly, how much money will be in your travel fund at the end of the 4th year when you graduate? (Round to the nearest cent.)

Exercise 3. Whoop! You just graduated, went on your backpacking trip to Europe, and are now hired at a firm working as a business consultant! With all the financial skills you learned in Math 140 you know that you already should start saving up for retirement. You wish to accumulate a retirement fund of \$550,000. How much should you deposit each month into your retirement account, if the account pays interest at a rate of 5.5%/year compounded monthly, and if you want to retire in 40 years? (Round to the nearest cent.)

Exercise 4. You plan to purchase your first home! You need to take out a mortgage loan for \$150,000. Your finance company has offered you two options:

- Option A: A fixed-rate mortgage at an interest rate of 6.5% per year compounded monthly, payable over a 30-year period in 360 equal monthly installments.
- Option B: A fixed-rate mortgage at an interest rate of 6.25% per year compounded monthly, payable over a 12-year period in 144 equal monthly installments.

How much interest would you save if you choose the 12-year mortgage instead of the 30-year mortgage?

Exercise 5. Suppose I have \$5000 dollars of credit card debt accruing interest at a rate of 27% per year compounded monthly. What will my outstanding debt be after 3 years if at the end of each month I pay \$150 to the credit card company?

Exercise 6. Skye wishes to purchase a \$360,000 house. She will make a down payment of 14% of the purchase price, and take out a mortgage loan on the remaining balance. The mortgage is to be amortized through monthly payments for a term of 30 years, with an interest rate of 3%/year compounded monthly on the unpaid balance.

1. What monthly payment will Skye be required to make? (Round to the nearest cent.)
2. Skye plans to sell her house in 10 years. How much equity will Skye have in her house at this time? (Round to the nearest dollar.)

Exercise 7. Alexa purchased a new home for \$230,000 and financed the purchase price at 5.25% annual interest compounded monthly for 30 years. The bank figured that Alexa's monthly payment is \$1,270.07. How much of Alexa's first payment will go toward interest and how much will go toward the current principal?

Exercise 8. If you deposit \$10,000 into an account that compounds interest quarterly for 40 years, you will have a balance of \$211,307.65. What is the interest rate for this investment? If you have a chance to put the same deposit in a continuously compounded account at the same interest rate, how much faster will you get to a balance of \$211,307.65? Round your **final** answers to one decimal place.

Multiple Choice Problems

Study tip: Write out all your work when you complete the multiple-choice problems.

Multiple Choice 1. A bank advertises a nominal rate of 8.2% compounded daily. What is the annual percentage yield? (Round your answer to 3 decimal places.)

- (a) There is not enough information to determine the annual percentage yield.
- (b) 0.085%
- (c) 8.203%
- (d) 8.515%
- (e) 8.545%

Multiple Choice 2. What is the domain of $g(x) = \frac{\ln(x-2)}{e^{x-3}}$?

- (a) $(-\infty, \infty)$
- (b) $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$
- (c) $[2, \infty)$
- (d) $(2, \infty)$
- (e) $(2, 3) \cup (3, \infty)$

Multiple Choice 3. Lauren found an ordinary annuity that pays 4.5% annual interest compounded monthly. If she deposits \$100.00 each month into this annuity for the next twenty-five years, how much interest will she have earned?

- (a) \$2615.80
- (b) \$25,607.18
- (c) \$25,299.80
- (d) \$55,299.80
- (e) \$30,000

Multiple Choice 4. The United States paid about 4 cents an acre for the Louisiana Purchase in 1803. Suppose the value of this property grew at an annual rate of 5.5% compounded annually. What was an acre of land worth 200 years later, in 2003? (Round to the nearest cent.)

- (a) None of these
- (b) \$178875.94
- (c) \$2.56
- (d) \$1788.76
- (e) \$1.50

Multiple Choice 5. Find the accumulated amount at the end of 11 months on a \$1200 bank deposit paying simple interest at a rate of 6%/year. (Round your answer to the nearest cent.)

- (a) \$1266.00
- (b) \$1206.55
- (c) \$80400.00
- (d) \$7800.00
- (e) None of these

Multiple Choice 6. Suppose I have an account with the amount \$1325 at the beginning of January 2018. If at the end of December 2019, it has the amount \$1523, what rate of interest was earned, to two decimal places (assuming simple interest and no other deposits or withdrawals in this time period)?

- (a) 1.14%
- (b) 1.75%
- (c) 7.21%
- (d) 7.47%
- (e) 14.94%

Multiple Choice 7. Which of the following is equivalent to $\frac{f(x+h) - f(x)}{h}$ if $f(x) = \sqrt{x-5}$?

- (a) $\frac{5}{\sqrt{x+h-5} - \sqrt{x-5}}$
- (b) $\frac{1}{\sqrt{x+h-5} + \sqrt{x-5}}$
- (c) $\frac{1}{\sqrt{x+h-5} - \sqrt{x-5}}$
- (d) $\frac{h-10}{h(\sqrt{x+h-5} - \sqrt{x-5})}$
- (e) None of these

Multiple Choice 8. Find the product of the solutions of

$$2e^{4-x^2} = 3$$

(a) $\sqrt{\frac{5}{2}}$

(b) $\ln \left[\left(\frac{2}{3} \right)^4 \right]$

(c) $4 - \ln \frac{3}{2}$

(d) $4 \ln 3 - 4 \ln 2$

(e) $-4 + \ln 3 - \ln 2$

Multiple Choice 9. Suppose the demand equation for a particular product is given by $x = 12000 - 1000p$, where x is the number of units sold and p is the unit price in dollars. Find the company's **maximum revenue**.

- (a) \$48000
- (b) \$36000
- (c) \$24000
- (d) \$12000
- (e) \$6000

Multiple Choice 10. Find the domain of the following function

$$f(x) = \frac{\sqrt{x+1}}{(x^2-9)\sqrt[5]{60+12x}} .$$

- (a) $(-\infty, -5) \cup (-3, 3) \cup (3, \infty)$
- (b) $(-5, -3) \cup (3, \infty)$
- (c) $(9, \infty)$
- (d) $[-1, 3) \cup (3, \infty)$
- (e) $(-1, 3) \cup (3, \infty)$