

Cumulative Review Test 1

Financial Applications of Sequences and Series

- A sequence is defined by the general term $t_n = 2n^2 - 4n$.
 - Determine the first four terms of the sequence.
 - Find t_{15} .
 - Graph the first eight terms of the sequence.
 - Which term has a value of 880?
- Martina has won the grand prize in the “Cash Forever” lottery. She will receive \$50 000 the first year and receive an annual increase of \$2000 each year, on top of the \$50 000 annual payment.
 - Write the first five terms of the sequence of her annual payments.
 - Determine the general term of this sequence.
 - Find her annual payment in the tenth year.
 - Determine her total winnings over the next 20 years.
- For each sequence, determine
 - the general term
 - t_{15}
 - S_{25}
 - $-18, -54, -162, \dots$
 - $30, 26, 22, \dots$
- Determine the number of terms in each sequence.
 - $-2, 4, 10, \dots, 364$
 - $3, \frac{3}{2}, \frac{3}{4}, \dots, \frac{3}{1024}$
- Determine the amount of a \$12 000 investment at 6%/a compounded quarterly for four years.
 - Determine the present value of \$8000 due in 5 years if money is worth 5% compounded semiannually.
- Evaluate. Round to the nearest hundredth where necessary.
 - $25^{\frac{3}{2}}$
 - $-27^{-\frac{2}{3}}$
 - $20^{\frac{4}{5}}$
 - $200(1.08)^{-10}$
- Simplify.
 - $$\frac{(25x^6y^4)^{\frac{1}{2}}(9x^4y^2)^{\frac{1}{2}}}{\left(-x^{\frac{1}{2}}y^{\frac{1}{2}}\right)^6}$$
 - $$\frac{(49x^{-8}y^2)^{-\frac{1}{2}}(27x^{-3}y^{12})^{\frac{2}{3}}}{\sqrt[4]{16x^8y^{-4}}}$$
- Solve.
 - $2^{3x+2} = \frac{1}{32}$
 - $3^{2x^2+9x} = 243$
- How long will it take for \$5000 invested at 6% compounded monthly to grow to \$6545.42?
- Pavendeep bought a hot tub by financing \$4800 through Wet Coast Spas at 15%/a compounded monthly. He agrees to make monthly payments of \$220 until it is paid in full.
 - Without the use of a spreadsheet, construct an amortization table for the first six months. What does he still owe after six months?
 - Use a spreadsheet to create an amortization of the loan.

- (c) How long will it take him to repay the complete loan? What will be the final payment?
 - (d) What is the total cost of buying the hot tub?
 - (e) What monthly payment amount would enable him to repay the loan in 12 months?
- 11.** Monique is saving for a new car. She wants to have enough money for a \$10 000 down payment. She plans to deposit \$450 at the end of each month into an account that pays 8%/a compounded monthly.
- (a) Draw a time line diagram to represent the annuity.
 - (b) Write out the series that represents the annuity.
 - (c) Determine how long it will take her to save for the down payment.
 - (d) Monique buys the new car she wants. After making the down payment, she still owes \$18 350. Determine her monthly car payment if she finances this amount at 4.8%/a compounded monthly.
- 12.** Simon wants to buy a home entertainment system for \$4600. The store will finance the purchase at a rate of 15%/a compounded annually. Simon plans to repay the system in four years with monthly payments at the end of each month.
- (a) Draw a time line diagram to represent the repayment of the loan.
 - (b) Write out the series that represents the present value of all the payments.
 - (c) Determine his monthly payment.
 - (d) Verify your solution using technology.
- 13.** The Watsons are buying a cottage for \$145 900. They have \$25 000 for a down payment and can afford a monthly mortgage payment of \$1200. They have negotiated a mortgage rate of 7.6%/a compounded semiannually.
- (a) How long would it take them to repay their mortgage?
 - (b) How much will their cottage end up costing them when interest charges are included?
 - (c) How much would they save in interest costs if they increase their monthly payments by 50%?

Functions and Relations

- 14U.** Determine the first six terms of the sequence defined by $t_1 = -5$ and $t_n = -3(t_{n-1}) + 8$.
- 15U.** Marcus has a bacterial infection and must take 350 mg of medication every six hours. By the time he takes the next dose, 32% of the medication remains in his body.
- (a) Determine a recursive formula that models this situation.
 - (b) What will the amount of medication in his body level off to?
 - (c) How long will it take for the medication to reach this level?