Date: _____

CHAPTER 7

Annuities and Mortgages

Get Set

Answer these questions to check your understanding of the Prerequisite Skills concepts on pages 400–401 of the *Foundations for College Mathematics 12* textbook.

Proportional Thinking

1. How many weeks are in each time period?

a) 3 years

b) 8 years

c) 15 years

d) 23 years

2. Earning $34 000 in one year means earning an average of how much in each time period?

a) 2 months

b) 2 weeks

c) 5 days

d) 6 months

3. How many payments are made in two years for each payment frequency?

a) semi-monthly

b) monthly

c) weekly

d) bi-weekly

e) quarterly

f) semi-annually

Work with Exponents

4. Complete each table.

a)

x	$y = 4^x$	First Differences	Common Ratio
0			
1			
2			
3			
4			
5			

Date: _____

b)

x	$y = 0.4^x$	First Differences	Common Ratio
0			
1			
2			
3			
4			
5			

5. Without calculating, predict whether each exponential expression will give a value greater than or less than the initial value.

	Initial Value ($)	Exponential Expression
a)	650	$650(1.006)^{-2}$
b)	28000	$28000(0.0054)^{-1}$
c)	31.7	$31.7(0.95)^{5}$
d)	4900	$4900(1.02)^{6}$

6. Calculate the value of each exponential expression in question 5. Round your answer to four decimal places.

7. Determine the present value, PV, of each amount using the formula $PV = FV(1 + i)^{-n}$, where FV is the amount of the discounted loan, i is the interest rate per compounding period, and n is the number of compounding periods. Round your answer to two decimal places.

a) $500 is discounted at 10% per year, compounded annually, for two years.

b) $6000 is discounted at 7.5% per year, compounded semi-annually, for seven years.

c) $20 000 is discounted at 14.9% per year, compounded monthly, for eight months.

8. Complete the table.

x	$y = 250 + 250(0.5)^x$
0	
1	
2	
3	
4	
5	

9. Use graphing technology to graph the relation from question 8.

Date: _____

7.1 Annuities

Textbook pp. 402–411

Warm-Up

1. Number Skills

Round each number to the nearest hundredth.

a) 3.575

b) 19.692

c) 5.548

2. Algebra

Simplify.

a) $4m - n + 7n - 3m$

b) $3k + 2j + 5k - 6j$

c) $6e - 4f - e - 3 - 9f$

3. Relations

Line L has the equation $y = -\frac{3}{2}x + 6$.

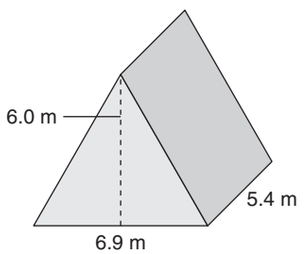
a Determine the coordinates of the y-intercept.

b) Determine the slope of a line that is parallel to line L.

c) Determine the slope of a line that is perpendicular to line L.

4. Geometry/Measurement

Find the volume of this equilateral triangular prism.



5. Data/Probability

Calculate the probability of each event.

a) rolling a number greater than four on one die

b) rolling a sum greater than four with two dice

6. Problem Solving

Look at the pattern in the numbers. Then, find the next two numbers.

0, 1, 1, 2, 3, 5, …

7. Math Literacy

Give a definition of compound interest.

8. Previous Section

Solve.

a) $9^{2x} = 27^{x+2}$

b) $1024^{x-1} = 8^{x+2}$

Date: _____

Practise

1. An amount of $4000 is invested at the end of each year for nine years into a fund that pays 2.5% per year, compounded annually. Use a timeline to determine the future value of the annuity.

2. Use a TVM Solver or an Internet calculator to determine the future value of each annuity. Check your answer using a timeline.

a) $450 is invested at the end of each month for eight months into an account that pays 3.7% per year, compounded monthly.

b) $600 is deposited quarterly for three years into a fund that pays 4.3% per year, compounded quarterly.

3. Determine the monthly payment for a two-year loan on a $9000 entertainment system at 9.85% per year, compounded monthly.

4. Determine the weekly deposit needed to save $5000 in two years if interest is earned at 1.5% per year, compounded daily.

5. Determine the present value of each annuity. Use a timeline to check your answer.

a) Monthly deposits of $150 at 2.75% per year compounded monthly for one year.

b) Annual income of $60 000 for 19 years from a fund that earns 6.5% per year, compounded annually.

6. Marty would like to borrow $8000. His bank offered him a four-year personal loan with monthly payments. The interest rate on the loan is 4.25% per year, compounded monthly.

a) Determine Marty's monthly payment.

b) Calculate the total amount that he will pay to the bank.

c) How much interest will Marty pay over the life of the loan?

7. Nona is in grade 12 and lives at home. She has a part-time job and earns $1500 per month. Nona deposits $800 at the end of each month into an account that pays 2.6% per year, compounded monthly.

a) How much was in Nona's account at the end of one year?

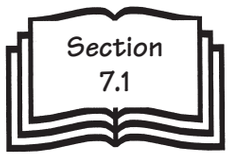
b) How much was in Nona's account at the end of three years?

c) Compare your answers to parts a) and b). Explain why the answer to part b) is not triple the answer to part a).

d) Calculate the total amount that Nona has deposited over the three years.

e) How much interest has she earned in three years?

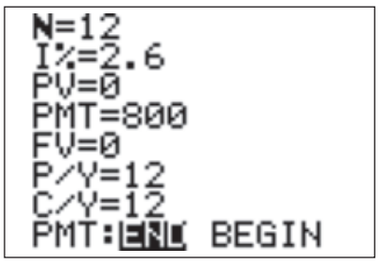
Date: _____



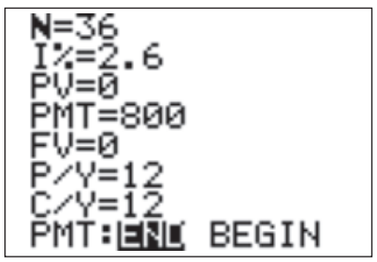
8. Kuan plans to take a three-year college program. He estimates he will need $9000 per year for each of the three years. Currently, his savings are in an account paying 2.3% per year, compounded annually. What is the minimum amount Kuan will need in his account when he starts college so he can graduate without debt?

9. **a)** Which TVM Solver screen is correct for question 7, part b)?

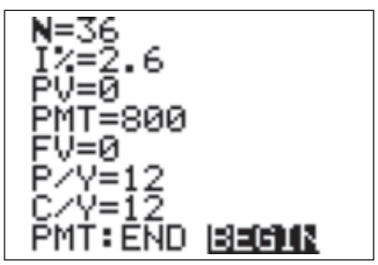
A



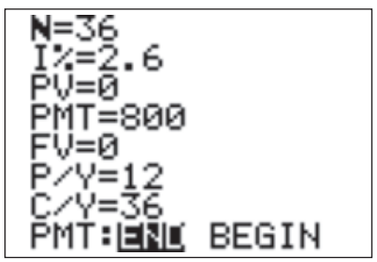
B



C

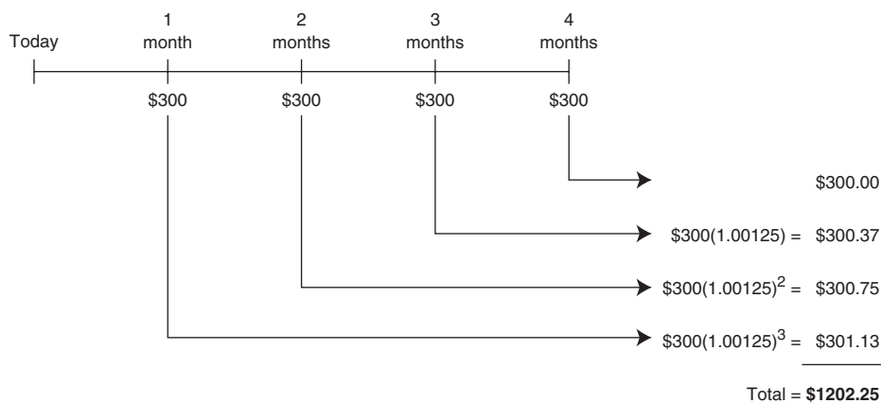


D



b) Explain the error in each of the other screens.

10. Which scenario could be modelled by this timeline?



A $300 invested at 1.25% per year, compounded monthly, for four months.

B $300 invested at 4.5% per year, compounded monthly, for four months.

C $300 invested at 2.5% per year, compounded monthly, for four months.

D $300 invested at 1.5% per year, compounded monthly, for four months.

Date: _____

7.2 The Conditions of an Annuity

Textbook pp. 414–419

Warm-Up

1. Number Skills

Order the numbers from least to greatest.

–5.36, 14.98, 0.07, –0.002, 14.96, –0.08

2. Algebra

Simplify.

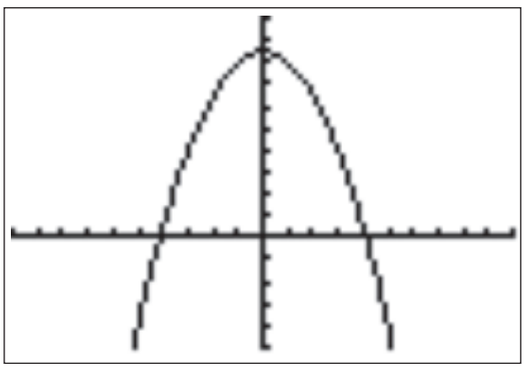
a) $ab - 7b + 4a + 7ab$

b) $6a - 8b + 3 - 6a + 9$

c) $(5x - y) - (6x - 3y)$

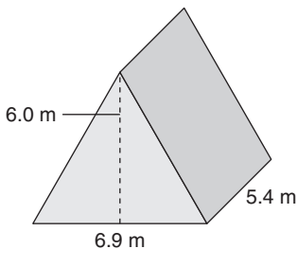
3. Relations

Indicate the number of roots for the equation that is modelled by the graph.



4. Geometry/Measurement

Find the surface area of this equilateral triangular prism.



5. Data/Probability

Give the probability of each event.

a) drawing a queen from a deck of 52 cards

b) drawing a face card (jack, king, or queen) from a deck of 52 cards

6. Modelling

The side length in a regular hexagon is increased by x units. The perimeter of the new hexagon is 36 units. Write an equation to model this situation.

7. Math Literacy

In the equation $PV = FV(1 + i)^{-n}$, n is

A a radical

B a power

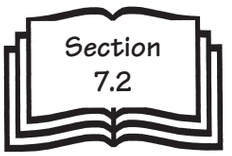
C an exponent

D a divisor

8. Previous Section

Determine the future value of monthly payments of \$620 at 7.9% per year, compounded monthly for five years.

Date: _____



Practise

1. Determine the monthly payment on $5500 borrowed at 8.5% per year, compounded monthly for each time period.

a) 1 year

b) 2 years

c) $2\frac{1}{2}$ years

d) $3\frac{1}{4}$ years

e) $3\frac{3}{4}$ years

2. Refer to question 1. Calculate the total interest paid for each time period.

3. Vincent plans to borrow $30 000 to pay for college. The annual interest rate on the loan is 7.25%, compounded monthly. Determine the number of months, to one decimal place, required to repay the loan for each monthly payment amount.

a) $300

b) $350

c) $400

d) $475

e) $600

4. Refer to question 3. Calculate the total interest paid for each monthly payment amount.

5. For each interest rate, determine the monthly payment for a five-year loan of $20 000 if interest is compounded monthly.

a) 6.5%

b) 7%

c) 8%

d) 9.25%

e) 9.75%

6. Refer to question 5. Calculate the total interest paid for each interest rate.

7. Estella needs to repay a $16 000 debt. Her bank offers personal loans with terms from one to five years at 5.25% per year, compounded monthly.

a) Determine the monthly payment for a four-year term.

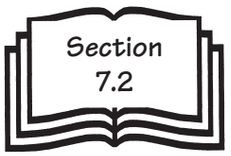
b) Calculate the total interest paid on the loan.

c) Determine Estella's payment if she chooses to make bi-weekly payments.

d) Calculate the total interest paid on the loan.

e) Explain why changing the payment frequency reduces the total interest paid on the loan.

Date: _____



8. Simon is purchasing a computer system from City Electronics. The after-tax cost is $2352.60.The interest rate on a personal loan from City Electronics is 19.5% per year, compounded monthly. He can manage a monthly payment of $95.

a) Use a TVM Solver to determine the number of months, to the next full month, it will take for Simon to repay the loan.

b) Round **N** to the nearest multiple of 12 and solve for **PMT**.

c) Use your answer to part b) to determine the total amount that Simon will pay for the computer.

d) The same computer system can be purchased at Computer World for the same after-tax price. Computer World is offering personal loans at 18% per year, compounded monthly. Repeat parts a) and b), then calculate the amount Simon will save if he chooses the 18% loan.

9. When Mrs Zhao's son was one month old, and at the end of every month thereafter, she invested $80 in a Registered Education Savings Plan (RESP) that paid 6% per year, compounded monthly. This investment was set up to assist her son with the cost of his post-secondary education.

a) Assume that the interest rate remains constant. Determine the amount in the RESP on the boy's 6th, 12th, and 18th birthday.

b) By the time her son turned 18, how much of her own money had Mrs Zhao invested?

c) How much interest did her investment earn?

10. Refer to question 9. Mrs Lippincott's daughter was born in the same month and year as her neighbour Mrs Zhao's son. When her daughter was five years and one month old, Mrs Lippincott set up an RESP for her. She wanted to have as much in her account as Mrs Zhao, so she deposited $160 at the end of each month into an RESP that paid 6% per year.

a) Repeat question 9 for Mrs Lippincott's daughter.

b) How much more money does Mrs Lippincott have in her account than Mrs Zhao?

c) How much more of her own money has Mrs Lippincott invested than Mrs Zhao?

d) How much less interest has Mrs Lippincott's investment earned than Mrs Zhao?

11. Rashid has several debts. He owes approximately $15 000 on a student loan, approximately $4000 on each of his three credit cards, and $7500 to his uncle. Rashid is approaching his bank for a consolidation loan.

a) Calculate Rashid's monthly payment on an eight-year loan at 8.95% per year, compounded monthly.

b) Determine the total amount paid on the loan.

c) How much interest will Rashid have to pay to eliminate his debt?

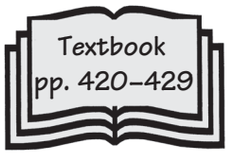
d) How much could Rashid save by choosing a six-year loan?

e) Determine the monthly payment on a ten-year loan.

f) Give one advantage and one disadvantage of Rashid choosing a ten-year loan.

Date: _____

7.3 Mortgages and Amortization



Warm-Up

1. Number Skills

Evaluate.

a) $17 - [6 - (12 + 3)]$

b) $9 + [20 - (7 - 15)]$

2. Algebra

Simplify.

a) $(x^2 - 6x + 15) - (4x^2 + 2x + 12)$

b) $(9x^2 - 4) + (3x^2 + 6x - 7)$

c) $(3x - y) - (2y + 5x) - (4y - 2x)$

3. Relations

What translation maps the parabola $y = -4x^2$ onto the parabola $y = -4x^2 + 2$?

4. Geometry/Measurement

At a point 4.9 m away from a flagpole, the angle of elevation to the top of the flagpole is 74°. How tall is the flagpole, to the nearest tenth of a metre?

5. Data/Probability

Determine the mean, the median, and the mode of the set of data.

15, 71, 32, 45, 9, 26, 33, 32, 58

6. Modelling

Three times Elsa's age is 4 years older than her father. The sum of their ages is 52 years. Write an equation to model this situation.

7. Math Literacy

Which is a definition of complementary angles?

A Angles whose sum is 90°.

B Angles that have the same measure.

C Angles whose sum is 180°.

D A pair of angles that are on opposite sides of two intersecting lines.

8. Previous Section

For each interest rate, determine the monthly payment for a three-year loan of $7500 if interest is compounded monthly. Then determine the amount of interest paid for each loan.

a) 6%

b) 7%

c) 8%

Date: _____

Practise

1. For each five-year fixed term mortgage listed:

i) Determine the monthly payment.

ii) Calculate the total amount paid over the term of the mortgage.

iii) Calculate the total principal paid over the term of the mortgage.

iv) Calculate the total interest paid over the term of the mortgage.

a) $255 000 amortized over 20 years at an annual interest rate of 5.6%.

b) $316 000 amortized over 25 years at an annual interest rate of 6.35%.

c) $195 000 amortized over 30 years at an annual interest rate of 5.15%.

d) $493 000 amortized over 35 years at an annual interest rate of 4.85%.

2. Refer to question 1. Assume that property values appreciate at a rate of 3% per year. Determine the value of the mortgage at the end of the five-year term, to the nearest thousand dollars.

3. Consider this amortization table for the first year of a $360 000 mortgage amortized over 30 years.

Month	Principal Paid ($)	Interest Paid ($)
1	436.68	1484.61
2	438.48	1482.81
3	440.29	1481.00
4	442.10	1479.19
5	443.92	1477.37
6	445.76	1475.53
7	447.59	1473.70
8	449.44	1471.85
9	451.29	1470.00
10	453.15	1468.14
11	455.02	1466.27
12	456.90	1464.39

a) Calculate the monthly payment.

b) Calculate the total amount paid in the first year.

c) Calculate the total principal paid in the first year.

d) Calculate the total interest paid in the first year.

e) How much debt is owed on the house at the end of one year?

Date: _____

4. Lin-Mei purchased a used motorcycle. Part of an amortization table for Len-Mei's one-year personal loan is shown.

Principal Paid ($)	Interest Paid ($)
435.74	31.50
438.29	28.95
440.84	26.40
443.41	23.83
446.00	21.24
448.60	18.64
451.22	16.02
453.85	13.39
456.50	10.74
459.16	8.08
461.84	5.40
464.53	2.71

a) Determine the amount of Lin-Mei's monthly payment.

b) Calculate the total amount needed to repay the loan.

c) Calculate the total interest paid.

d) Determine the amount Lin-Mei borrowed.

e) Graph the data to show the remaining amount owing each month.

5. Yasmina and Tony recently purchased their first home for $285 000. They made the minimum 5% down payment and mortgaged the rest. They agreed to a five-year fixed term mortgage amortized over 30 years at 3.75% per year.

a) Calculate the down payment.

b) Calculate the amount of the mortgage.

c) Use a TVM Solver to determine the amount of their monthly payment.

d) Determine the amount still owing after five years.

6. Yasmina and Tony sold their home for $340 000. They made a $55 000 down payment toward a $460 000 house. They chose a variable rate mortgage with a five-year term amortized over 20 years at an annual interest rate of 3.9%.

a) Calculate the amount of the mortgage.

b) Determine Yasmina and Tony's monthly mortgage payment.

c) How much debt was owed on the mortgage after one year?

d) After one year, the annual interest rate increased to 4.25%. Recalculate the monthly payment for the remainder of the amortization period.

Date: _____

7. Liam purchased a one-bedroom condominium for $169 000 with a 5% down payment. The mortgage rate is 4.5% per year, amortized over 20 years.

a) Determine Liam's monthly payment.

b) Assume the interest rate remains constant. How much will Liam end up paying before the condominium is truly his?

c) How much interest was charged over the life of the mortgage?

d) Housing prices are expected to appreciate by 3.5% per year. Express the growth in the selling price of the condominium as an exponential relation.

e) Calculate the estimated selling price of Liam's condominium in 20 years, to the nearest thousand dollars.

f) By how much did the condominium increase in value?

8. An amortization table for the 20 years of Brian and Rachel's mortgage is shown.

Year (n)	Payments per Year ($)	Total Paid After n Years ($)	Principal Paid After n Years ($)	Interest Paid After n Years ($)	Balance After n Years ($)
1	$12 \times 1\,573.88$	18 886.55	4 078.90	14 807.65	185 921.10
2	$12 \times 1\,573.88$	37 773.10	8 490.64	29 282.46	181 509.36
3	$12 \times 1\,573.88$	56 659.65	13 262.38	43 397.27	176 737.62
4	$12 \times 1\,573.88$	75 546.20	18 423.49	57 122.71	171 576.51
5	$12 \times 1\,573.88$	94 432.75	24 005.73	70 427.02	165 994.27
6	$12 \times 1\,573.88$	113 309.31	30 033.52	83 275.79	159 966.48
7	$12 \times 1\,573.88$	132 195.87	36 563.99	95 631.88	153 436.01
8	$12 \times 1\,573.88$	151 082.42	43 627.32	107 455.10	146 372.68
9	$12 \times 1\,573.88$	169 968.97	51 267.01	118 701.96	138 732.99
10	$12 \times 1\,573.88$	188 855.53	59 530.13	129 325.40	130 469.87
11	$12 \times 1\,573.88$	207 742.09	68 467.51	139 274.58	121 532.49
12	$12 \times 1\,573.88$	226 628.64	78 134.18	148 494.46	111 865.82
13	$12 \times 1\,573.88$	245 515.18	88 589.66	156 925.52	101 410.34
14	$12 \times 1\,573.88$	264 401.74	99 898.31	164 503.43	90 101.69
15	$12 \times 1\,573.88$	283 288.30	112 129.75	171 158.55	77 870.25
16	$12 \times 1\,573.88$	302 174.86	125 359.27	176 815.59	64 640.73
17	$12 \times 1\,573.88$	321 061.40	139 668.30	181 393.10	50 331.70
18	$12 \times 1\,573.88$	339 947.95	155 144.95	184 803.00	34 855.05
19	$12 \times 1\,573.88$	358 834.51	171 884.50	186 950.01	18 115.50
20	$12 \times 1\,573.88$	377 721.06	189 990.01	187 731.05	9.99

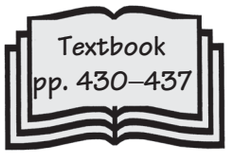
a) Calculate the principal and the interest paid during year 5.

b) Calculate the principal and the interest paid during year 15.

c) In which year did the amount of principal paid become greater than the amount of interest paid? Show the calculations that justify your answer.

Date: _____

7.4 The Conditions of a Mortgage



Warm-Up

1. Number Skills

Evaluate.

a) $\frac{12 + 56}{28 \div 7} - 2$

b) $\frac{6}{9 \times 4}$

2. Algebra

Solve.

a) $18x - 11 = 1$

b) $2(x + 5) = 7$

c) $(3x - 2) - (5x + 4) = 16$

3. Relations

Give the point of intersection of lines L_1 and L_2.

L_1: $y = 3x - 1$

L_2: $y = 2x + 3$

4. Geometry/Measurement

A cylindrical barrel has a radius of 15.4 cm and a height of 53.5 cm. What is the volume of the barrel, to the nearest litre? Recall that 1000 cm^3 = 1 L.

5. Data/Probability

Determine the mean, the median, and the mode of the set of data.

63, 41, 5, 19, 27, 26, 5, 98, 41

6. Problem Solving

A cube has a volume of 20 m^3. What is its surface area, to the nearest metre?

7. Math Literacy

Which is a definition of supplementary angles?

A Angles whose sum is 360°.

B Angles whose difference is 90°

C Angles whose sum is 180°.

D A pair of angles that are on the same side of two intersecting lines.

8. Previous Section

A five-year fixed term mortgage for $325 500 is amortized over 30 years at 4.8% per year.

a) Determine the monthly payment.

b) Calculate the total amount paid over the term of the mortgage.

Date: _____

Practise

1. Murray and Hazel have a pre-approved mortgage for $480 000. The current annual interest rate for a five-year fixed term mortgage is 4.25%.

a) Determine the monthly payment for a 30-year amortization period.

b) Calculate the total amount paid for the mortgage.

c) Determine the monthly payment for a 25-year amortization period.

d) How much more is the monthly payment?

e) Calculate the total amount paid for the mortgage.

f) How much less will Murray and Hazel pay by choosing a 25-year amortization period?

2. Fatima bought a house for $224 000 and made a down payment of $25 000. The annual interest rate for a five-year fixed term mortgage is 3.75%.

a) Determine the amount to be mortgaged.

b) Determine the monthly payment for a 25-year amortization period.

c) Determine the monthly payment for a 20-year amortization period.

d) How much less will Fatima pay by choosing the 20-year amortization period?

3. George can afford to pay approximately $1200 per month on his mortgage. Determine the payment amount for each payment frequency.

a) accelerated weekly

b) weekly

c) accelerated bi-weekly

d) bi-weekly

e) semi-monthly

4. Refer to question 3.

a) Calculate the amount paid in one year for each payment frequency.

b) Which payment frequency from part a) pays down the mortgage fastest? Explain.

5. Mohammad and Ava bought a three-bedroom townhouse for $254 800.

a) Use a spreadsheet or other technology to determine the monthly payment for a four-year fixed term mortgage with an annual interest rate of 4.35% and a 20-year amortization period.

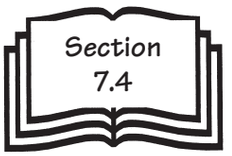
b) Use a spreadsheet or other technology to determine how long it will take to pay off the mortgage with monthly payments of

i) $1600

ii) $1700

c) Graph the data for parts a) and b) on the same set of axes. Plot Year on the horizontal axis and Remaining Amount Owing on the vertical axis.

Date: _____



6. Chang has a $204 000 mortgage at 3.75% per year on his one-bedroom condominium.

a) Determine the bi-weekly payment on a mortgage amortized over 30 years.

b) Use the **ΣPrn** function on your graphing calculator to determine the principal paid over the first five years of the mortgage.

7. Lamar makes accelerated weekly mortgage payments of $378.26 every Friday.

a) Determine the amount paid in each month.

i)

APRIL						
S	**M**	**T**	**W**	**T**	**F**	**S**
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

ii)

MAY						
S	**M**	**T**	**W**	**T**	**F**	**S**
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

iii)

JUNE						
S	**M**	**T**	**W**	**T**	**F**	**S**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

b) How much less would he pay over the three months (13 weeks) if he paid $378.26 bi-weekly?

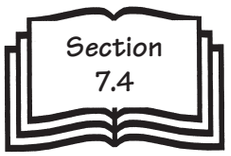
8. Nadine has a $216 500 mortgage at 3.4% per year.

a) Determine the monthly payment for a 25-year amortization period.

b) She decides to make weekly payments of $350. Determine the number of years it will take to pay the mortgage in full.

c) How much interest would she save by making weekly payments of $450?

Date: _____



9. Go to the McGraw-Hill Ryerson Web site and follow the links to the mortgage calculator for *Foundations for College Mathematics 12,* Chapter 7, Section 7.4, Question 9.

a) Determine the monthly mortgage payment for a $315 800 mortgage with a five-year fixed rate of 4.9% per year, amortized over 20 years.

b) How much less interest is paid by choosing each payment frequency?

i) semi-monthly

ii) weekly

iii) accelerated weekly

c) Click on **Semi-Monthly**. Describe the differences in the two graphs.

d) Click on **Weekly**. Describe the differences in the two graphs.

e) Click on **Accelerated Weekly**. Describe the differences in the two graphs.

f) Click on **Show Amortization Table**. What is the balance of the mortgage after the five-year term?

10. A five-year fixed rate mortgage of $365 000 is amortized over 25 years at 5.75% per year.

a) Use the mortgage calculator from question 9 to determine the payment amount for each payment frequency.

i) monthly

ii) semi-monthly

iii) bi-weekly

iv) weekly

v) accelerated bi-weekly

vi) accelerated weekly

b) Determine the total amount paid for each payment frequency.

c) How much less would the home owner pay for the mortgage by choosing accelerated weekly payments instead of monthly payments?

d) Approximately how long would it take to pay the mortgage in full by paying weekly payments of $600? Provide a TVM Solver screen to show the settings you used.

11. Laura can afford a maximum of $1200 per month for mortgage payments.

a) Given an annual interest rate of 2.95%, determine the maximum mortgage that she can afford for each amortization period, to the nearest dollar.

i) 15 years

ii) 20 years

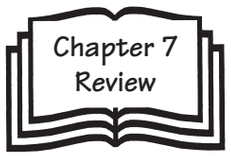
iii) 25 years

iv) 30 years

b) Give two reasons why Laura might choose a longer amortization period when it results in paying more interest.

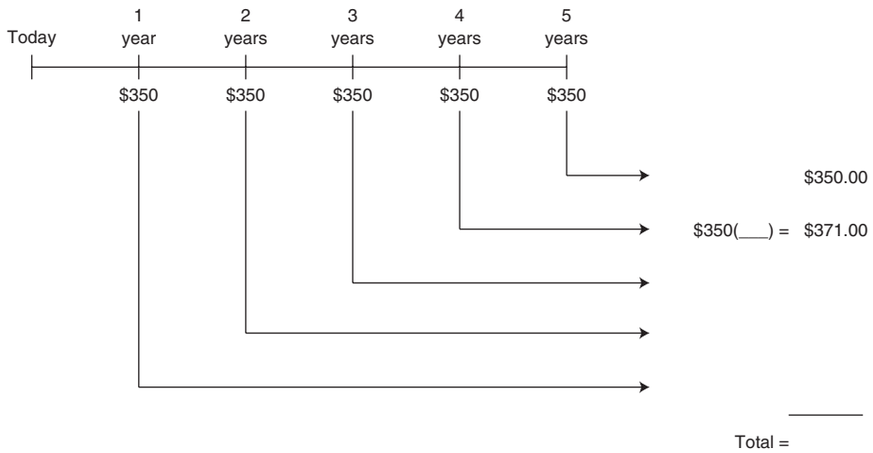
Date: _____

Chapter 7 Review



7.1 Annuities, textbook pages 402–411

1. a) Complete the timeline.



b) Which scenario best describes the timeline?

A $350 invested at 3% per year for five years.

B $350 invested at 1% per year for five years.

C $350 invested at 6% per year for five years.

D $350 invested at 7.2% per year for five years.

2. Use technology to determine the future value of each annuity.

a) $800 is invested at the end of each month for three years into an account that pays 2.5% per year, compounded monthly.

b) $450 is deposited monthly for five years into a fund that pays 4.75% per year, compounded quarterly.

c) $6800 is deposited quarterly for six years into a fund that pays 3.25% per year, compounded quarterly.

d) $1400 is deposited semi-annually for two years into a fund that pays 7.5% per year, compounded semi-annually.

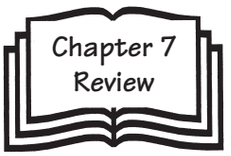
3. Jean-Baptiste's bank is offering him a two-year personal loan of $6000 at 3.85% per year, compounded monthly.

a) Determine Jean-Baptiste's monthly payment on the loan.

b) Calculate the total amount that he will pay to the bank.

c) How much interest will Jean-Baptiste pay over the life of the loan?

Date: _____



7.2 The Conditions of an Annuity, textbook pages 414–419

4. Dinah plans to borrow $37 000 at 4.65% per year, compounded monthly.

a) Determine the number of months required to repay the loan for each monthly payment amount. Round your answer up to the next whole month.

i) $500
ii) $600
iii) $800
iv) $1000

b) Calculate the total interest paid for each monthly payment amount.

5. Repeat question 4 for each weekly payment. Round your answers to part a) up to the next whole week.

i) $70
ii) $150
iii) $250
iv) $350

6. Ian owes $30 000 for a small business loan, $4000 on his credit card, and $18 000 to his parents. Ian is seeking a consolidation loan from his bank.

a) Calculate Ian's monthly payment on a six-year loan at 3.75% per year, compounded monthly.

b) Determine the total amount paid on the loan.

c) How much interest will Ian have to pay to eliminate his debt?

d) How much could Ian save by choosing a four-year loan?

e) Determine the monthly payment on an eight-year loan.

f) How much more interest will he pay compared to the six-year loan?

7.3 Mortgages and Amortization, textbook pages 420–429

7. For each five-year fixed term mortgage listed:

i) Determine the monthly payment.
ii) Calculate the total amount paid over the term of the mortgage.
iii) Calculate the total principal paid over the term of the mortgage.
iv) Calculate the total interest paid over the term of the mortgage.

a) $320 000 amortized over 20 years at an annual interest rate of 6.35%.

b) $275 000 amortized over 25 years at an annual interest rate of 4.75%.

d) $487 000 amortized over 30 years at an annual interest rate of 3.15%.

8. Ling purchased a one-bedroom condominium for $198 900 with a 5% down payment. The mortgage rate is 4.3% per year, amortized over 20 years.

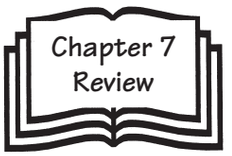
a) Determine Ling's monthly payment.

b) Assume the interest rate remains constant. How much will Ling end up paying before the condominium is truly hers?

c) How much interest was charged over the life of the mortgage?

d) Condominium prices are expected to appreciate by 2.5% per year. Calculate the estimated selling price of Ling's condominium in 20 years.

Date: _____



9. Umberto purchased furniture for his new apartment. Part of an amortization table for Umberto's one-year personal loan is shown.

Principal Paid ($)	Interest Paid ($)
334.87	33.60
337.54	30.93
340.24	28.23
342.96	25.51
345.71	22.76
348.47	20.00
351.26	17.21
354.07	14.40
356.91	11.56
359.76	8.71
362.64	5.83
365.54	2.93

a) Determine the amount of Umberto's monthly payment.

b) Calculate the total amount needed to repay the loan.

c) Calculate the total interest paid.

d) Determine the amount Umberto borrowed.

10. Romy and Connie recently purchased their first home for $255 000. They made the minimum 5% down payment and mortgaged the rest. They agreed to a five-year fixed term mortgage amortized over 25 years at 3.25% per year.

a) Calculate the down payment.

b) Calculate the amount of the mortgage.

c) Use a TVM Solver to determine the amount of their monthly payment.

d) Determine the amount still owing after five years.

11. Romy and Connie sold their home for $350 000. They made a $75 000 down payment toward a $450 000 house. They chose a variable rate mortgage with a five-year term amortized over 25 years at an annual interest rate of 3.50%.

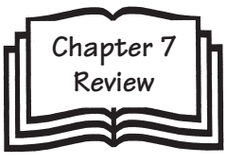
a) Calculate the amount of the mortgage.

b) Determine Romy and Connie's monthly mortgage payment.

c) How much debt was owed on the mortgage after one year?

d) After one year, the annual interest rate increased to 3.75%. Recalculate the monthly payment for the remainder of the amortization period.

Date: _____



7.4 The Conditions of a Mortgage, textbook pages 430–437

12. Parvati has a mortgage of $228 500 at 3.75% per year amortized over 20 years. On the first anniversary of her mortgage, she makes a payment equal to 10% of the balance, which is applied entirely to the principal.

a) Determine her monthly payment.

b) Determine the amount of principal she has paid after one year.

c) Determine the amount of the 10% payment.

d) What is her new balance after the 10% payment has been applied?

13. Draco can afford to pay $1900 per month on his mortgage.

a) Determine the payment amount for each payment frequency.

i) accelerated weekly

ii) weekly

iii) accelerated bi-weekly

iv) bi-weekly

v) semi-monthly

b) Calculate the amount paid in one year for each payment frequency.

14. Fiona has a $172 000 mortgage at 6.35% per year, amortized over 25 years.

a) Determine the bi-weekly payment on the mortgage.

b) Use the **ΣPrn** function on your graphing calculator to determine the amount of principal Fiona paid over the first five years of the mortgage.

15. Roscoe makes accelerated weekly mortgage payments of $398.45 every Friday.

a) Determine the amount paid in each month.

i)

JUNE						
S	**M**	**T**	**W**	**T**	**F**	**S**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

ii)

JULY						
S	**M**	**T**	**W**	**T**	**F**	**S**
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

b) How much less would he pay over the two months (8 weeks) if he paid $398.45 bi-weekly?