Chapter 7

1. Leila is borrowing $65 000 for 4 years. She is deciding between a loan at 6.95% per annum, compounded monthly, and a loan at 7% per annum, compounded annually.
   a) Predict which loan is the better deal.
   b) How much interest is paid on the loan that is the better deal?

2. To have the tuition of $7250 when she returns to school in a year and a half, Fatima will make a payment into an investment account every 3 months. She will start the payments 3 months from now, and continue until she returns to school. The account earns interest at a rate of 5.2% per annum, compounded quarterly.
   a) How much must Fatima’s payments be?
   b) By the day of the last payment, how much interest will she have earned?

3. Leo’s business plans are based on his receiving investment income of $25 000 every 6 months, starting 6 months from now. How much must he pay today into an investment earning interest at a rate of 8.5% per annum, compounded semi-annually.

4. Randall is buying a house for $242 000. His down payment is 55% of the price. The mortgage rate for a 5-year term is 8.2% per annum, compounded semi-annually, amortized over 25 years, and paid monthly.
   a) For how much is the mortgage?
   b) How much are the monthly payments?
   c) Use a spreadsheet to find how much he will owe at the end of the term.

Chapter 8

1. a) Graph the locus of points that are equidistant from the lines \( y = 3x + 7 \) and \( y = 3x - 5 \).
   b) Write an equation to describe this locus.

2. Sketch the circle \( (x - 3)^2 + (y + 5)^2 = 81 \). State the domain and range.

3. Use the locus definition of the ellipse to find an equation of the ellipse with foci \((-12, 0)\) and \((12, 0)\), and with the sum of the focal radii 26.

4. Sketch each conic. Label the coordinates of the centre, the foci, the vertices, and the co-vertices. State the domain and range.
   a) \[ \frac{(x - 5)^2}{144} + \frac{(y + 11)^2}{121} = 1 \]
   b) \[ \frac{(x + 1)^2}{4} - \frac{(y + 3)^2}{9} = 1 \]

5. Sketch the parabola \( x + 2 = \frac{1}{2}(y - 4)^2 \). Label the coordinates of the vertex and the focus, and the equation of the directrix. Determine the domain and range.

6. For each of the following equations,
   i) identify the conic
   ii) write the equation in standard form
   iii) determine the key features and sketch the graph
   a) \( 4x^2 + y^2 + 24x - 4y + 36 = 0 \)
   b) \( x^2 - 8x + 8y + 8 = 0 \)
   c) \( x^2 + y^2 + 4x - 6y - 3 = 0 \)
   d) \( 2x^2 - y^2 - 4x - 6y - 3 = 0 \)

7. Solve each system of equations. Round solutions to the nearest tenth, if necessary.
   a) \( x^2 + y^2 = 16 \)
   b) \( x + 4 = (y - 1)^2 \)
   \( x + y = 1 \) \( y + x + 1 = 0 \)

Cumulative Review: Chapters 7 and 8 • MHR 701