## Chapters 1-7



1. Determine the perimeter and area of each figure. The curve is a semicircle.
a)

10 cm

b)

2. Determine the volume of each object.
a)

b)

c)

e)

3. a) For each perimeter, determine the dimensions of the rectangle with the maximum area.
i) 40 cm
ii) 68 m
iii) 90 cm
b) Calculate the area of each rectangle in part a. How do you know each area is a maximum?
4. Determine the dimensions of a rectangle with area $144 \mathrm{~cm}^{2}$ and the minimum perimeter. What is the minimum perimeter?
5. A patio is to be built on the side of a house using 48 congruent square stones. It will then be surrounded by edging on the 3 sides not touching the house. Which designs require the minimum amount of edging? Include a labelled sketch in your answer.
6. Can a right triangle have an obtuse angle? Explain.
7. Determine the angle measure indicated by each letter. Justify your answers.
a)

b)

c)

8. Determine the measure of one exterior angle of a regular polygon with each number of sides.
Show your work.
a) 5 sides
b) 9 sides
c) 10 sides

CHAPTER
9. Determine the value of each variable.
a) $2: 5=6: n$
b) $3: b=7: 42$
c) $a: 15=4: 10$
d) $9: 12=15: m$
10. Determine each unit rate.
a) 288 km driven in 4 h
b) $\$ 3.79$ for 3 kg of apples
c) $\$ 51$ earned for 6 h of work
d) 9 km hiked in 2.5 h
e) $\$ 3.49$ for 6 muffins
11. Maria is swimming lengths. She swims 2 lengths in 1.5 min . At this rate:
a) How far can she swim in 9 min?
b) How long will it take her to swim 30 lengths?
12. A bathing suit is regularly priced at $\$ 34.99$. It is on sale at $30 \%$ off.
a) What is the sale price?
b) How much does the customer pay, including taxes?
13. Tomas borrows $\$ 2500$ for 6 months.

The annual interest rate was $3 \%$.
a) How much simple interest does Tomas pay?
b) What does the loan cost Tomas?
14. Your teacher will give you a large copy of the scatter plot below.

Women's Discus
Throw World Records

a) What does the scatter plot show?
b) What was the world record in women's discus in 1975? In 1980?
c) In what year was the world record about 70 m ?
d) Draw a line of best fit.
e) Estimate the world record in 1984. Explain how you did this.
15. Here are the dimensions of some rectangles with perimeter 30 cm .

| Width (cm) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Length (cm) | 14 | 13 | 12 | 11 | 10 | 9 | 8 |

a) Is the relationship between length and width linear? Justify your answer.
b) Graph the data.

Does the graph illustrate your answer to part a? Explain.
c) Use the graph.
i) Determine the length when the width is 5.5 cm .
ii) Determine the width when the length is 13.5 cm .
d) Write a rule for the relationship.
16. A baseball is thrown up into the air. Its height is measured every 0.2 s .

| Time (s) | 0 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Height (m) | 1.0 | 2.1 | 2.8 | 3.0 | 2.9 | 2.5 | 1.6 |

a) Graph the data.
b) Draw a curve or line of best fit.
c) What is the greatest height the ball reaches?
d) When will the ball hit the ground?
e) At what times is the ball 2 m above the ground?
17. The graph shows Tyler's distance from his home as he drives to his cottage.

Tyler's Drive

a) Describe Tyler's drive.
b) Tyler makes 2 stops:
one to buy gas and another to pick up his cousin.
Which part of the graph do you think represents each stop? Justify your answers.
18. This pattern is made of toothpicks. It continues.

Frame 1

Frame 2

Frame 3
a) Sketch the next frame in the pattern.
b) Copy and complete the table below for the first 6 frames. Is the relation linear or non-linear? Explain.

| Frame <br> number | Number of <br> toothpicks | First <br> differences |
| :---: | :---: | :---: |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

c) Graph the relationship. Does the graph support your answer to part b? Explain.
19. The table shows the value in Philippine pesos of different amounts in Canadian dollars in early 2006.

| Amount in dollars | 10 | 55 | 48 | 20 | 36 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Amount in pesos | 450 | 2475 | 2160 | 900 | 1620 |

a) Graph the data. Does the graph represent direct variation? Explain.
b) Determine the rate of change. Explain what it represents.
c) Write an equation for the value, $p$ pesos, of $d$ dollars.
d) Determine the value of $\$ 175$.
e) Determine the value of 7500 pesos.
f) How did you answer parts d and e? Did you use the table, graph, or equation? Explain.
20. Refer to question 19. In early 1999, \$1 was worth about 25 Philippine pesos.
a) How would the graph change? Draw the new graph on the grid in question 19.
b) How would the equation change? Write the new equation.
21. Sunil is joining a tennis club for the summer. The club offers a special 10-week summer membership for students. It costs \$50, plus \$3.50 per hour of court time.
a) Make a table. Show the total costs for times played from 0 h to 60 h .
b) Graph the data. Does the graph represent direct variation? Explain.
c) Write an equation to determine the total cost, $C$ dollars, when $n$ hours of tennis are played.
d) Suppose Sunil has budgeted \$200 for tennis costs. How many hours can he play? How did you determine your answer?
22. Refer to question 21. The tennis club also offers a special 10-week summer membership for adults. It costs $\$ 75$, plus $\$ 4.00$ per hour of court time.
a) How would the graph change? Draw the new graph on the grid in question 21.
b) How would the total cost equation change? Write the new equation.
c) How many hours could an adult play if her budget for tennis is $\$ 200$ ?
23. The daily cost of running a sausage cart is a fixed cost of $\$ 40$, plus $\$ 1$ per sausage. The revenue is $\$ 3$ per sausage.
a) Write an equation for the daily cost, $C$ dollars, in terms of $n$, the number of sausages sold.
b) Write an equation for the revenue, $R$ dollars, in terms of $n$.
c) Graph the equations on the same grid.
d) How many sausages have to be sold before a profit is made? Explain.

7 24. What expression does each group of algebra tiles represent?
a)

b)

25. Simplify each expression by combining like terms.
a) $8 x+3-x$
b) $3 x^{2}-7 x-x^{2}+4 x$
c) $10+2 x-5-2 x$
d) $3 x^{3}+6 x+2 x^{3}-2 x$
26. Add. Which tools can you use?
a) $(5 x+3)+(6 x-7)$
b) $\left(2 x^{2}-9 x\right)+\left(4 x-3 x^{2}\right)$
c) $\left(-x^{2}+3 x-1\right)+\left(3 x^{2}-7 x+2\right)$
27. Subtract. How could you check your answers?
a) $(2 x+5)-(x+2)$
b) $\left(7 x^{2}-8\right)-\left(6 x^{2}-3\right)$
c) $\left(5 x^{2}+x-2\right)-\left(-2 x^{2}+3 x-3\right)$
28. Expand.
a) $6(5+2 x)$
b) $2\left(x^{3}-3 x^{2}+3\right)$
c) $-3(3 x+1)$
d) $-4\left(2 x^{3}-5 x^{2}\right)$
e) $x(2 x+7)$
f) $3 x(7-3 x)$
g) $-2 x\left(2 x^{2}-3\right)$
h) $2 x\left(3 x^{2}-4 x+5\right)$
29. Solve each equation. How could you check your answer?
a) $7 x+6=10+3 x$
b) $8+5 x=x-4$
c) $9-3 x=-5 x+3$
d) $2 x-2=4-x$

