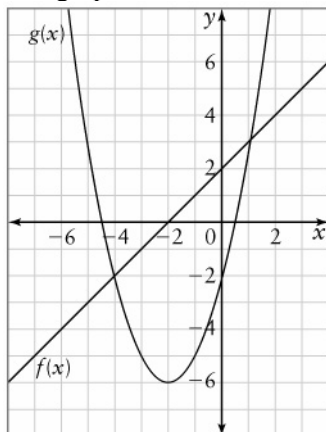


Chapter 8 Test

BLM 8-10

1. The graphs of two functions are shown.



- a) Evaluate.

i) $f(-3) + g(-3)$ ii) $g(f(-3))$

- b) Draw the graph of
- $y = f(x) + g(x)$
- .

- c) For what values of
- x
- is each true?

i) $g(x) > f(x)$ ii) $\frac{g(x)}{f(x)} > 1$

- d) For what value of
- x
- is
- $\frac{g(x)}{f(x)}$
- not defined?

2. The equations for the graph in question 1 are
- $f(x) = x + 2$
- and
- $g(x) = (x + 2)^2 - 6$
- .

- a) Calculate.

i) $f(g(2))$ ii) $\frac{g}{f}(3)$

- b) Develop a simplified algebraic model for each.

i) $y = f(x) + g(x)$

ii) $y = f(x)g(x)$

iii) $y = (f \circ g)(x)$

3. a) The radius of a circle is related to its circumference,
- $r(C) = \frac{C}{2\pi}$
- . Since the area of a circle is given by
- $A(r) = \pi r^2$
- , the area can be written in terms of the circumference as
- $A(r(C))$
- . Determine the simplified algebraic model for
- $A(r(C))$
- .

- b) Repeat this technique to determine an expression for the surface area of a cube in terms of its volume. Let the length of a side be
- b
- .

4. The season ticket sales for a football team depend on the number of wins that the team has in the previous year according to the formula

$$N(w) = 10\,000 \left(1 + \frac{w}{10}\right)^2, \text{ where the}$$

number of season tickets sold is N and the number of wins in the previous season is w . The number of wins that the team has in the previous year is currently given by $w(t) = -\frac{1}{2}(t-4)^2 + 12$, where t is the year, with $t = 0$ in 2009.

- a) Calculate the number of season tickets sold in 2009.
- b) Graph $y = w(t)$. If the season has 14 games, describe what the model predicts concerning the winning success of the team.
- c) What domain restrictions must be placed on $w(t)$? Explain.
- d) The team's stadium holds 50 000 fans. Does the model predict a need for expansion? Justify your answer.
- e) The team plans to sign several older star free agents for next year. How might this affect $w(t)$?
- f) The team has just drafted four rookies who are projected to be stars in 4 years. How might this affect $w(t)$?

5. For the football team in question 4, the average season ticket price is \$400.

- a) Determine an algebraic model (un-simplified) for revenue $R(t)$ from season ticket sales.
- b) Graph the model for $0 \leq t \leq 9$.
- c) The cost of running the team is $C(t) = 12\,300\,000(1 + 0.05t)$. Add this function to the graph.
- d) When will the team be profitable?