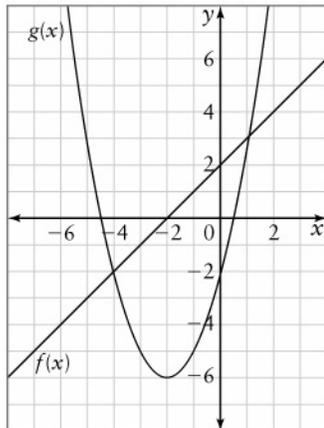


## Chapter 8 Test

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
- $$N(w) = 10\,000 \left(1 + \frac{w}{10}\right)^2$$
- 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?