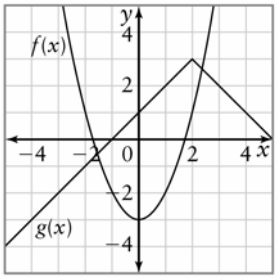
Name: _____ Date: _____

Chapter 8 Review

BLM 8–8

8.1 Sums and Differences of Functions

1. Use the graph shown.



Use the superposition principal to draw a graph of each.

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

b) $y = g(x) - f(x)$

2. If $f(x) = 2x + 3$, $g(x) = x^2 + x$, and $h(x) = x^2 - 3$, develop an algebraic model for each of the following.

a) $y = f(x) - g(x)$

b) $y = f(x) - g(x) + h(x)$

8.2 Products and Quotients of Functions

3. Let $u(x) = x$, $v(x) = \sin x$, and $w(x) = x^2$. Work in radians.

a) Will the graph of $y = u(x)v(x)$ have symmetry? Explain why or why not.

b) Will the graph of $y = u(x)w(x)$ have symmetry? Explain why or why not

c) Use graphing technology to confirm your predictions.

d) Is the domain of $y = u(x)v(x)$ the same as the domains of $y = u(x)$ and $y = v(x)$? Explain.

e) Is the domain of $y = \dfrac{u(x)}{v(x)}$ the same as the domains of $y = u(x)$ and $y = v(x)$? Explain.

8.3 Composite Functions

4. If $f(x) = 2x + 3$, $g(x) = x^2 + x$, and $h(x) = x^2 - 3$, develop algebraic models for each.

a) $y = f(h(x))$ **b)** $y = (g \circ f)(x)$

c) $y = f(f^{-1}(x))$

8.4 Inequalities of Combined Functions

5. Use Technology Jay has $4000 to invest. He could invest in a money fund, where the value is given by the compound interest formula $A(t) = 4000(1.06)^t$. He could buy a guitar, whose value is modelled by $V(t) = 80t^2 - 800t + 4000$.

a) Graph the two options.

b) Which option is better over the first 10 years?

c) After how long would the value of both investments be the same?

8.5 Making Connections: Modelling with Combined Functions

6. Relative motion uses the superposition principle. Consider the position of a person relative to the ground as she runs back and forth in a train while the train itself is also moving.

a) Suppose the runner's motion relative to the train is $x_1(t) = -5\cos(0.2\pi t)$, where x_1 is in metres and t is in seconds. If the train is moving at a constant speed of 1 m/s, its position is $x_2(t) = t$.

i) Predict what the motion of the runner would look like from the vantage point of a person standing on the ground beside the train as it went by. Sketch a graph of this motion.

ii) Graph $y = x_1(t) + x_2(t)$ to check your answer to part a). Work in radians, and use technology.

b) Repeat part a) but with the train accelerating from rest, so that $x_2(t) = 0.15t^2$.