Precalculus Review #2 Chapter 2 page 1 _____

Given the functions f and g defined by the equations $f(x) = x^2 + 2$ and $g(x) = 5x - 3$. Find each of the following.

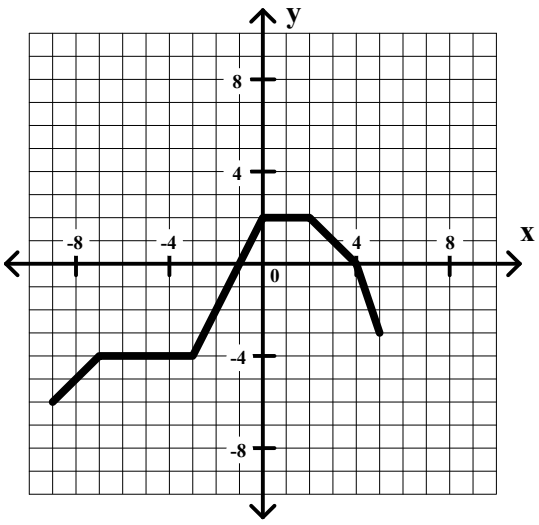
1) f(3) = _____ 2) g(3) = _____ 3) f(-5) = _____ 4) g(-5) = _____

5) (f + g)(0) = ____ 6) (fg)(2) = ____ 7) (f – g)(x) = _____

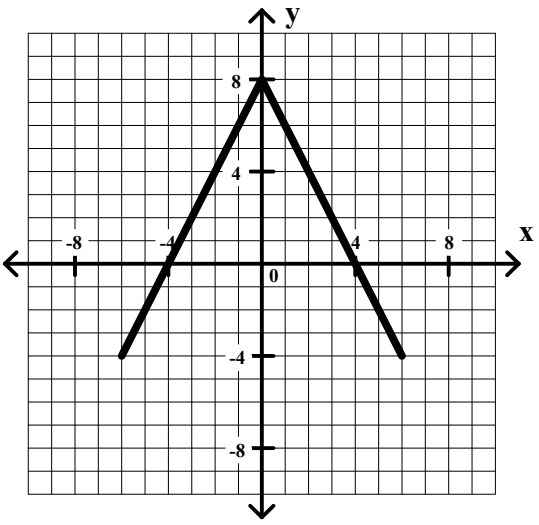
8) (f ∘ g)(2) = ____ 9) (g ∘ f)(2) = ____ 10) (f ∘ g)(x) = _____

Given the functions f and g defined by the graphs below.

graph of f



graph of g



Answer each of the following questions.

11. What is the domain of f ? _____ **12. What is the range of f ? _____**

13. Is f a 1-to-1 function? _____

14. On what open interval(s) is f increasing? _____

15. On what open interval(s) is f decreasing? _____

16. On what open interval(s) is f constant? _____

Find each of the following, if possible. If any do not exist, write undefined.

17) f(3) = _____ 18) g(3) = _____ 19) f(-5) = _____ 20) g(-5) = _____

21) f(6) = _____ 22) g(6) = _____ 23) f(0) = _____ 24) g(0) = _____

25) (f + g)(2) = _____ 26) (fg)(1) = _____ 27) (f – g)(5) = _____

28) (f / g)(-1) = _____ 29) (f ∘ g)(-3) = _____ 30) (g ∘ f)(-3) = _____

Given the function f defined by the equation f(x) = 5x + 3. Answer each of the following questions.

31. What is $f^{-1}(x)$?

32. Show that $(f \circ f^{-1})(x) = x$.

33. Show that $(f^{-1} \circ f)(x) = x$.

Find $f^{-1}(x)$ for each of the following functions.

34. $f(x) = 2x^2 + 5$ where $x \geq 0$

35. $f(x) = \dfrac{4x - 3}{2x + 3}$

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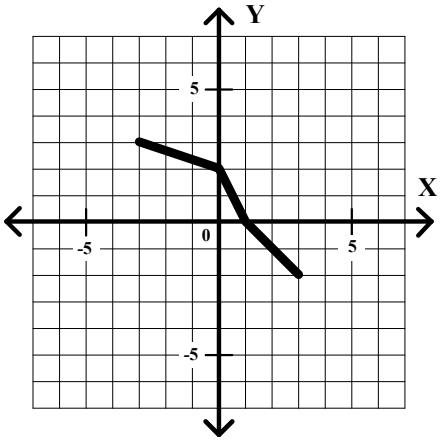
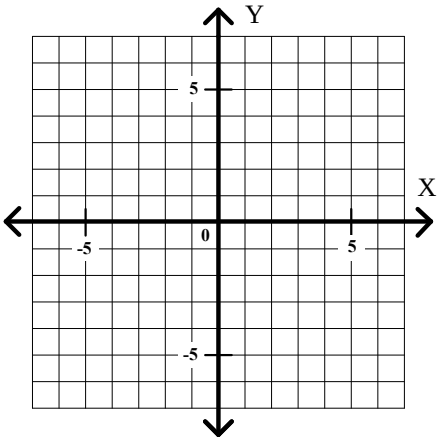
Use the graph of y = f(x) to sketch the graph of each of the following.

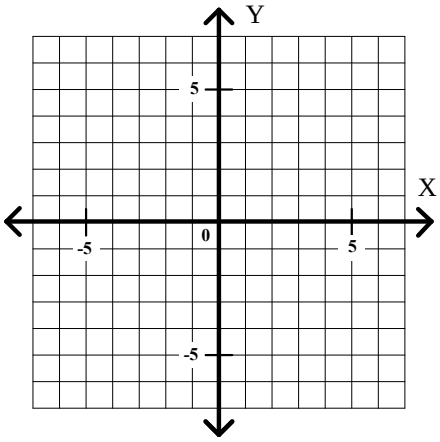
y = f(x)



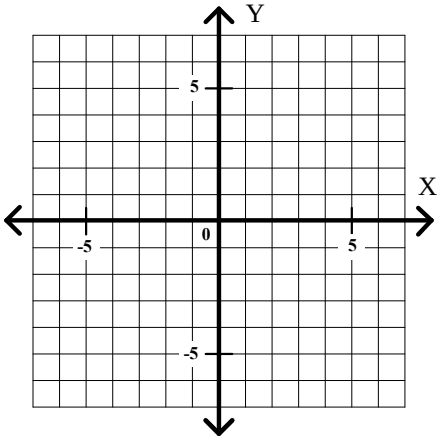
36. y = f(x + 2)



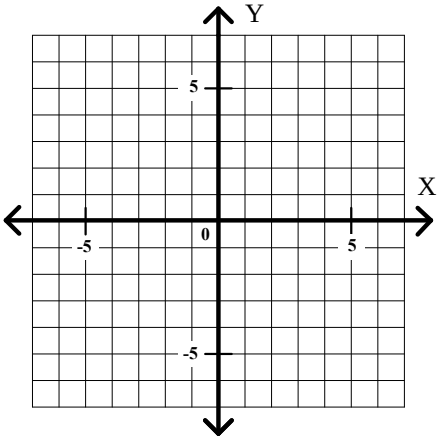
37. y = f(x) + 2



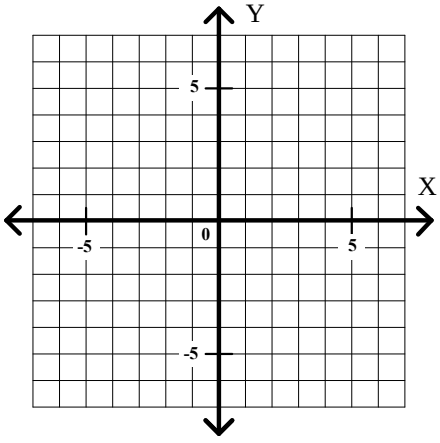
38. y = .5f(x)



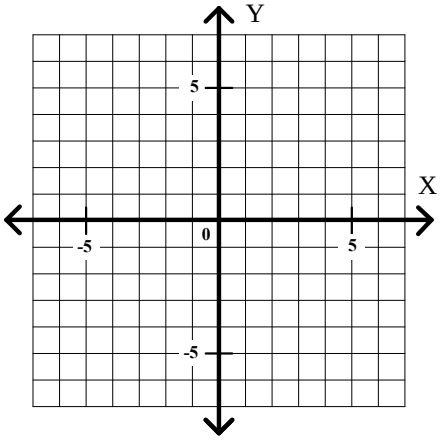
39. y = f(.5x)



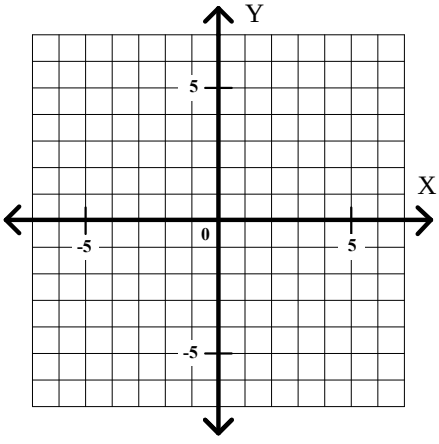
40. y = | f(x) |



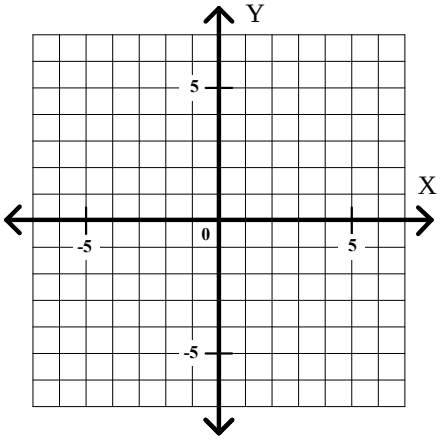
41. y = -f(x)



42. y = f(-x)



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



Solve each of the following problems. Show your process neatly organized.

44. The total cost of meat is proportional to the amount purchased. If 2.4 pounds cost $9.30, then how much would 3.6 pounds cost?

45. The time required to travel between two places is inversely proportional to the average speed. If a hike took 2 hours and 40 minutes when the average speed was 5 miles per hour, then how long would it have taken if the average speed had been 4 miles per hour? Express your answer in hours and minutes.

46. In an open tank filled with liquid, the fluid pressure varies directly as the square of the depth. If the pressure is 5.25 pounds per square inch at a depth of 20 feet, then what would be the pressure at a depth of 16 feet?

47. The weight of an object is inversely proportional to the square of the distance between the object and the center of the earth. If an object normally weighs 98 pounds (on the surface of the earth), what would the object weigh if it was stationary at a point 3000 miles above the surface of the earth? (The diameter of the earth is about 8000 miles.)