Directions: Use the given functions below to evaluate the following, if possible.

$f(x) = 4x - 5$ $g(x) = x^2 - 2x + 4$ $h(x) = 3(2)^x$ $k(x) = 3 - 2x$

1. $f\big(g(1)\big) =$

2. $g\big(f(0)\big) =$

3. $h\big(k(2)\big) =$

4. $f\big(f(-1)\big) =$

5. $h\big(h(0)\big) =$

6. $(g \circ k)(4) =$

7. $k\big(f(x)\big) =$

8. $(f \circ g)(x) =$

9. $g\big(f(x)\big) =$

x	4	5	6	7	8
$f(x)$	135	45	15	5	5/3

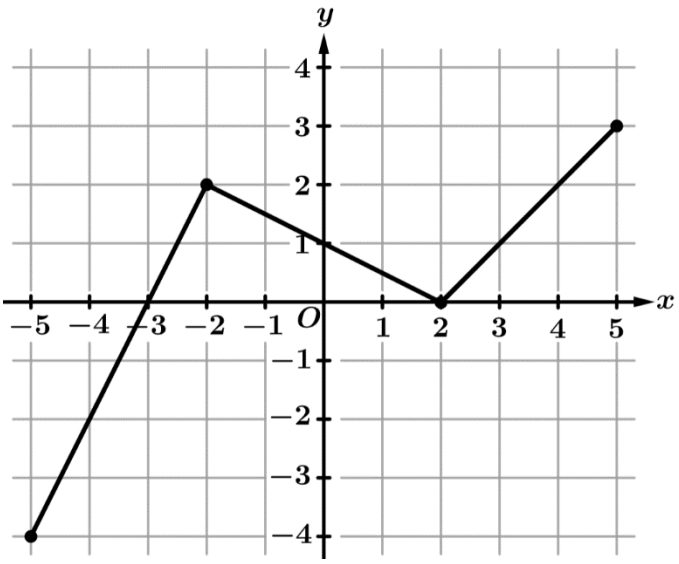
10. Let f be a function defined for all real numbers. The table gives values for $f(x)$ at selected values of x. The function g is given by $g(x) = \frac{x^2-3}{7x+23}$.

(A) (i) The function h is defined by $h(x) = (g \circ f)(x) = g\big(f(x)\big)$. Find the value of $h(6)$ as a decimal approximation, or indicate that it is not defined.

(ii) Find all values of x for which $f(x) = 5$, or indicate there are no such values.

(C) (i) Use the table of values of $f(x)$ to determine if f is best modeled by a linear, quadratic, exponential, or logarithmic function.

(ii) Give a reason for your answer based on the relationship between the change in the output values of f and the change in the input values of f.



Graph of f

11. The function f is defined for $-5 \le x \le 5$, and consists of three line segments, as shown in the figure. The function g is given by $g(x) = 1.57x^3 - 2.07x^2 + 5.62$.

(A) (i) The function h is defined by $h(x) = (g \circ f)(x) = g(f(x))$. Find the value of $h(3)$ as a decimal approximation, or indicate that it is not defined.

(ii) Find all values of x for which $f(x) = 2$, or indicate there are no such values.

x	2	5	8	11	14
$f(x)$	-1	6	11	14	15

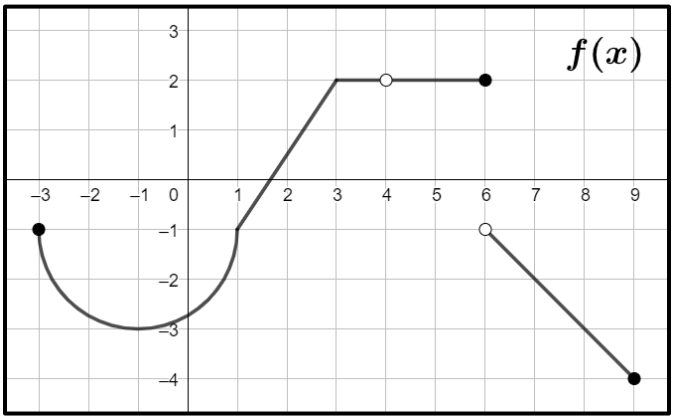
12. The domain of f consists of the five real numbers $2, 5, 8, 11,$ and 14. The table defines the function f for these values. The function g is given by $g(x) = 1.3(0.9)^x$.

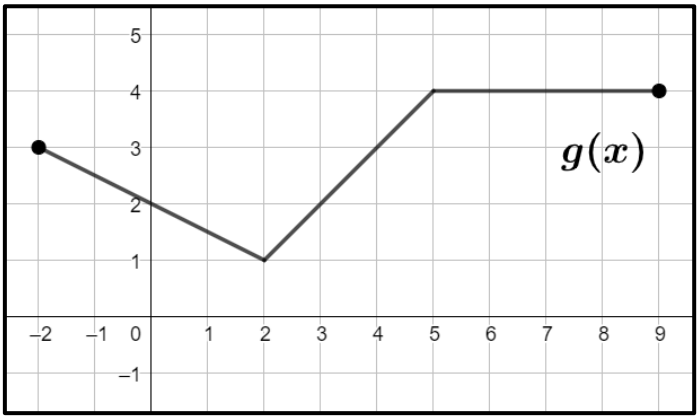
(A) (i) The function h is defined by $h(x) = (g \circ f)(x) = g(f(x))$. Find the value of $h(11)$, as a decimal approximation, or indicate that it is not defined.

(ii) Find all values of x for which $f(x) = 8$, or indicate there are no such values.

(C) (i) Use the table of values of $f(x)$ to determine if f is best modeled by a linear, quadratic, exponential, or logarithmic function.

(ii) Give a reason for your answer based on the relationship between the change in the output values of f and the change in the input values of f.





x	-3	-1	2	6	9
$p(x)$	$f(6)$	e	-1	1	3

$$h(x) = \begin{cases} 8\left(\frac{1}{2}\right)^x, & x < 2 \\ 1 - x^2, & x = 2 \\ 4, & x > 3 \end{cases}$$

The function m is is the result of applying three transformations to the graph of g in this order: a vertical dilation by a factor of 2, a vertical translation by -3 units, and a horizontal translation by 1 unit.

Directions: Use the given information above to evaluate the following, if possible.

13. $f\big(g(4)\big)$

14. $(g \circ f)(6)$

15. $(g \circ g)(-2)$

16. $p\big(f(\pi)\big)$

17. $(f \circ g)(8)$

18. $(g \circ h)(0)$

19. $h\big(f(6)\big)$

20. $(p \circ f)(-3)$

21. $(h \circ p)(6)$

22. $m\big(h(7)\big)$

23. $(m \circ m)(-1)$

24. $(p \circ f)(8)$

25. $f\big(m(1)\big)$

26. $(m \circ f \circ p)(9)$

27. $h\big(h(2)\big)$