

Functions Gateway B - Practice

For Problems 1 and 2, let $Q(x) = x + \frac{1}{x^2}$

1. Evaluate $Q(2)$.

$$Q(2) = 2 + \frac{1}{2^2} = 2 + \frac{1}{4} = \boxed{\frac{9}{4}}$$

2. Find $Q(2+h)$. Do not simplify.

$$Q(2+h) = (2+h) + \frac{1}{(2+h)^2}$$

3. Express the following rule for obtaining the output of a function using functional notation.

Square the input and then add four times the input.

$$F(x) = x^2 + 4x$$

4. What is the natural domain of the function $f(t) = \sqrt{2t-5}$. Give your answer in interval notation.

Natural
Domain
occurs
when

$$\begin{aligned} 2t - 5 &\geq 0 \\ 2t &\geq 5 \\ t &\geq \frac{5}{2} \end{aligned}$$

interval is $\left[\frac{5}{2}, \infty\right)$

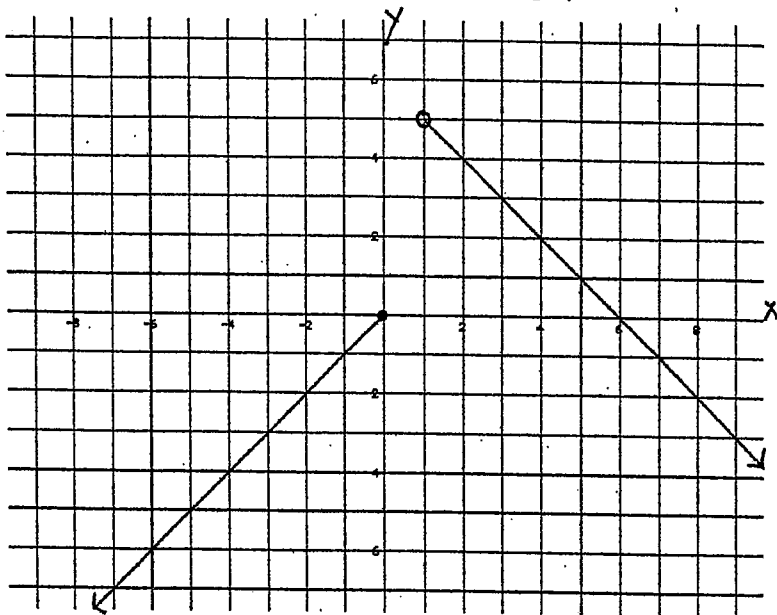
5. The functions, f and g , are defined by the table given below.

x	$f(x)$	$g(x)$
-0.5	-1	0
0	10	-3
1.5	1.5	4
3	-10	5
4	22	10

Find the value of $2f(3) - 10g(0)$

$$\begin{aligned} 2 \cdot [-10] - 10[-3] &= -20 + 30 \\ &= \boxed{10} \end{aligned}$$

For Problems 6 and 7, consider the function, f , graphed below.



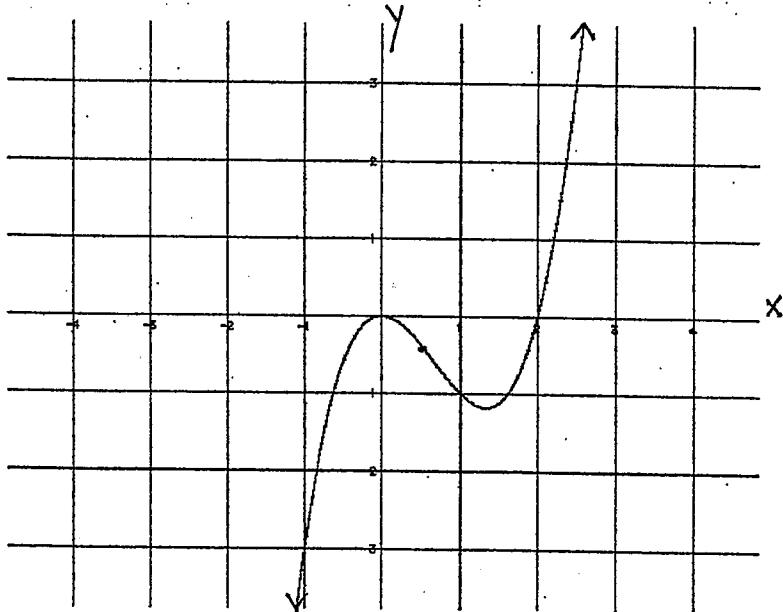
6. What is the domain of the function graphed above? Write your answer in interval notation.

$$\text{Domain: } (-\infty, 0] \cup (1, \infty)$$

7. What is the range of the function graphed above? Write your answer in interval notation.

$$\text{Range: } (-\infty, 4)$$

For Problems 8, 9 and 10, consider the function, g , graphed below.



8. What is the (approximate) value of $g(0.5)$?

$$g(0.5) \approx -0.3$$

9. For what (approximate) value(s) of x is $g(x) = -1$?

$$x = -1$$

10. What is the value of $2g(-1) + [g(-1)]^2 + g((-1)^2)$?

$$2 \cdot [-3] + (-3)^2 + g(1) \\ -6 + 9 - 1 = \boxed{2}$$