

Name \_\_\_\_\_

1. (7 pts) If the domain of  $f$  is all real numbers in the interval  $(-2, 6]$  and the domain of  $g$  is all real numbers in the interval  $[-5, 4]$ , then what is the domain of the function  $f + g$ ?

2. (5 pts) What is the domain of the function  $f(x) = \frac{x+72}{x^2-2x-15}$ ? Give your answer in set-builder notation (i.e., start with  $\{x |$  \_\_\_\_\_  $\}$ ).

3. (5 pts) Let  $f(x) = \frac{x}{x^2+4}$ . Find the following values:

a.  $f(2)$

b.  $f(-2)$

4. Determine whether each of the following relations represents a function. State the domain and range in each case. But if one is *not* a function, explain why.

a. (5 pts)

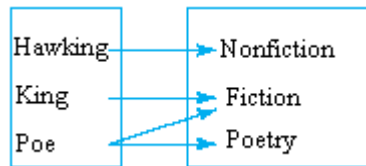


Domain:

Range:

Function? (If not, why not?)

b. (5 pts)



Domain:

Range:

Function? (If not, why not?)

5. (5 pts) What is the average rate of change of the function  $r(x) = 2x^2 - 1$ , from  $x = 1$  to  $x = 2$ ?

6. Let  $f(x) = \frac{x+5}{x-2}$  and  $g(x) = \sqrt{x+5}$ .

a. (5 pts) What is the domain of  $f$ ? (Set notation or interval notation)

b. (5 pts) What is the domain of  $g$ ? (Set notation or interval notation)

c. Find the following functions and *find the domain of each one*. You do not need to simplify the functions.

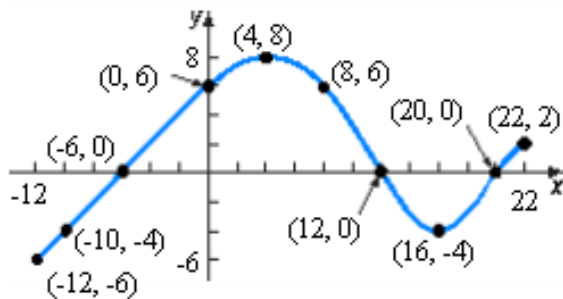
i. (5 pts)  $(f + g)(x)$

ii. (5 pts)  $\left(\frac{f}{g}\right)(x)$

iii. (5 pts)  $(f \circ g)(x)$  (The domain on this one is a little bit tricky.)

7. (10 pts) Find the difference quotient of  $f$ , that is, find  $\frac{f(x+h) - f(x)}{h}$ , for  $f(x) = 2x^2 - 3x$ . Simplify your answer.

8. Use the graph of the function  $f$ , below, to answer the following questions.



- a. (2 pts) What is  $f(8)$  ?
- b. (2 pts) Is  $f(18)$  positive or negative?
- c. (2 pts) How often does the line  $y = 1$  intersect the graph of  $f$  ?
- d. (2 pts) What is the domain of  $f$  ?
- e. (2 pts) What is the range of  $f$  ?
- f. (2 pts) List the interval(s) on which  $f$  is decreasing.

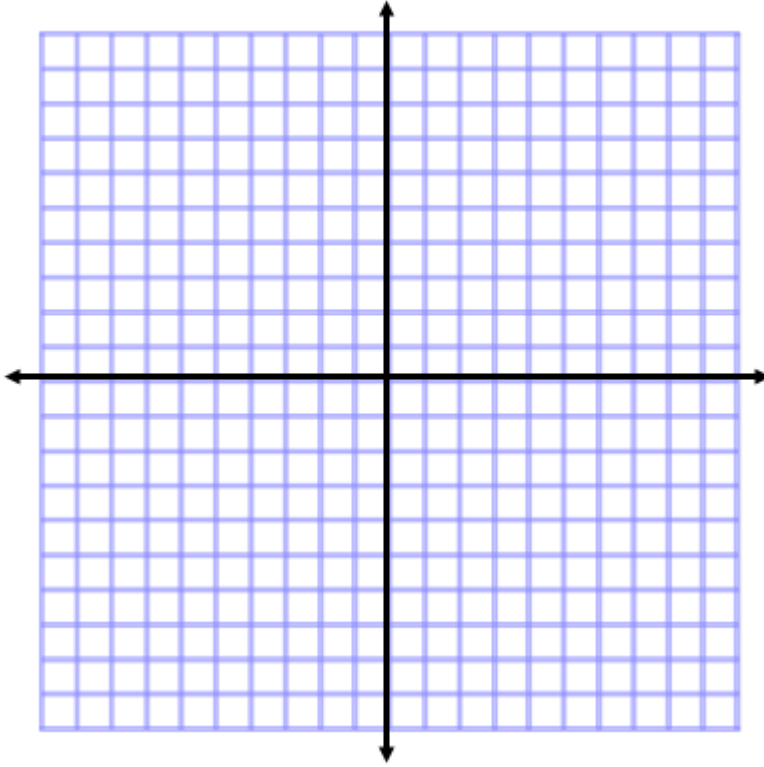
9. Graph each of the following functions using the techniques of shifting, compressing, stretching, and/or reflecting. Start with the graph of the basic function and show all stages.

a. (5 pts)  $g(x) = 3(x + 3)^2 + 5$

b. (5 pts)  $g(x) = \sqrt{x - 5} + 4$

10. (5 pts) Sketch the graph of  $f(x) = \begin{cases} 2x+3 & \text{if } -4 \leq x < 1 \\ -3x+5 & \text{if } 1 < x \leq 3 \end{cases}$ . Include all intercepts.

State the domain and range.



11. (5 pts) Determine the piecewise-defined function  $g$  from its graph, below.

