

Name \_\_\_\_\_

1. (7 pts) What is the domain of the function  $f(x) = \sqrt{2x-7}$  ? Give your answer in
- set-builder notation (i.e., start with  $\{x |$  \_\_\_\_\_  $\}$ ), *and*
  - interval notation.

2. Let  $f(x) = \frac{x^2 + 13}{x^2 - 5}$ . Find the following values:

a. (3 pts)  $f(2)$

b. (3 pts)  $f(-2)$

3. (5 pts) What is the average rate of change of the function  $f(x) = x^2 + 2x + 7$ , from  $x = 2$  to  $x = 3$  ?

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)  $\{(2,-1), (3,2), (7,-1), (2,2)\}$

Domain:

Range:

Function? (If not, why not?)

b. (5 pts)  $\{(2,-1), (3,2), (7,-1), (-1,2)\}$

Domain:

Range:

Function? (If not, why not?)

5. (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.

6. Let  $f(x) = \sqrt{2x-6}$  and  $g(x) = \frac{x+3}{x-1}$ .

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

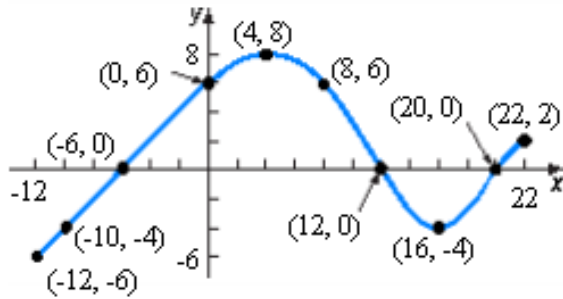
b. (5 pts) What is the domain of  $g$ ? (Set notation or interval notation)

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

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



a. (2 pts) What is  $f(-6)$  ?

b. (2 pts) Is  $f(21)$  positive or negative?

c. (2 pts) How often does the line  $y = 1$  intersect the graph of  $f$ ?

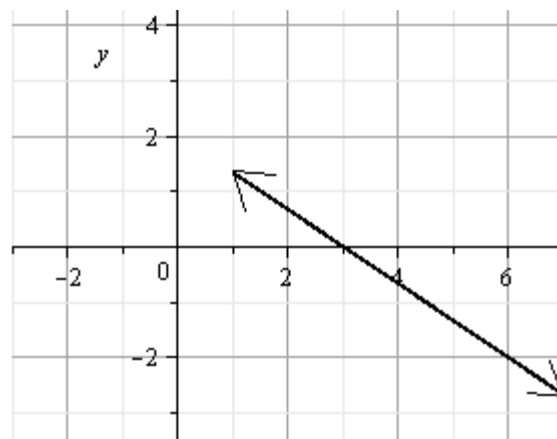
d. (2 pts) What is the domain of  $f$ ?

e. (2 pts) What is the range of  $f$ ?

f. (2 pts) List the interval(s) on which  $f$  is increasing.

8. (10 pts) Determine the equation of the line, below, from its graph. Give the equation in two forms:

- point-slope
- slope-intercept



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)  $g(x) = 2(x - 5)^2 + 7$

b. (5 pts)  $g(x) = \sqrt{x - 2} + 3$

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

State the domain and range.

