

1. For each of the following functions, state the domain in set-builder notation and in interval notation.

a. (5 pts) $f(x) = \sqrt{9x - 2}$

b. (5 pts) $g(x) = \frac{x^2 + 13}{9x - 2}$

c. (5 pts) $h(x) = \frac{x^2 + 13}{\sqrt{9x - 2}}$

2. (5 pts) If $f(x) = |3x + 7|$, what is $f(-8)$?

3. (10 pts) What is the average rate of change of the function $f(x) = x^2 - 3$ from $x = 2$ to $x = 4$?

4. (5 pts) Consider the relation $\mathbf{R} = \{(2,3), (3,-2), (5,7), (6,2)\}$ and fill in the following:

a. Domain

b. Range

c. Is \mathbf{R} a function?

d. If \mathbf{R} is a function, is it a 1-to-1 function? (Yes, No or DNA)

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

a. (5 pts) What is the domain of f ?

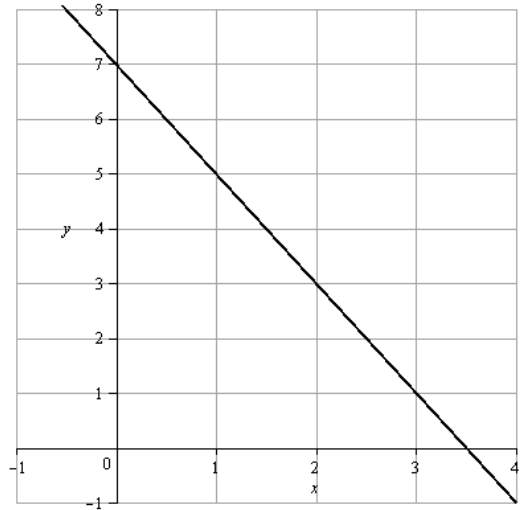
b. (5 pts) What is the domain of g ?

c. (5 pts) Write the function $(f - g)(x)$. Do not simplify. What is its domain?

d. (5 pts) Write the function $\left(\frac{g}{f}\right)(x)$. Do not simplify. What is its domain?

e. (5 pts) Write the function $(f \circ g)(x)$. Do not simplify. What is its domain?

6. (10 pts) Determine the equation of the line from its graph.
Give the equation in...
- ... point-slope form and
 - ... slope-intercept form.



7. Graph each of the following by the techniques of shifting, stretching, compressing or reflecting. Start with the graph of a basic function and show all steps *as demonstrated in Videos*. I expect to see 3 points labeled in the first sketch, and to see where those points are moved to in each subsequent step.
- (10 pts) $g(x) = -2\sqrt{4-x} + 5$

Bonus: (5 pts) Label the x - and y -intercepts on the graph of $g(x)$.

b. (10 pts) $g(x) = 3(x+4)^2 - 2$

8. (10 pts) Sketch the graph of the piecewise-defined function $f(x) = \begin{cases} x-1 & \text{if } -2 \leq x \leq 0 \\ x^2 - 3 & \text{if } 0 < x \end{cases}$

