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

    a. (5 pts) $f(x) = \sqrt{3x+5}$ b. (5 pts) $g(x) = \dfrac{x^2 + 13}{3x + 5}$

    c. (5 pts) $h(x) = \dfrac{x^2 + 13}{\sqrt{3x+5}}$

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

3. (10 pts) What is the average rate of change of the function $f(x) = x^2 + 1$ from $x = 3$ to $x = 4$?

4. (5 pts) Consider the relation $\mathbf{R} = \{(2,4), (3,-2), (5,6), (6,4), (7,2)\}$ 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 $f(x) = \dfrac{x-2}{x-3}$ and $g(x) = \sqrt{5x+10}$.

   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 $\left(\dfrac{f}{g}\right)(x)$. 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…
   a. … point-slope form and
   b. … slope-intercept form.
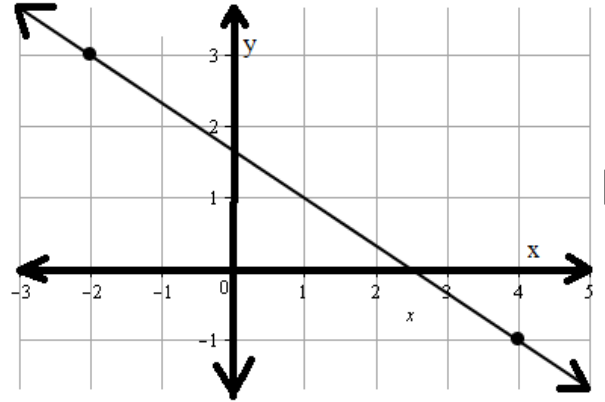
7. Graph each of the following by the techniques of shifting, stretching, compressing or reflecting. Start with the graph of a basic function and show all steps *as demonstrated in Videos*. I expect to see 3 points labeled in the first sketch, and to see where those points are moved to in each subsequent step.

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

b. (10 pts) $g(x) = -3\sqrt{2-x} + 4$

8. (10 pts) Sketch the graph of the piecewise-defined function $f(x) = \begin{cases} -x+3 & \text{if } -3 \le x \le 2 \\ (x-2)^2 - 1 & \text{if } x \ge 2 \end{cases}$. You don't

have to show all steps with that 2nd piece, like I wanted for #7a, above. You can safely read the vertex from the definition. But I do want to see special care taken at the endpoints of the pieces. I also expect to see the x- and y- intercepts for f.

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