

Show all your work for full credit. Unsupported answers = reduced points. **Clearly circle all answers.**

1. Simplify the difference quotient: $\frac{f(x+h)-f(x)}{h}$ for the functions:

a) $f(x) = 3x^2 - 5x + 7$

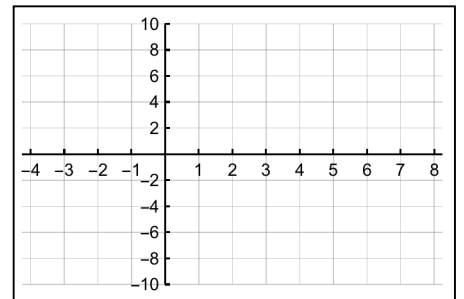
[/2]

b) $g(x) = \frac{2x}{x+3}$

[/2]

2. **Algebraically** find the domain of the function f and use your calculator to help make a sketch of the

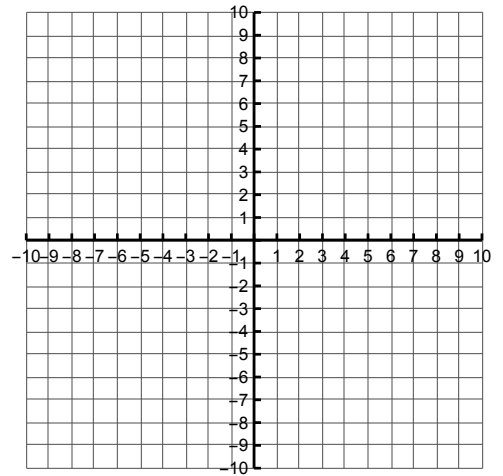
function to verify the domain: $f(x) = \frac{\sqrt{5x-x^2}}{x-2}$



[/2]

3. Graph the piecewise function:

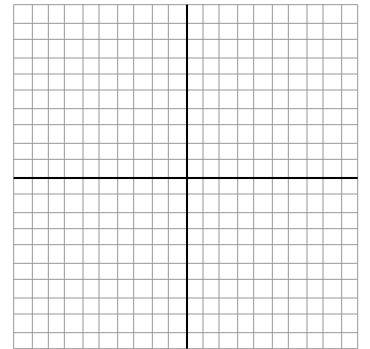
$$f(x) = \begin{cases} \frac{1}{2}x + 3 & \text{if } x \leq -2 \\ 2 & \text{if } -2 < x < 3 \\ \sqrt{x-3} & \text{if } x \geq 3 \end{cases}$$



[/3]

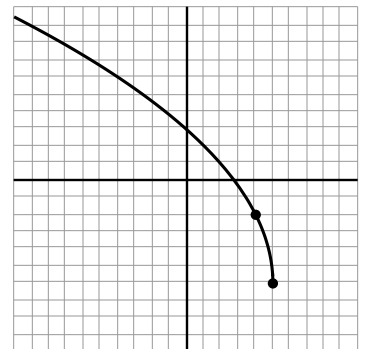
4. Identify and write down all the transformations used on the toolkit function $f(x) = \sqrt[3]{x}$ to obtain $g(x) = -3\sqrt[3]{x+5} + 2$ and make a sketch of $g(x)$.

Where does the point (8, 2) on f get transformed to on g .



[/3]

5. Find the function whose graph is given. Describe the transformations you used.



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