

Graphing Technology Lab

Piecewise-Linear Functions

Casio FX-9750G

You can use a graphing calculator to graph and analyze various piecewise functions, including greatest integer functions and absolute value functions.

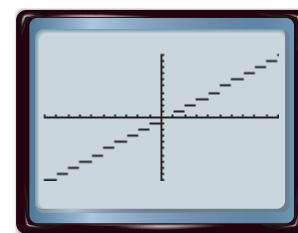
ACTIVITY 1 Greatest Integer Functions

Graph $f(x) = \llbracket x \rrbracket$ in the standard viewing window.

Enter the equation in the Y= list. Then graph the equation.

KEYSTROKES: $\boxed{\text{OPTN}}$ $\boxed{\text{F5}}$ $\boxed{\text{F5}}$ $\boxed{\text{X},\theta,\text{T}}$ $\boxed{\text{EXE}}$ $\boxed{\text{F6}}$

- 1A. How does the graph of $f(x) = \llbracket x \rrbracket$ compare to the graph of $f(x) = x$?
1B. What are the domain and range of the function $f(x) = \llbracket x \rrbracket$? Explain.



The graphs of piecewise functions are affected by changes in parameters.

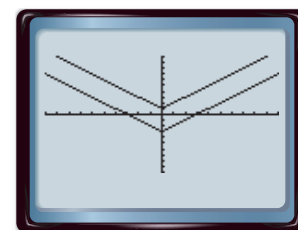
ACTIVITY 2 Absolute Value Functions

Graph $y = |x| - 3$ and $y = |x| + 1$ in the standard viewing window.

Enter the equations in the Y= list. Then graph.

KEYSTROKES: $\boxed{\text{OPTN}}$ $\boxed{\text{F5}}$ $\boxed{\text{F1}}$ $\boxed{\text{X},\theta,\text{T}}$ $\boxed{-}$ $\boxed{3}$ $\boxed{\text{EXE}}$ $\boxed{\text{OPTN}}$
 $\boxed{\text{F5}}$ $\boxed{\text{F1}}$ $\boxed{\text{X},\theta,\text{T}}$ $\boxed{+}$ $\boxed{1}$ $\boxed{\text{EXE}}$ $\boxed{\text{F6}}$

- 2A. Compare and contrast the graphs to the graph of $y = |x|$.
2B. How does the value of c affect the graph of $y = |x| + c$?



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Analyze The Results

1. A parking garage charges \$4 for every hour or fraction of an hour. Is this situation modeled by a *linear* function or a *step* function? Explain your reasoning.
2. A maintenance technician is testing an elevator system. The technician starts the elevator at the fifth floor of a building. It is sent to the ground floor, then back to the fifth floor. Assume the elevator travels at a constant rate. Should the height of the elevator be modeled by a step function or an absolute value function? Explain your reasoning.
3. **MAKE A CONJECTURE** Explain why the greatest integer function is sometimes called the *floor function*.
4. Graph $y = -|x|$ in the standard viewing window. How is this graph related to the graph of $y = |x|$?
5. **MAKE A CONJECTURE** Describe the transformation of the parent graph to $y = |x + c|$. Use a graphing calculator with different values of c to test your conjecture.