HOW MUCH WILL MY PURCHASE COST TO SHIP?

MM2A1. Students will investigate step and piecewise functions, including greatest integer and absolute value.

b. Investigate and explain characteristics of a variety of piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, point(s) of discontinuity, intervals over which the function is constant, intervals of increase and decrease and rates of change.

PROBLEM:

You own an internet based company that ships merchandise across the country. The cost of shipping is based on the cost of the order. The table below gives shipping cost. Your employees have asked to see the information in a graph rather than a chart.

Order Total	Shipping Cost
Less than $25.00	$5.00
$25.00 - $74. 99	$10.00
$75.00 - $124.99	$15.00
$125.00 - $349.00	$20.00
$350.00 and greater	$25.00

Create a graph that shows the shipping cost for any order. Your child's math teacher has asked you to give a presentation on real-world applications of step-functions. Use your companies graph to explain these concepts to the students.

1. What is the domain of the function?
2. What is the range of the function?
3. What are the extrema?
4. What are the intervals which the function is constant?
5. What are the points of discontinuity?

Answers:
1. x > 0
2. y = 5,10,15, 20,25
3. Minimum value is $5. Maximum value is $25
4. x = 0 to 24.99, y = 5; x = 25 to 74.99, y = 10; x = 75 to 124.99, y = 15; x = 125 to $349.99, y = 20; x $\geq$ 350, y = 25
5. (24.99, 5), (74.99, 10), (124.99, 15), (349.99, 20)

Shipping Cost

♦ Shipping Cost