Set One:

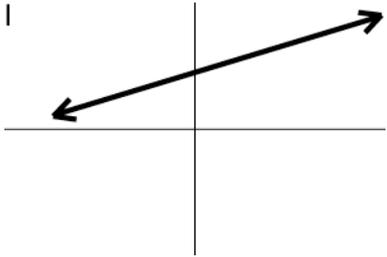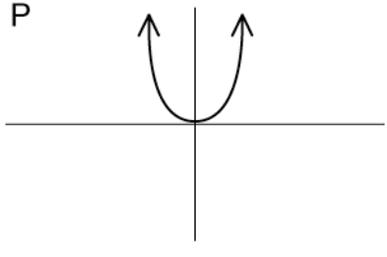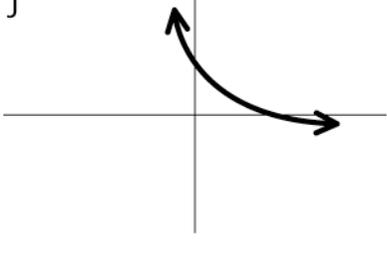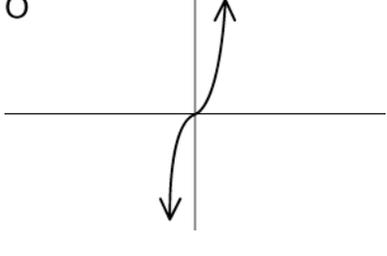| 1	2
At Sam's Pizza Parlor, the price of the pizza is a function of the number of toppings. Sam charges the same amount for each topping.	A flag company makes rectangular flags with dimensions in a 2:1 ratio. The area of the flag in square inches is a function of the width of the flag.
3	**4**
In a single-elimination athletic tournament, the number of teams remaining after each round is a function of the number of rounds that have been played.	The volume of a sphere is a function of the radius of the sphere.

Match That Function

R		S	
x | **f(x)**		**x** | **f(x)**	
1 | 7.75		0 | 0	
2 | 8.50		1 | 2	
3 | 9.25		2 | 8	
4 | 10		3 | 18	
		4 | 32	

Q		T	
x | **f(x)**		**x** | **f(x)**	
1 | 32		0 | 0	
2 | 16		1 | 4.189	
3 | 8		2 | 33.51	
4 | 4		3 | 113.1	
		4 | 268.08	

A	Y
$f(x) = 0.75x + 7$	$f(x) = 2x^2$

Z	B
$f(x) = 64 \bullet \left(\dfrac{1}{2}\right)^x$	$f(x) = \dfrac{4}{3}\pi x^3$

G	BB
Linear Function	Quadratic Function
AA	H
Exponential Function	Cubic Power Function

Set Two:

5	6
A hot air balloon appears to be descending at a steady rate. The height of the balloon is a function of time.	At a fireworks display, a fireworks rocket is launched upward from the ground with an initial velocity of 160 feet per second. The heightof the rocket, in feet, is a function of time.
7	8
You receive a cash gift from your aunt. You decide to invest the money in a savings account in which the 6% interest rate is compounded annually. The amount in your savings account is a function of the number of years the money is invested in the account.	The intensity of light from a light source varies inversely with the square of the distance from the bulb.

K

N

L

M

U	V
<table><tr><td>x</td><td>f(x)</td></tr><tr><td>1</td><td>100</td></tr><tr><td>2</td><td>25</td></tr><tr><td>3</td><td>11.1</td></tr><tr><td>4</td><td>6.25</td></tr><tr><td>5</td><td>4</td></tr></table>	<table><tr><td>x</td><td>f(x)</td></tr><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>144</td></tr><tr><td>2</td><td>256</td></tr><tr><td>3</td><td>336</td></tr><tr><td>4</td><td>384</td></tr></table>
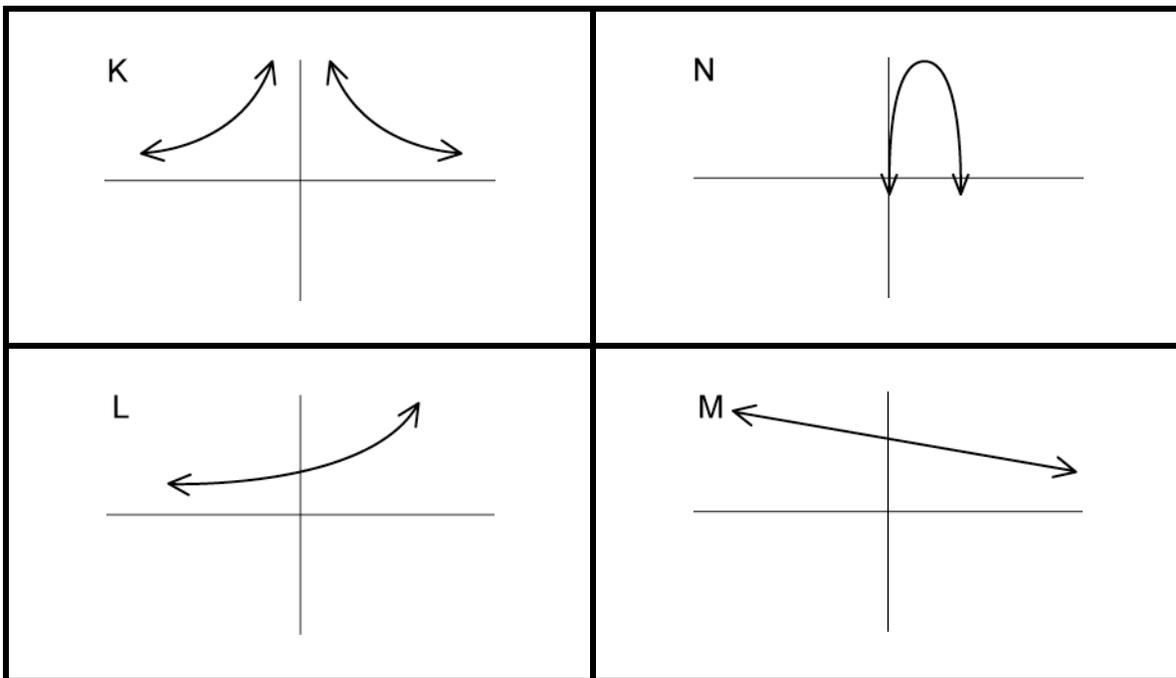
U

x	f(x)
1	100
2	25
3	11.1
4	6.25
5	4

V

x	f(x)
0	0
1	144
2	256
3	336
4	384

W

x	f(x)
0	500
1	530
2	561.8
3	595.5
4	631.24

X

x	f(x)
0	800
1	780
2	760
3	740
4	720

F

$$f(x) = 100x^{-2}$$

C

$$f(x) = -16x^2 + 160x$$

E

$$f(x) = 500(1.06)^x$$

D

$$f(x) = 800 - 20x$$

CC Inverse Power Function	BB Quadratic Function
AA Exponential Function	G Linear Function

Insert the letters of the representations that match.

Description	Type of Function (Explain how you know.)	Graph	Table	Function Rule
1				
2				
3				
4				
5				
6				
7				
8				

Discussion/Further Questions/Extensions

Note: This activity is divided into two parts. Teachers may want to give their students all eight examples or choose to limit the activity to either the first or second set of situations.

Teachers may guide student thinking by asking which of the verbal descriptions can be placed into more than one family of functions. Ask students to describe a process they could use to complete the activity and tell which column they might begin with. After they have completed the activity, ask students which of the graph, table, or function rule was the hardest to categorize. What made it hard?

The task may also be extended by asking students to create their own situations for elementary functions.

Extension Questions:

1. Create a verbal description that can be modeled by a power function. Create a graph, table, and function rule to represent the verbal description.

2. Create a verbal description that can be modeled by an exponential function. Create a graph, table, and function rule to represent the verbal description.

Sample Solutions

Insert the letters of the representations that match.

Description	Type of Function (Explain how you know.)	Graph	Table	Function Rule
1	G The Sam's Pizza Parlor situation is linear and increasing since there is a constant rate of increase in cost for each added topping.	I	R	A
2	BB The flag company situation is quadratic since 2-dimensional area depends on 1-dimensional width.	P	S	Y

Description	Type of Function (Explain how you know.)	Graph	Table	Function Rule
3	AA In the tournament situation, the number of teams is cut in ½ at the end of each round of play; therefore, the function is exponential and decreasing.	J	Q	Z
4	H 3-dimensional volume depends on 1-dimensional radius, so this function is a power function (and is also cubic).	O	T	B
5	G The balloon's height is decreasing at a constant rate, so the function is linear and decreasing.	M	X	D
6	BB Height of the rocket depends on the gravity coefficient multiplied by the amount of time squared, which makes this quadratic.	N	V	C
7	AA The compounding interest formula is exponential since interest is figured each year on the increasing amount in the account.	L	W	E
8	CC The formula for light intensity is an inverse variation. There is a variable in the denominator.	K	U	F