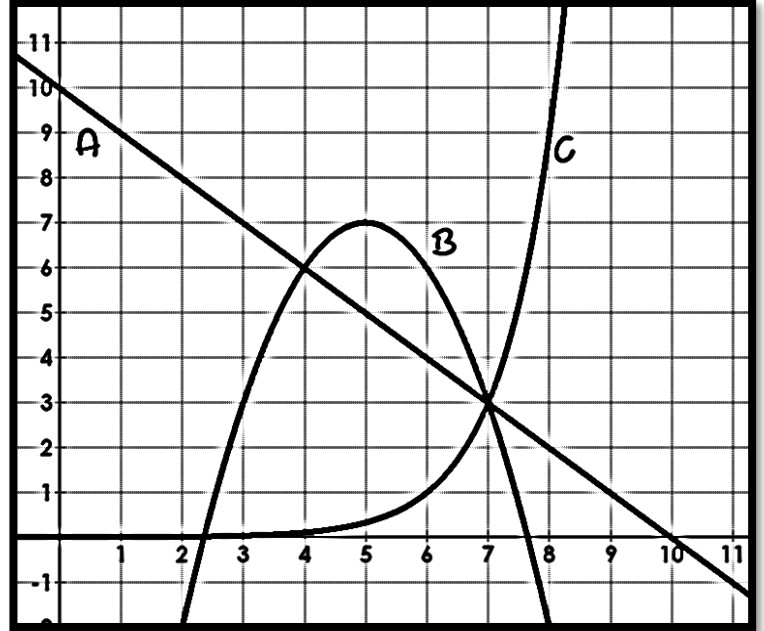# Comparing Applications

**Scenario 1:** Use the graph below to answer the following questions:

a. Which function has the largest x-intercept?

b. Which function has the largest y-intercept?

c. List the functions in order from smallest to biggest when x = 2:

d. List the functions in order from smallest to biggest when x = 5:

e. List the functions in order from smallest to biggest when x = 7:

f. List the functions in order from smallest to biggest when x = 9:

g. List the functions in order from smallest to biggest when x = 15:

h. Which functions have a positive rate of change throughout the entire graph?

i. Which functions have a negative rate of change throughout the entire graph?

j. Which graph has a rate of change that is negative and positive?

k. Which function has the largest ROC when x is between 6 and 7?

Scenario 2: Consider the following:

f(x)

g(x)

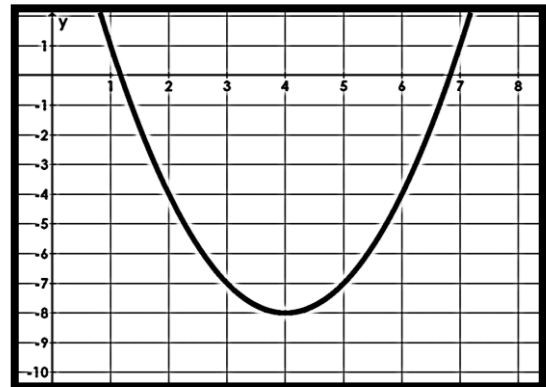| x	$g(x)$
-2	-10
-1	-8
0	-6
1	-4
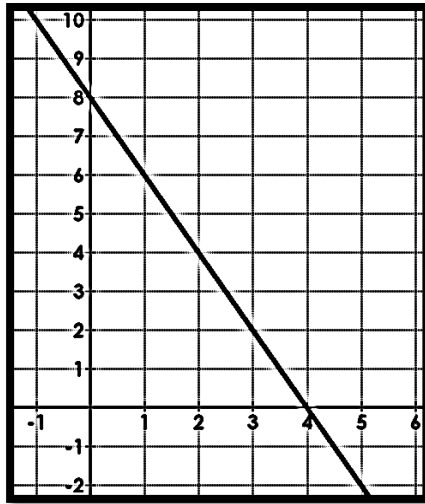
a. Write an equation for each representation.

b. Compare the y-intercepts and rates of changes for both functions:

Scenario 3: Consider the following representations:

a. f(x)

| X	-4	-3	-2	-1	0	1
y	0	-5	-8	-9	-8	-5

b. g(x)

a. Which quadratic function has the smaller minimum value? Explain why.

b. Which quadratic function has the bigger y-intercept? Explain why.

c. Name the x-intercepts for each function (estimate if necessary):

2

f(x):   g(x):

Scenario 4:

Two airplanes are in flight. The function $f(x) = 400x + 1200$ represents the altitude, f(x) of one airplane after x minutes. The graph below represents the altitude of the second airplane.
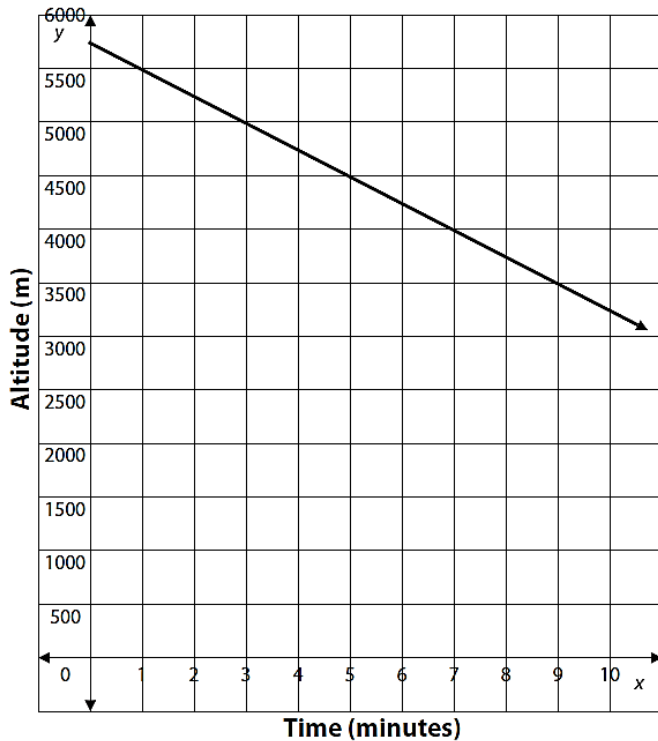
a. Compare the starting altitudes of both airplanes.

b. Compare the rates of changes of both airplanes.

Altitude (m) (y-axis: 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000)

Time (minutes) (x-axis: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

Scenario 5: Compare the two functions below:

Function A	Function B
A local newspaper began with a circulation of 1,300 readers in its first year. Since then, its circulation has increased by 150 readers per year.	The function $g(x) = 225x + 950$ represents the circulation of another newspaper where g(x) represents total subscriptions and x represents the number of years since its first year.

a. Starting Subscribers

b. Rate of Change

Scenario 6:
You are considering investing $5,000 in one of two mutual funds. The first fund will pay $500 each year. The second fund is predicted to have end of year balances as shown in the following table.

x (year)	0	1	2	3	4	5
$I(x)$ ($)	5,000	5,200	5,500	5,900	6,400	7,000

a. Identify what type of function each fund is and why:

       Type: Why:

       Type: Why:

b. Create an equation to model both mutual funds:

       Mutual Fund A:

       Mutual Fund B:

c. Which fund should you choose if you want to withdraw your money after 5 years and why?

d. Which fund should you choose if you want to withdraw your money after 10 years and why?

Scenario 7:

Suppose you are offered a position at a prestigious company. You may choose how your salary is paid.

- Option 1 is described by the quadratic equation $S(x) = 2500x^2 + 2500x + 60{,}000$ where x is the number of years you are with the company and S(x) is the yearly salary in dollars.

- Option 2 has a starting salary of $35,000, but you get a 25% raise each year. (Equation: _____)

a. Identify what type of function each fund is and create an equation to model both mutual funds:

Type: _____   Why:

Type: _____   Why:

b. If you plan to work for one of these companies for 5 years, which option should you choose?

c. If you plan to work for one of these companies for 30 years, which option should you choose?

d. When does Option 2's salary exceed Option 1's salary?

IMPORTANT

The graphs and tables of a function increasing

_____ will ALWAYS eventually exceed a function

increasing _____ or _____