

## Average Rate of Change

## Progress Assessment

Circle the letter of the best answer.

1. In the following table, what is the pattern between dependent values?

Hours	Medication level (mg)
2	388
4	352
6	292
8	208
10	100

- a. constant first difference  
b. constant second difference  
c. constant multiple  
d. There is no pattern in the values.
2. When the Johnsons gave birth to their son, they opened a college savings account. They deposited \$1,000 initially and add \$150 each month. Let  $A$  be the amount in the savings account  $t$  years after it is opened. What type of function best models the value of the account?
- a. linear function  
b. quadratic function  
c. exponential function  
d. cubic function
3. Use the table to determine the rate of change on the interval  $[2, 5]$ .

Weeks	Value of stock (\$)
1	90,000
2	81,000
3	72,900
4	65,610
5	59,049

- a.  $-\$9,000$  per week  
b.  $-\$8,452$  per week  
c.  $-\$7,800$  per week  
d.  $-\$7,317$  per week

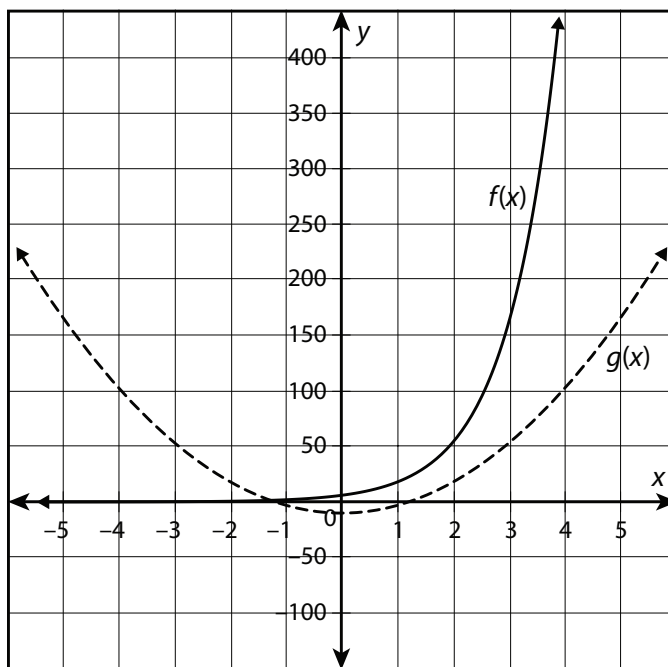
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4. Which type of function is modeled in the table?

<b>Ticket price (\$)</b>	10	15	25	30
<b>Profit made (\$)</b>	20,600	21,350	23,750	25,400

- a. linear function  
b. exponential function  
c. quadratic function  
d. It is impossible to determine.

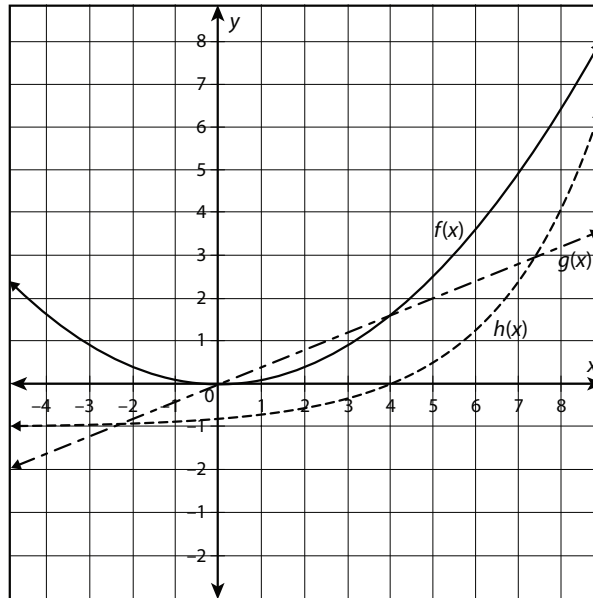
5. The function  $f(x)$  can be described as:



- a. an exponential function with a positive initial value  
b. an exponential function with a negative initial value  
c. a quadratic function with a positive leading coefficient  
d. a quadratic function with a negative leading coefficient

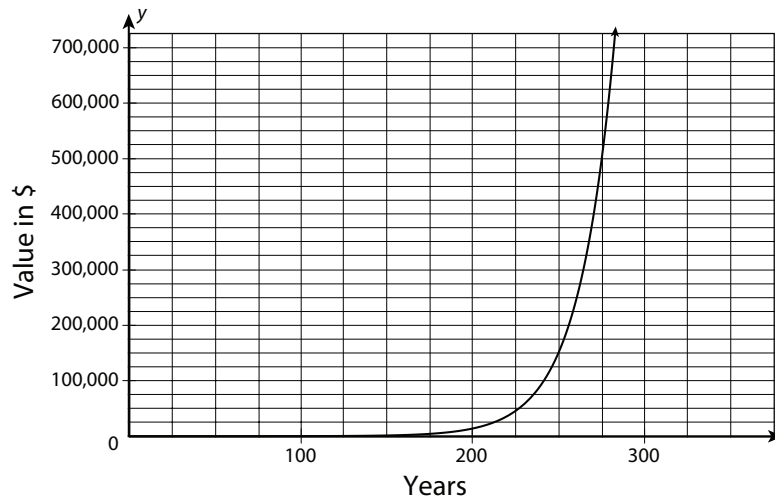
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6. Which function will eventually exceed the others?



- a.  $f(x)$
- c.  $h(x)$
- b.  $g(x)$
- d. It is impossible to determine.

7. The following graph represents the value of an antique painting over a period of time. What is the approximate rate of change on the interval  $[0, 275]$ ?



- a. \$1,818 per year
- c. \$500,000 per year
- b. \$93,000 per year
- d. The rate of change cannot be determined.

continued

8. The function  $f(x) = -12(x - 3)^2 + 19$  can be described as:
- a. an exponential function with a positive initial value
  - b. an exponential function with a negative initial value
  - c. a quadratic function with a positive leading coefficient
  - d. a quadratic function with a negative leading coefficient
9. Given that as  $x \rightarrow \infty, f(x) \rightarrow \infty$  and as  $x \rightarrow -\infty, f(x) \rightarrow \infty$ , which of the following could be  $f(x)$ ?
- a.  $f(x) = \frac{x+2}{7}$
  - b.  $f(x) = 6x^2 - 9$
  - c.  $f(x) = -2(3)^x$
  - d.  $f(x) = 5^x$
10. Given the function  $f(x) = \left(\frac{2}{3}\right)^x + 8$ , as  $x \rightarrow -\infty, f(x) \rightarrow$  \_\_\_\_\_?
- a.  $-\infty$
  - b.  $\infty$
  - c. 0
  - d. 1

**continued**

Name: \_\_\_\_\_

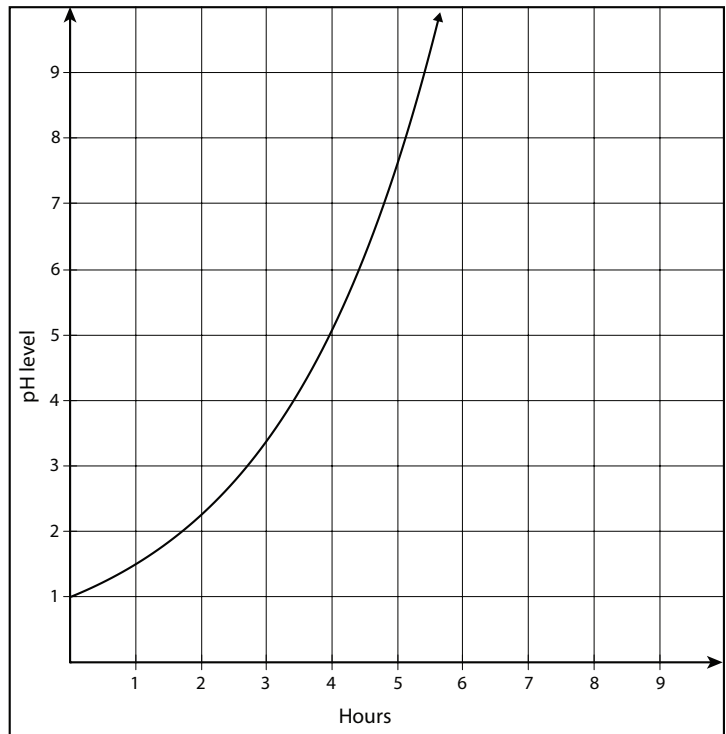
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**Assessment**

Use what you have learned about rates of change and different types of functions to answer the questions that follow.

11. Marc is experimenting with adding various chemicals to two spare fish tanks. He sets up two different delivery systems to add strong bases to the liquid in the tanks. The table shows the pH levels in Tank 1, and the graph shows the pH levels in Tank 2.

Hours	pH level
1	4.3
2	5.1
3	5.9
4	6.7
5	7.5



- a. What is the average rate of change in Tank 1 from 2 to 4 hours?
- b. What is the average rate of change in Tank 2 from 0 to 4 hours?
- c. Approximately when will the pH levels in the two tanks be equal?
- d. Describe the difference in the pH levels in the two tanks after 8 hours.