8.6 Start Thinking

Complete the table.

Type of function	General form	Graph characteristics
linear		
exponential		
quadratic		

Sketch a graph for each type of function.

Describe one example of a real-life situation for each type of function.

8.6 Warm Up

Tell which quadrant or axis the point lies on.

1. $(-1, 0)$ **2.** $(4, -6)$ **3.** $(-1, 3)$ **4.** $(1, 2)$

5. $(-3, 4)$ **6.** $(-2, 0)$ **7.** $(4, -5)$ **8.** $(6, -1)$

9. $(3, 3)$ **10.** $(5, -1)$ **11.** $(-3, 0)$ **12.** $(-1, -3)$

8.6 Cumulative Review Warm Up

Write a system of linear equations that has the ordered pair as its solution.

1. $(4, 4)$ **2.** $(-3\ -13)$ **3.** $(-1, 7)$

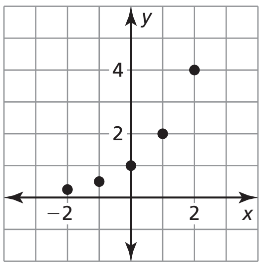
4. $(16, -26)$ **5.** $(1, 3)$ **6.** $(-3, 2)$

Name ____ Date __________

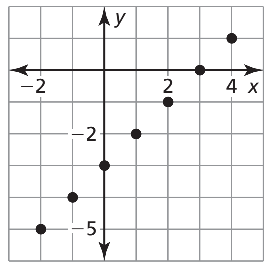
8.6 Practice A

In Exercises 1 and 2, tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

1.



2.



In Exercises 3–6, plot the points. Tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

3. $(-3, 4), (-2, 1), (-1, 0), (0, 1), (1, 4)$

4. $(-4, 0), (-2, 1), (0, 2), (2, 3), (4, 4)$

5. $(-3, -6), (-2, -1), (-1, 2), (0, 3), (1, 2)$

6. $\left(-2, \frac{1}{9}\right), \left(-1, \frac{1}{3}\right), (0, 1), (1, 3), (2, 9)$

7. The table shows the demand for a certain commodity (measured in thousands), where x is the number of the month of the year.

Number of month, *x*	1	2	3	4	5	6
Demand, *y*	5	2	1	2	5	10

a. During what month is the demand at a minimum?

b. Plot the points. Let x be the independent variable. Then determine the type of function that best represents this situation.

c. Write a function in standard form that models the data.

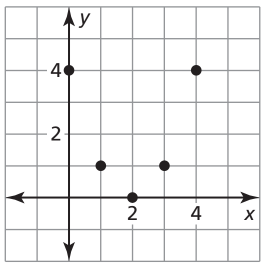
d. Use the function from part (c) to find the demand for the commodity (measured in thousands) during August.

Name____ Date__________

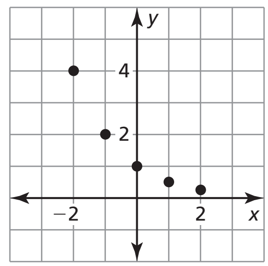
8.6 Practice B

In Exercises 1 and 2, tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

1.



2.



In Exercises 3–6, plot the points. Tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

3. $\left(2, \frac{1}{9}\right), \left(1, \frac{1}{3}\right), (0, 1), (-1, 3), (-2, 9)$

4. $(-1, 3), (0, 0), (1, -1), (2, 0), (3, 3)$

5. $(-4, -2), (-2, -1), (0, 0), (2, 1), (4, 2)$

6. $(-3, -2), (-2, -1), (-1, 0), (0, 1), (1, 2)$

In Exercises 7–10, tell whether the table of values represents a *linear*, an *exponential*, or a *quadratic* function.

7.

x	−3	−2	−1	0	1	2
y	0.9	0.4	0.1	0	0.1	0.4

8.

x	1	2	3	4	5	6
y	1	−1	−3	−5	−7	−9

9.

x	1	2	3	4	5	6
y	9	4	1	0	1	4

10.

x	−1	0	1	2	3
y	6	3	$\frac{3}{2}$	$\frac{3}{4}$	$\frac{3}{8}$

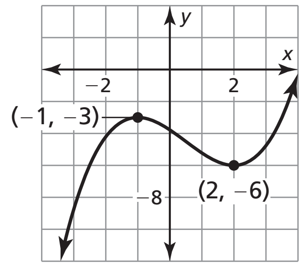
11. Write a function that has constant second differences of 4.

Name ____ Date _________

8.6 Enrichment and Extension

Increasing and Decreasing Functions

When the y-values of a function increase as the x-values increase, the function is increasing, and when the y-values decrease as the x-values increase, the function is decreasing. However, at the maxima or minima of the graph, the function neither increases nor decreases. It is not a simple task to find the intervals on which a function increases or decreases, but the task is easier when given a graph.



Example: Consider the graph shown above.

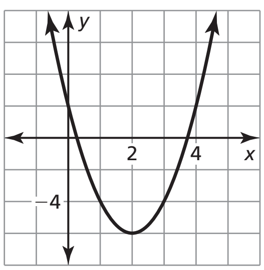
The intervals on which the function increases are $(-\infty, -1) \cup (2, \infty)$.

The interval on which the function decreases is $(-1, 2)$.

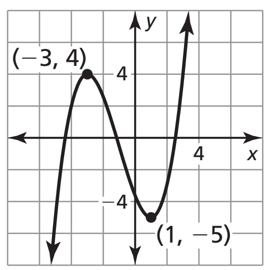
Notice the use of parentheses, because the endpoints of the intervals are not included. Also be aware that when giving increasing and decreasing intervals, only use the x-values.

Determine on what interval(s) the function is increasing or decreasing.

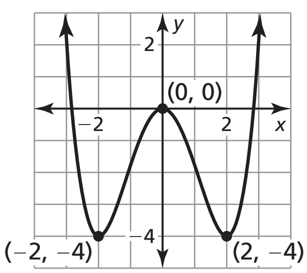
1.



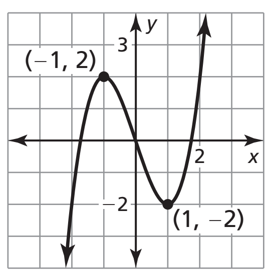
2.



3.



4.



Name____ Date__________

8.6 Puzzle Time

Where Does A Snake Go To Get A New Skin?

Write the letter of each answer in the box containing the exercise number.

Tell whether the points represent a *linear*, an *exponential*, or a *quadratic* model.

1. $(-2, 6), (0, -4), (2, -6), (4, 0), (6, 14)$

F. Linear **G.** Exponential **H.** Quadratic

2. $(-2, 14), (-1, 10), (0, 6), (1, 2), (2, -2)$

A. Linear **B.** Exponential **C.** Quadratic

3. $\left(-1, \frac{2}{3}\right), (0, 2), (1, 6), (2, 18), (3, 54)$

S. Linear **T.** Exponential **U.** Quadratic

Write the function represented by the points.

4. $(-4, -7), (-2, -3), (0, 1), (2, 5), (4, 9)$

E. $y = 2x + 1$ **F.** $y = 2^x$ **G.** $y = 3x^2 + 3x + 4$

5. $(1, 3), (2, 0), (3, -1), (4, 0), (5, 3)$

M. $y = 8x + 6$ **N.** $y = 8(6^x)$ **O.** $y = x^2 - 6x + 8$

6. $\left(-1, \frac{5}{2}\right), (0, 5), (1, 10), (2, 20), (3, 40)$

R. $y = 5x + 2$ **S.** $y = 5(2^x)$ **T.** $y = 5x^2 + 2x + 1$

7. $(0, 3), (1, 0), (2, -1), (3, 0), (4, 3)$

B. $y = 4x + 3$ **C.** $y = 4(3^x)$ **D.** $y = x^2 - 4x + 3$

3	5		2		6	1	4	7