

3.2 Start Thinking

Plot the following points in a coordinate plane.

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

Connect the points with a line. Name another point on the line.

Is the point $(1, -2)$ on the line? How do you know? If $(1, -2)$ is part of the relation, is it a function? Why or why not?

3.2 Warm Up

Plot the coordinates from the table in a coordinate plane.

Connect them with a line or smooth curve.

1.

x	1	2	3	4
y	4	8	12	16

2.

x	3	4	5	6
y	2	1	0	-1

3.

x	4	4	4	4
y	2	3	4	5

4.

x	5	6	7	8
y	35	28	29	31

3.2 Cumulative Review Warm Up

Solve the literal equation for x .

1. $y = 5x - 7x$

2. $a = 3x - 5xz$

3. $y = 5x - rx - 5$

4. $sx - tx = r$

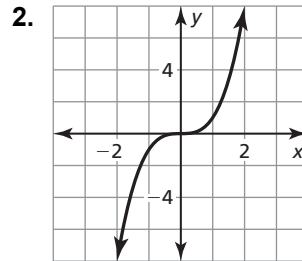
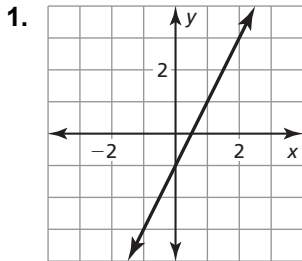
5. $c = 84x - 61$

6. $m = 9x + x$

3.2

Practice A

In Exercises 1 and 2, determine whether the graph represents a *linear* or *nonlinear* function. Explain.



In Exercises 3 and 4, determine whether the table represents a *linear* or *nonlinear* function. Explain.

3.

x	0	1	2	3
y	3	5	7	9

4.

x	1	4	7	10
y	2	5	6	10

In Exercises 5–8, determine whether the equation represents a *linear* or *nonlinear* function. Explain.

5. $y = \sqrt{x} + 5$

6. $y = 4x - 2$

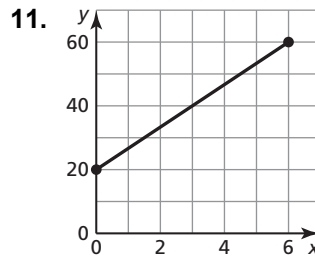
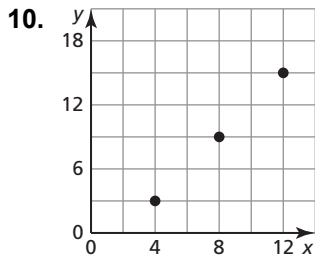
7. $y = 9 - x$

8. $y = (x - 1)(x + 7)$

9. Fill in the table so it represents a linear function.

x	4	8	12	16	20
y	-4				12

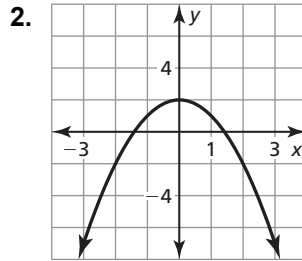
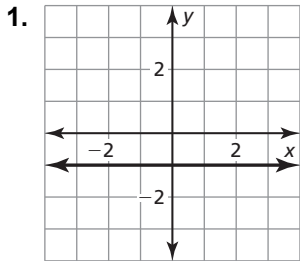
In Exercises 10 and 11, find the domain of the function represented by the graph. Determine whether the domain is *discrete* or *continuous*. Explain.



3.2

Practice B

In Exercises 1 and 2, determine whether the graph represents a *linear* or *nonlinear* function. Explain.



In Exercises 3 and 4, determine whether the table represents a *linear* or *nonlinear* function. Explain.

3.

x	0	2	4	6
y	3	9	27	81

4.

x	14	24	34	44
y	24	20	16	12

In Exercises 5–8, determine whether the equation represents a *linear* or *nonlinear* function. Explain.

5. $y - \frac{1}{3}x = 4x - 7$

6. $6 - \frac{2}{5}x = 3y + 8x$

7. $(y + 2)(y - 4) = 3x$

8. $4x - 5y + 2xy = 0$

In Exercises 9 and 10, determine whether the domain is *discrete* or *continuous*. Explain.

9.

Input Months, x	1	2	3
Output Height of basil plant (inches), y	3	7	11

10.

Input Tickets, x	10	20	30
Output Cost (dollars), y	60	120	180

3.2 Enrichment and Extension

Linear Functions: Taking a Taxi

You take a trip to downtown Boston to walk the Freedom Trail with your family. After you walk through the Bunker Hill Memorial, your family decides to take a taxi to a restaurant for dinner. After 1 mile, the meter on the taxi says \$4.75. It will cost \$8.25 to go 3 miles. The cost varies linearly with the distance that you traveled.

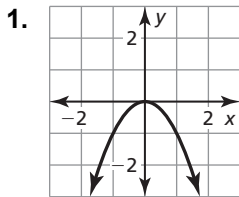
- a. Write the particular linear function that models the cost of your trip as a function of the distance traveled. Use the notation $C(d)$.
- b. Write the function using improper fractions.
- c. How much would it cost you to travel 10 miles in a taxi?
- d. How far can you travel if you only have \$10 to spend?
- e. Calculate the cost-intercept. What does this number represent?
- f. Plot the graph of this linear function. What is a suitable domain for this problem? What is a suitable range?
- g. What is the slope of the line? Show how to find it both graphically and algebraically.
- h. What does the slope of the line represent?
- i. Write your own linear function word problem, and prove that it works graphically and algebraically.

3.2 Puzzle Time

What Do You Get When You Cross A Tortoise And A Porcupine?

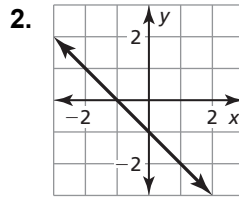
Write the letter of each answer in the box containing the exercise number.

Determine whether the graph, table, or equation represents a linear or nonlinear function.



D. linear

E. nonlinear



O. linear

P. nonlinear

3.

x	2	4	6	8
y	21	18	15	12

A. linear

B. nonlinear

4.

x	-13	-9	-5	-1
y	27	30	27	22

N. linear

O. nonlinear

5. $y = \frac{1}{7}(x - 28) + 16$

W. linear

X. nonlinear

6. $y = -2x^2 + 7$

K. linear

L. nonlinear

7. $y = 14 - \frac{1}{5}x$

P. linear

Q. nonlinear

8. $3 - \frac{1}{9}y = 8x - 11$

K. linear

L. nonlinear

9. The function $y = 16 + 0.75x$ represents the cost y (in dollars) of a large pizza with x extra toppings.

S. linear

T. nonlinear

3		9	6	2	5	7	4	8	1
---	--	---	---	---	---	---	---	---	---