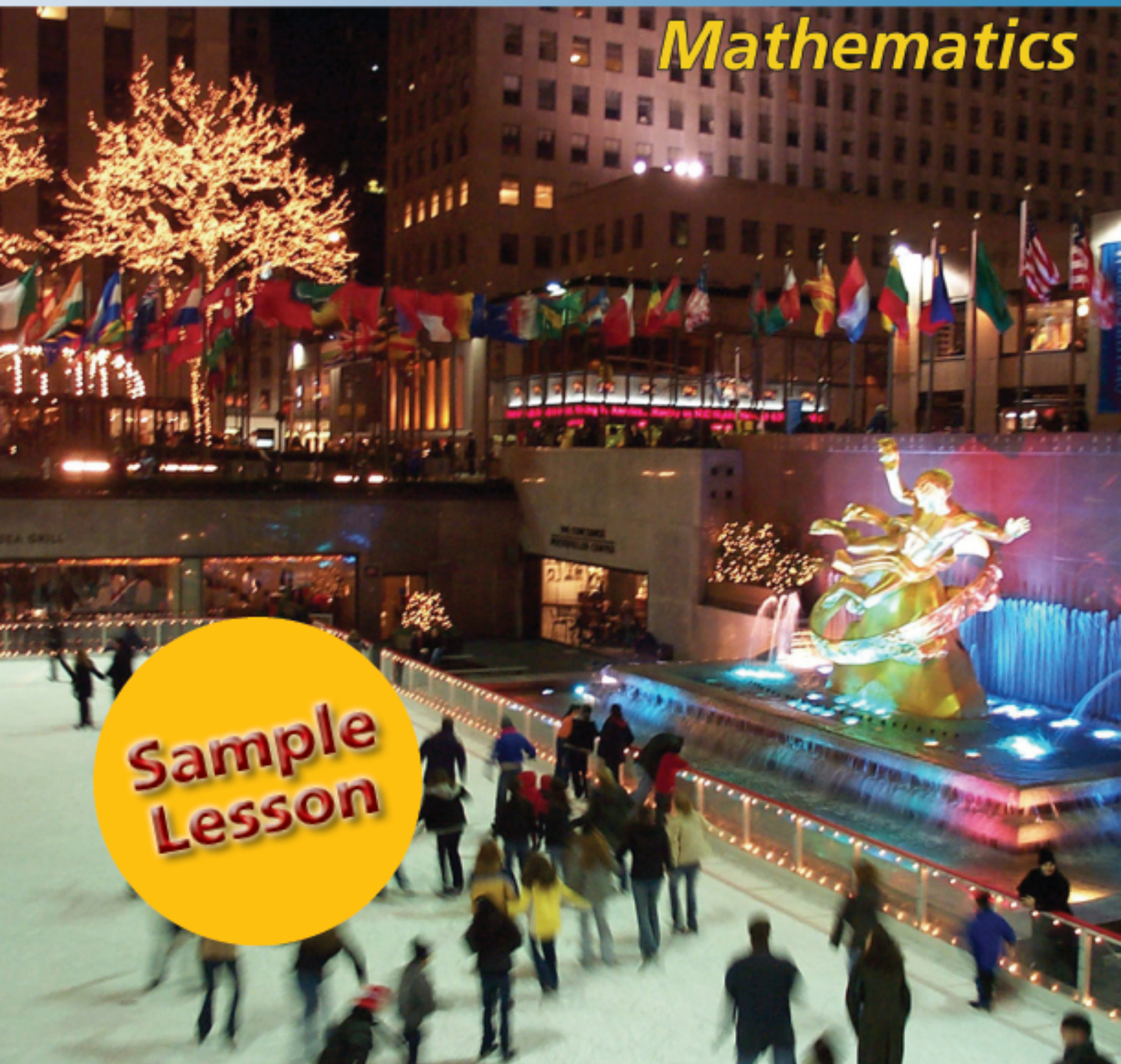




New York State

Mathematics



**Sample
Lesson**

Continental Press

Contents

Introduction to New York State Mathematics 8.	5
Understanding Mathematical Processes	7
Unit 1: Number Systems and Theory	
Lesson 1 Real Numbers.	13
Lesson 2 Scientific Notation.	17
Lesson 3 Factors and Multiples	21
Lesson 4 Prime Factorization.	25
Lesson 5 Understanding Percents.	29
Number Systems and Theory Review.	33
Unit 2: Operations and Estimation	
Lesson 1 Operations with Integers	37
Lesson 2 Order of Operations	41
Lesson 3 Operations with Exponents	45
Lesson 4 Applications of Percents	49
Lesson 5 More Applications of Percents	53
Lesson 6 Using Estimation	57
Operations and Estimation Review.	61
Unit 3: Variables and Expressions, Part 1	
Lesson 1 Algebraic Expressions	65
Lesson 2 Addition and Subtraction with Polynomials	69
Lesson 3 Multiplication and Division with Monomials.	73
Variables and Expressions, Part 1 Review	77
Unit 4: Variables and Expressions, Part 2	
Lesson 1 Multiplication with Polynomials	81
Lesson 2 Division with Polynomials	85
Lesson 3 Factoring Expressions	89
Lesson 4 Factoring Trinomials.	93
Variables and Expressions, Part 2 Review	97

Unit 5: Geometric Relationships

Lesson 1 Intersecting Lines and Angles	101
Lesson 2 Parallel Lines and Transversals	105
Lesson 3 Pythagorean Theorem	109
Lesson 4 Geometric Constructions: Congruent Figures	113
Lesson 5 Geometric Constructions: Bisectors	117
Geometric Relationships Review	121

Unit 6: Equations and Inequalities

Lesson 1 Solving Equations	125
Lesson 2 Applications of Solving Equations	129
Lesson 3 Solving and Graphing Inequalities	133
Lesson 4 More Solving Linear Inequalities	137
Equations and Inequalities Review	141

Unit 7: Patterns, Functions, and Relations

Lesson 1 Representing Data.	145
Lesson 2 Understanding Functions.	149
Lesson 3 Representing Functions	153
Patterns, Functions, and Relations Review	157

Unit 8: Transformational Geometry

Lesson 1 Transformations: Reflections	161
Lesson 2 Transformations: Translations	165
Lesson 3 Transformations: Rotations.	169
Lesson 4 Transformations: Dilations	173
Transformational Geometry Review.	177

Unit 9: Coordinate Geometry

Lesson 1 Understanding Slope and Intercept	181
Lesson 2 Equations in Slope-Intercept Form.	185
Lesson 3 Systems of Equations	189
Lesson 4 Linear and Nonlinear Equations	193
Lesson 5 Graphs of Linear and Nonlinear Relationships.	197
Coordinate Geometry Review	201

Representing Functions

Indicator 8.A.19

- Functions can be represented in many equivalent ways. If you are given an equation, you can make a **table of values**, then plot the points from the table and draw a graph.

All of the following represent the same function.

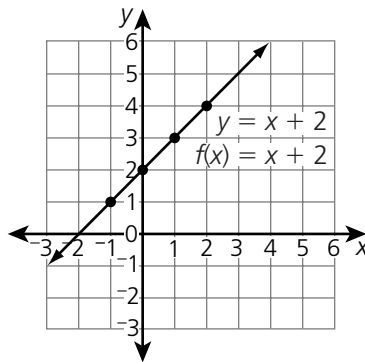
y is two more than x

$$y = x + 2$$

$$f(x) = x + 2$$

$$x \rightarrow \begin{array}{|c|} \hline \text{Add} \\ \hline 2 \\ \hline \end{array} \rightarrow y$$

x	y
-1	1
0	2
1	3
2	4



- If you have a table of values, look for the pattern, and find the rule used to change x -values to y -values. Then write an equation to describe this rule.

x	y
0	0
1	-2
2	-4
3	-6

Here, x -values are multiplied by -2 to get y -values. So the equation is $y = -2x$.

x	y
0	-1
1	2
2	5
3	8

The rule for this table is "multiply by 3, then subtract 1." So the equation is $y = 3x - 1$.

Remember—

Function notation:

A function that subtracts 5 from any number:

$$y = x - 5$$

$$\text{or } f(x) = x - 5$$

$$\text{So } f(9) = 9 - 5 = 4.$$

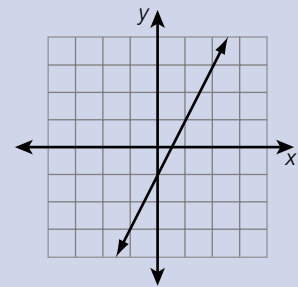
A function that squares any number, then adds four times the number:

$$y = x^2 + 4x$$

$$\text{or } f(x) = x^2 + 4x$$

$$\text{So } f(3) = 3^2 + 4(3) = 21.$$

If you are given the graph of a function, you can make a matching table of values by finding 3 or 4 points on the graph. Then you can write an equation that describes the rule used to change x -values to y -values.



x	-1	0	1	2
y	-3	-1	1	3

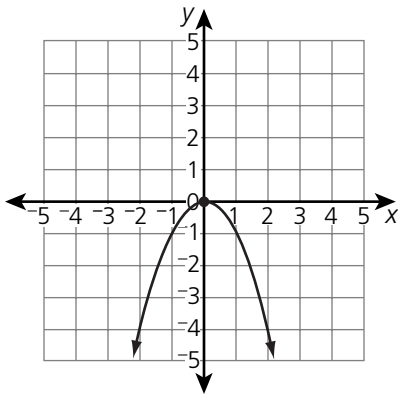
$$y = 2x - 1$$

$$\text{or } f(x) = 2x - 1$$



Read each problem. Circle the letter of the best answer.

- 1 Which equation describes the function graphed below?



- A $f(x) = -x^2$ C $f(x) = x^2$
 B $f(x) = -2x$ D $f(x) = 2x$

The correct answer is A. Some points on the graph are $(-2, -4)$, $(-1, -1)$, $(0, 0)$, $(1, -1)$, and $(2, -4)$. In each case the x -value is squared, then multiplied by -1 to get the y -value. So the equation is $y = -x^2$, or $f(x) = -x^2$.

- 2 Which equation matches this table of values?

x	0	1	2	3
y	-3	-2	-1	0

- A $y = -3x$
 B $y = 3x$
 C $y = x - 3$
 D $y = x + 3$

- 3 Damian has a summer job. The money in his savings account is increasing according to the equation $y = 6x + 50$, where x = number of hours worked and y = savings in dollars. Which table of values matches this equation?

A

x	y
0	0
5	80
10	160
15	240

C

x	y
0	50
5	100
10	150
15	200

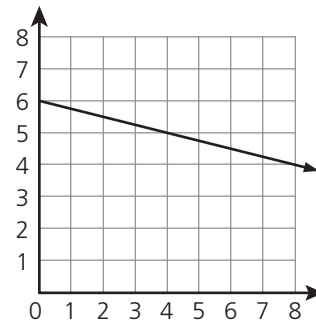
B

x	y
0	0
5	30
10	60
15	90

D

x	y
0	50
5	80
10	110
15	140

- 4 The graph shows how the amount of grain in storage in a certain country is changing over time.



Which equation describes the line graphed above?

- A $y = -4x + 6$
 B $y = -\frac{1}{4}x + 6$
 C $y = \frac{1}{4}x + 6$
 D $y = 4x + 6$



Read each problem. Write your answers.

5 Look at this table of x - and y -values.

x	y
0	2
1	6
2	10
3	14
4	18

Part A

Write an equation that expresses the relationship shown in the table.

Equation: $y = 4x + 2$

Part B

Explain how you found the equation.

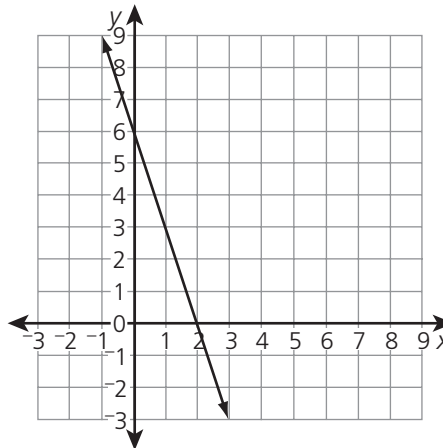
Whenever x increases by 1, y increases by 4. This means the term $4x$ must be involved. Since each y -value is 2 more than 4 times the corresponding x -value, the equation is $y = 4x + 2$.

6 Look at the graph of this function.

Part A

Use the graph to make a table of values with at least 4 points.

x	y



Part B

Write an equation that describes the function.

Equation: _____



Read the problem. Write your answer for each part.

- 7 Lindsey and her family hiked 3 miles to reach the Hudson River. Then they rafted downstream at a speed of 2 miles per hour.

Part A

Write an equation to describe the relationship between x , the number of hours spent rafting, and y , the total number of miles traveled.

Ask Yourself
What happens to y whenever x increases by 1?

Equation: _____

Part B

Use your equation to make a table of values with at least 4 points.

x	y

Part C

Graph your equation on the coordinate grid below.

