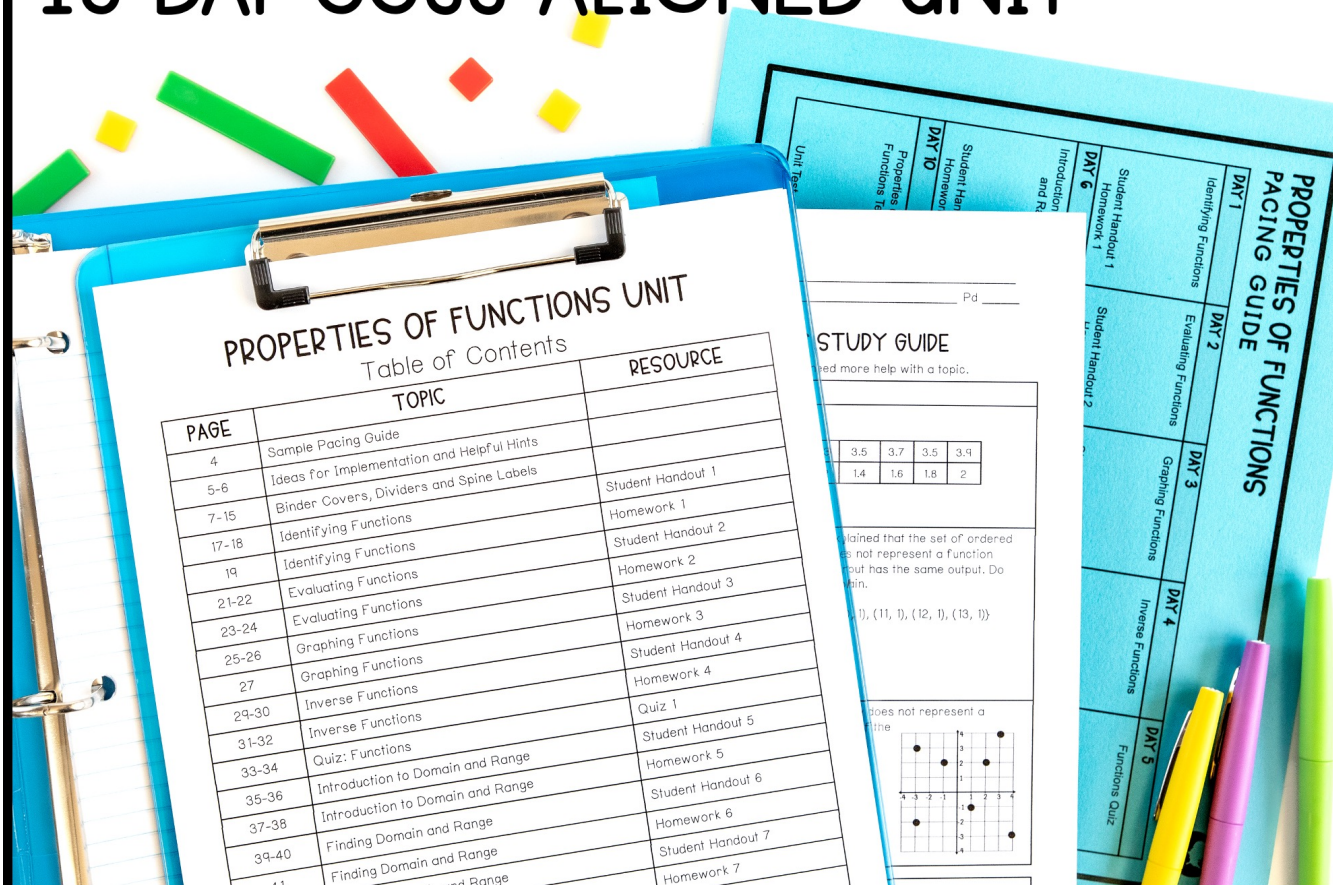# learning focus:

✓ identify, evaluate, and graph functions in mathematical and real-world situations

✓ find the inverse of a function

✓ find the domain and range of functions and relate the domain of a function to its graph

PROPERTIES OF FUNCTIONS UNIT
ALG 1
15 DAY CCSS-ALIGNED UNIT

PROPERTIES OF FUNCTIONS UNIT
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PROPERTIES OF FUNCTIONS
PACING GUIDE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Identifying Functions	Evaluating Functions	Graphing Functions	Inverse Functions	Functions Quiz

A MANEUVERING THE MIDDLE ® RESOURCE

PROPERTIES OF FUNCTIONS

ALG 1

a 15 day CCSS-aligned unit
CCSS: N.Q.1, F.IF.1, F.IF.2, F.IF.5, F.IF.7b, F.BF.4, F.LE.5

ready-to-go, scaffolded student materials

PROPERTIES OF FUNCTIONS UNIT
Table of Contents

PROPERTIES OF FUNCTIONS

ALG 1

student friendly + real-world application

multiple representations

Unit: Properties of Functions
Student Handout 2

Name _____
Date _____ Pd _____

EVALUATING FUNCTIONS

Evaluating functions can be compared to a "machine" where each input (x) in the machine follows a rule to produce its output called f(x). Two "machine" functions are given below. Use the given input values and function rule to find the output values.

A.

x → [2x] → f(x)

5 → [2x] →

-3 → [2x] →
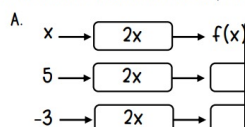
| FUNCTION NOTATION | f is the name of the function → $f(x)$
 x is the _____ |
| EVALUATING FUNCTIONS | • To evaluate f(x) = 3 <br> write f(5) = 3(5) + |

Evaluate the following functions.

| 1.
 $f(x) = 6(x + 9)$

 a. f(4) =

 b. f(-6) = | 2.

 a. g(1) =

 b. g(-3) = |

For p(x) in question 3, is there a value of

Evaluate the functions.

| 4. Find f(3).

 $f(x) = \frac{1}{2}(x - 6) - \frac{5}{2}$ | 5. Given h(x) = 5(x + 3)², what is the value of h(-5)? | 6. If g(x) = 3(x² − 1) + 7, what is the value of g(-7)? |
| 7. Given the function, f(x) = x² + 10 w values of x will yield a negative output Explain. | | |

9. The graph of y = f(x) is shown bel f(-4).
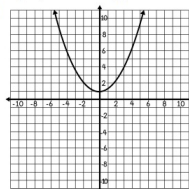
11. Malcolm is shooting a free throw. function h(t), where h(t) is the height the ball has left Malcom's hands. The

FEET / SECONDS
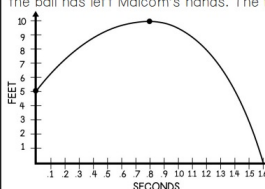
Summarize today's lesson:

Unit: Properties of Functions
Homework 2

Name _____
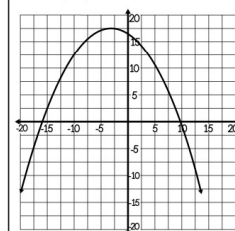Date _____ Pd _____

EVALUATING FUNCTIONS

Five functions are given below. Use the functions to answer the questions 1 - 6. Show your work.

$f(x) = 14 - 3x$

$h(t) = \frac{5}{4}(4 - t)$

$r(x) = \frac{x + 13}{x - 3}$

$g(x) = 4(x - 5) + x^2$

$p(x) = (x + 7)^2 - 15$

| 1. Find h(-8). | 2. What is the value of g(-3)? | 3. Find f(10). |
| 4. Evaluate the following.

 g(5) =

 p(5) = | 5. Evaluate the following.

 r(-9) =

 f(-9) = | 6. What value of x cannot be evaluated in the function r(x)? |

Evaluate the functions. Show your work.

| 7. The graph of y = g(x) is shown below. Find g(-15). | 8. Tonya is cutting square frame mats to frame several square photographs. She can determine the area of the mat from the function m(x) = x² + 6x + 9, where x is the length in inches of the side of the photograph and m(x) represents the area of the mat. Find the area of the mat given a photograph with a side length of 4.6 inches. |

higher-level analysis

PROPERTIES OF FUNCTIONS ALG 1

a 15 day CCSS-aligned unit
CCSS: N.Q.1, F.IF.1, F.IF.2, F.IF.5, F.IF.7b, F.BF.4, F.LE.5

streamline your planning process with unit overviews

✓ key vocabulary

✓ vertical alignment

sample pacing calendar

teaching ideas

PROPERTIES OF FUNCTIONS
OVERVIEW   CCSS

STANDARDS

N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

F.IF.1 Understand that a function from one set (the domain) to another set (the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.BF.4 Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.

F.LE.5 Interpret the parameters

BIG IDEAS

• Functions are specific relati
• Functions have domains an intervals.
• Functions can be evaluated
• Inverse functions interchang

ESSENTIAL QUESTION

• What are some different wa
• How is evaluating a functio
• When should domain and ra
• How can you determine a fu

PROPERTIES OF FUNCTIONS
PACING GUIDE   CCSS

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Identifying Functions	Evaluating Functions	Graphing Functions	Inverse Functions	Functions Quiz
Student Handout 1 Homework 1	Student Handout 2 Homework 2	Student Handout 3	Student Handout 4	

DAY 6	DAY 7
Introduction to Domain and Range	Finding Domain and Range
Student Handout 5 Homework 5	Student Handout 6 Homework 6

DAY 10	NOTES
Properties of Functions Test	
Unit Test	

PROPERTIES OF FUNCTIONS
OVERVIEW   CCSS

TOPIC	TEACHING TIPS
Identifying Functions	• Understanding non-examples of functions is important to recognizing examples of functions, so spend time discussing and creating examples of both. • Students often think that all equations represent functions, so challenge students to see if they can discover an equation where an input would result in more than one output. Show students the equation "y² = x" and discuss how certain input values would yield more than one output (an input of 25 would have an output of 5 and -5).
Evaluating Functions	• Don't rush past the details of "function notation" which will be new for students. Have the students say out loud the meaning of "f(x)" with given values of x. For example, when asked what finding f(7) means, a student might say "finding f(7) means finding the output value of the function when the input value is 7". This helps to clarify that f(7) does not represent multiplication of the variable f by 7. • Remind students to be careful when evaluating for a negative value; students can often make mistakes because of integer sign rules.
Inverse Functions	• As you teach the inverse function notation, note to students that f⁻¹(x) does not mean "f to the negative one power". Students may confuse this notation and think the inverse function is $\frac{1}{f(x)}$. • Highlight how the input and output of a function and its inverse are related. Use this as an opportunity to extend the lesson on evaluating functions. • Consider having students graph a function and its inverse. An inverse function will be a reflection over the line y = x.

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PROPERTIES OF FUNCTIONS

a 15 day CCSS-aligned unit
CCSS: N.Q.1, F.IF.1, F.IF.2, F.IF.5, F.IF.7b, F.BF.4, F.LE.5

unit study guide + assessments

✓ quizzes

✓ editable unit test

Unit: Properties of Functions
Quiz 1

Name _____
Date _____ Pd_____

QUIZ: FUNCTIONS

Show all work as you answer each question below. Record your solutions in the box at the right.

Answers

1. _____
2. _____
3. _____

1. Which set of ordered pairs demonstrates a function?

   a. {(6, 4), (2, 3), (9, -1), (0, 0), (6, -4)}

   b. {(-5, 1), (-5, 8), (-5, -2), (-5, -5), (-5,

   c. {(-2, 3), (0, 3), (5, 3), (8, 3), (12, 3)}

   d. All of the above

2. If $h(x) = 7(x + 3)^2 - 14x$, what is the v

   a. 329   b. 287

3. Which ordered pair would cause the g at the right to no longer be a function?

   a. (-2, 2)   b. (-3, 3)

   c. (1, 3)   d. (4, -1)

4. Which of the tables represents a fu

   TABLE A

x	-0.5	6.2	1.5
y	2	0.9	1.7

   TABLE B

x	-16	32	14
y	0.25	19	8.7

   a. Table A only
   b. Table B only
   c. Both table A and table B
   d. Neither table A nor table B

Unit: Properties of Functions
Review

Name _____
Date _____ Pd _____

PROPERTIES OF FUNCTIONS STUDY GUIDE

Solve each problem below. Be sure to ask questions if you need more help with a topic.
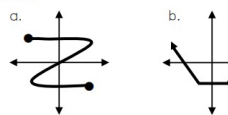
I CAN DECIDE WHETHER RELATIONS DEFINE A FUNCTION.

1. Describe whether each table represents a function.

   a.

x	9.2	9.4	9.6	9.
y	6	8	10	12

2. The mapping below represents a f Give an example of an ordered pair added to the mapping would no longe represent a function.

   X   Y
   6.2   →   3
   8
   11   →   5
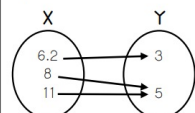
4. State whether each graph repres function.

   a.   b.

I CAN EVALUATE FUNCTIONS GIVEN E

6. Given $f(x) = 5(2 - x)$, evaluate the

   a. $f(7) =$

   b. $f(-6) =$

ALGEBRA 1 CURRICULUM

PROPERTIES OF FUNCTIONS

UNIT TWO: ANSWER KEY

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answer keys included

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