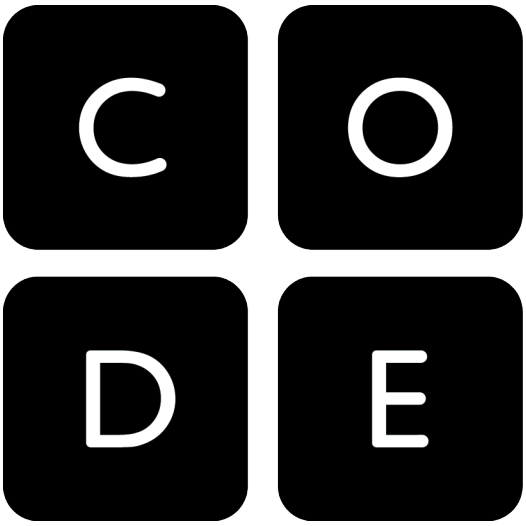
Name: _____ Course: _____



CS in Algebra

powered by Bootstrap

Student Workbook

Name: _____ Date:_____ Per: _____

Reverse Engineering

Code.org CS in Algebra - Stage 1

Thing in the game...	What changes about it?	More specifically...

Name: _____ Date:_____ Per: _____

Video Game Planning

Code.org CS in Algebra - Stage 1

Use this form to plan out your video game. Once your game is complete, the player will move up and down, the target and danger will move from left and right, and you will earn points by touching the target and lose points by touching the danger.

Created by:

The game takes place in:

This will be the background image in your game

The player is a:

The player moves up and down

The target is a:

The Target moves left and right

The danger is a:

The Danger moves left and right

Name: ____________________ Date: ____________ Per: ________

Fast Functions!

Code.org CS in Algebra - Stage 9

____________ : ______________________ -> ____________
name *domain* *range*

Example: ____________ (____________) = ____________________

Example: ____________ (____________) = ____________________

Define: ____________ (____________) = ____________________

____________ : ______________________ -> ____________
name *domain* *range*

Example: ____________ (____________) = ____________________

Example: ____________ (____________) = ____________________

Define: ____________ (____________) = ____________________

____________ : ______________________ -> ____________
name *domain* *range*

Example: ____________ (____________) = ____________________

Example: ____________ (____________) = ____________________

Define: ____________ (____________) = ____________________

____________ : ______________________ -> ____________
name *domain* *range*

Example: ____________ (____________) = ____________________

Example: ____________ (____________) = ____________________

Define: ____________ (____________) = ____________________

Name: _____ Date:_____ Per: _____

The Design Recipe

Code.org CS in Algebra

Description:

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

rocket-height

Code.org CS in Algebra - Stage 10

Description: A rocket blasts off, traveling at 15 meters per second. Write a function called 'rocket-height' that takes in the number of seconds that have passed since the rocket took off, and which produces the height of the rocket at that time.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

update-target

Code.org CS in Algebra - Stage 12

Directions: Use the Design Recipe to write a function 'update-target' which takes in the target's x-coordinate and produces the next x-coordinate, which is 10 pixels to the right.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

update-danger

Code.org CS in Algebra - Stage 12

Directions: Use the Design Recipe to write a function 'update-danger' which takes in the danger's x-coordinate and produces the next x-coordinate, which is 10 pixels to the left.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

safe-left?

Code.org CS in Algebra - Stage 15

Description: Write a function 'safe-left?', which takes in an x-coordinate and checks to see if it is greater than -25.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

safe-right?

Code.org CS in Algebra - Stage 15

Description: Write a function 'safe-right?', which takes in an x-coordinate and checks to see if it is less than 425.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

onscreen?

Code.org CS in Algebra - Stage 15

Description: Write a function 'onscreen?', which takes in a character's x-coordinate and checks to see if it is safe on the left and on the right.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem

cost

Code.org CS in Algebra - Stage 16

Directions: Luigi's Pizza has hired you as a programmer. They offer Pepperoni ($10.50), Cheese ($9.00), Chicken ($11.25), and Broccoli ($10.25). Write a function called cost which takes in the name of a topping and outputs the cost of a pizza with that topping.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Example: _____ (_____) = _____

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____ _____

_____ _____

_____ _____

_____ _____

_____

Name: _____ Date: _____ Per: _____

word problem

update-player

Code.org CS in Algebra - Stage 16

Directions: Write a function called update-player, which takes in the keycode of the key pressed and the player's y-coordinate, and returns the new y-coordinate.

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: update-player (38 240) = 240 + 10

Example: update-player (40 240) = 240 - 10

Example: update-player (38 250) = _____

Example: update-player (40 250) = _____

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Name: _____ Date:_____ Per: _____

Key Code Reference

Code.org CS in Algebra - Stage 16

When you press a key on your keyboard, a unique numeric code is sent to your computer, which is then translated into a letter, number, or command. Use this handy key code reference sheet to make your Player sprite respond to different key presses.

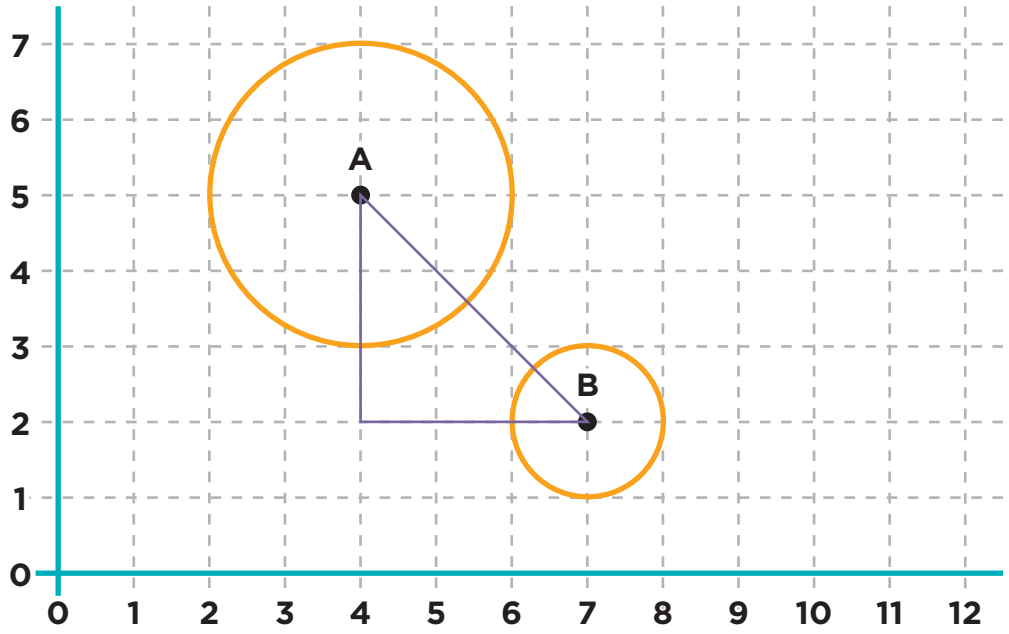
Key	Code	Key	Code
left arrow	37	G	71
up arrow	38	H	72
right arrow	39	I	73
down arrow	40	J	74
0	48	K	75
1	49	L	76
2	50	M	77
3	51	N	78
4	52	O	79
5	53	P	80
6	54	Q	81
7	55	R	82
8	56	S	83
9	57	T	84
A	65	U	85
B	66	V	86
C	67	W	87
D	68	X	88
E	69	Y	89
F	70	Z	90

Name: _____ Date:_____ Per: _____

Collision Detection

Code.org CS in Algebra - Stage 19

Graph #1



On the graph:

Label the right angle as C

Label segment AB as c

Label segment AC as b

Label segment CB as a

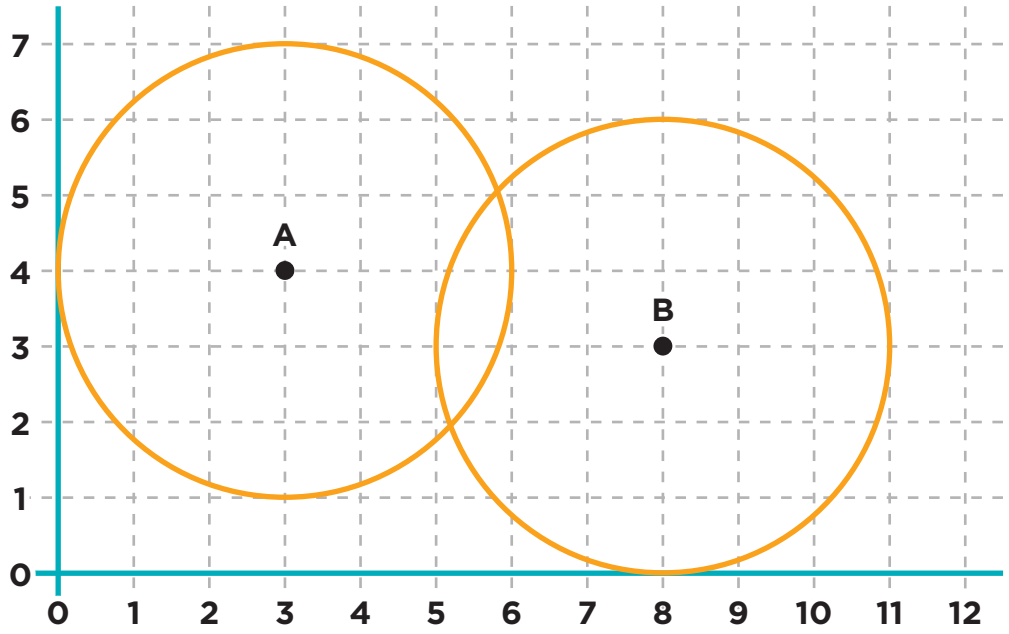
1. What is the radius of circle A? _____
2. What is the radius of circle B? _____
3. What is Radius A + Radius B _____
4. Do the circles overlap? (true/false) _____
5. What is the length of side a? _____
6. What is the length of side b? _____
7. Estimate the length of side c? _____
8. What is $a^2 + b^2$ _____

Name: _____ Date:_____ Per: _____

Collision Detection

Code.org CS in Algebra - Stage 19

Graph #2



On the graph:

Draw a segment from point A to point B

Label segment AB as c

Draw a right triangle using segment c as the hypotenuse.

Label the right angle as C

Label segment AC as b

Label segment CB as a

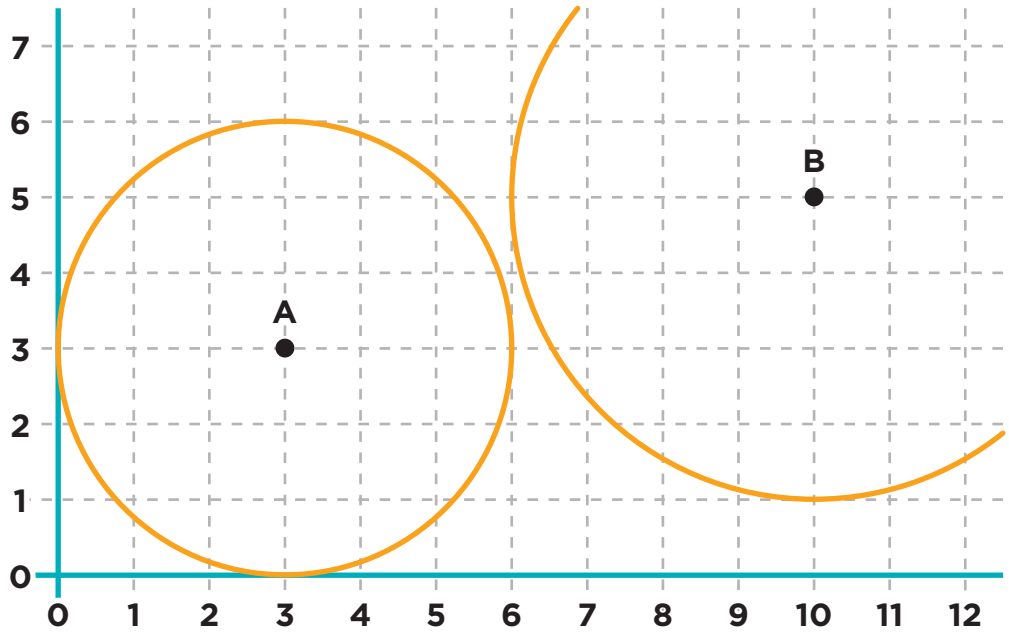
1. What is the radius of circle A? _____
2. What is the radius of circle B? _____
3. What is Radius A + Radius B _____
4. Do the circles overlap? (true/false) _____
5. What is the length of side a? _____
6. What is the length of side b? _____
7. Estimate the length of side c? _____
8. What is $a^2 + b^2$ _____

Name: _____ Date:_____ Per: _____

Collision Detection

Code.org CS in Algebra - Stage 19

Graph #3



On the graph:

Draw a segment from point A to point B

Label segment AB as c

Draw a right triangle using segment c as the hypotenuse.

Label the right angle as C

Label segment AC as b

Label segment CB as a

1. What is the radius of circle A? _____
2. What is the radius of circle B? _____
3. What is Radius A + Radius B _____
4. Do the circles overlap? (true/false) _____
5. What is the length of side a? _____
6. What is the length of side b? _____
7. Estimate the length of side c? _____
8. What is $a^2 + b^2$ _____

Name: _____ Date:_____ Per: _____

word problem
line-length

Code.org CS in Algebra - Stage 20

Directions: Write a function called 'line-length', which takes in two numbers and returns the difference between them. It should always subtract the smaller number from the bigger one

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: line-length (10 5) = 10 - 5

function name *input(s)* *what the function produces*

Example: line-length (2 8) = 8 - 2

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____ _____

_____ _____

_____

Name: _____ Date:_____ Per: _____

word problem

distance

Code.org CS in Algebra - Stage 20

Directions: Write a function 'distance', which takes four inputs:

- px: The x-coordinate of the player
- py: The y-coordinate of the player
- cx: The x-coordinate of another game character
- cy: The y-coordinate of another game character

It should use the Distance formula to return the distance between both points

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Name: _____ Date:_____ Per: _____

word problem
collide?

Code.org CS in Algebra - Stage 20

Directions: Write a function 'collide?', which takes four inputs:

- px: The x-coordinate of the player
- py: The y-coordinate of the player
- cx: The x-coordinate of another game character
- cy: The y-coordinate of another game character

Is the player's x and y within 100 pixels of the other character's x and y

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name *domain* *range*

_____

what does the function do?

Examples

Write some examples for your function in action...

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Example: _____ (_____) = _____

function name *input(s)* *what the function produces*

Definition

Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name *variables*

_____

what the function does with those variables

Contract Log

Name	Domain	Range	Example

Contract Log

Name	Domain	Range	Example