Name: _____ Course: _____

Computer Science in Algebra

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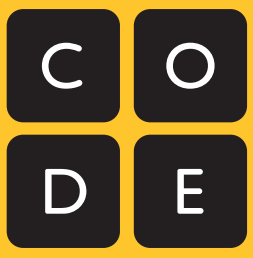
Student Workbook



Computer Science in Algebra

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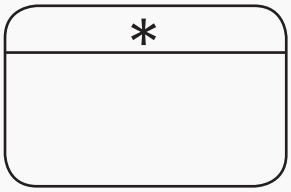
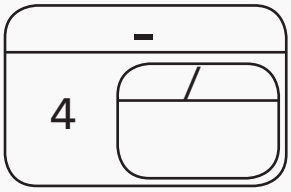
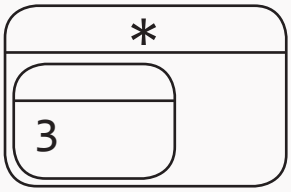
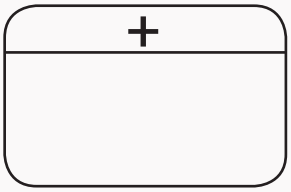
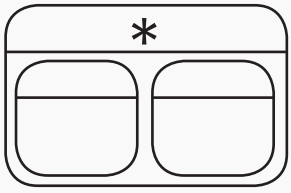
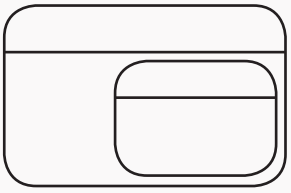
Course A

Name: _____ Date: _____ Per: _____

Evaluation Blocks

Code.org Computer Science in Algebra

Create the evaluation blocks for the provided equations.

2 * 5	
4 - (3 / 2)	
(3 + 12) * 16	
1 + (15 * 5)	
(2 + 17) * (12 - 8)	
9 * (17 + 2)	

32 / 3	
(25 + 14) - 12	
(23 * 14) * (3 + 2)	
19 - (12 + 11)	
4 - (6 - 17)	
(12 * 4) / 3	

Name: ______________________ Date: __________ Per: __________

Fast Functions!

Code.org Computer Science in Algebra

______________ : ______________________ -> ______________
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: __________

Fast Functions!

Code.org Computer Science in Algebra

C O D E

______________ : ______________________ -> ______________
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 Computer Science 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: _____

The Design Recipe

Code.org Computer Science in Algebra

Description:

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name | domain | range

_____

what does the function do?

Examples

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

Example: _____ (_____) = _____

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Definition

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Define: _____ (_____) =

function name | variables

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what the function does with those variables

Name: _____ Date: _____ Per: _____

The Design Recipe

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Description:

Contract and Purpose Statement

Every contract has three parts...

_____ : _____ -> _____

function name | domain | range

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what does the function do?

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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: _____

rocket-height (word problem)

Code.org Computer Science in Algebra

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

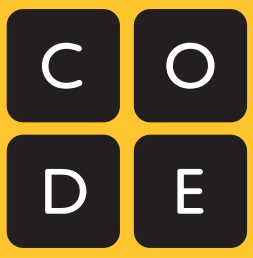
Write the definition, giving variable names to all your input values

Define: _____ (_____) =

function name | variables

_____

what the function does with those variables



Computer Science in Algebra

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Course B

Name: _____ Date: _____ Per: _____

Reverse Engineering

Code.org Computer Science in Algebra

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

Name: _____ Date: _____ Per: _____

Video Game Planning

Code.org Computer Science in Algebra

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: _____

12

update-target (word problem)

Code.org Computer Science in Algebra

Stage 12

Description: 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: _____

12

update-danger (word problem)

Code.org Computer Science in Algebra
Stage 12

Description: 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: _____

15

safe-left? (word problem)

Code.org Computer Science 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 50.

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: _____

15

safe-right? (word problem)

Code.org Computer Science 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 350.

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: _____

15 onscreen? (word problem)

Code.org Computer Science 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: _____

18 cost (word problem)

Stage 18 Computer Science in Algebra

Description:

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: _____

18 Key Code Reference

Code.org Computer Science in Algebra

Stage 18

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: _____

18 update-player (word problem)

Stage 18 Computer Science in Algebra

C O D E

Description: Write a function called **`update-player`**, which takes in the key code 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: _____

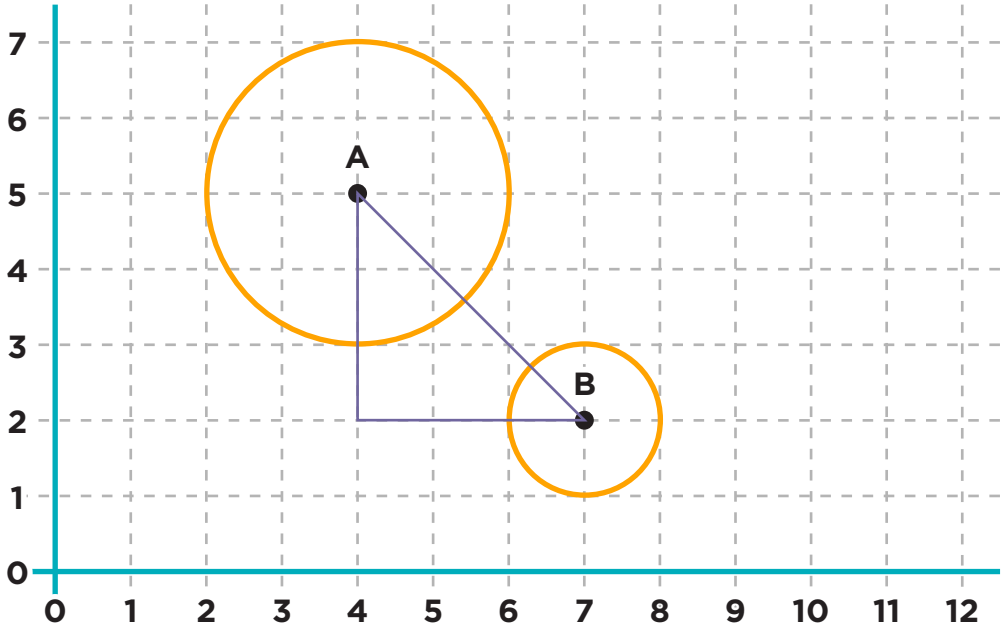
19

Collision Detection

Code.org Computer Science 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

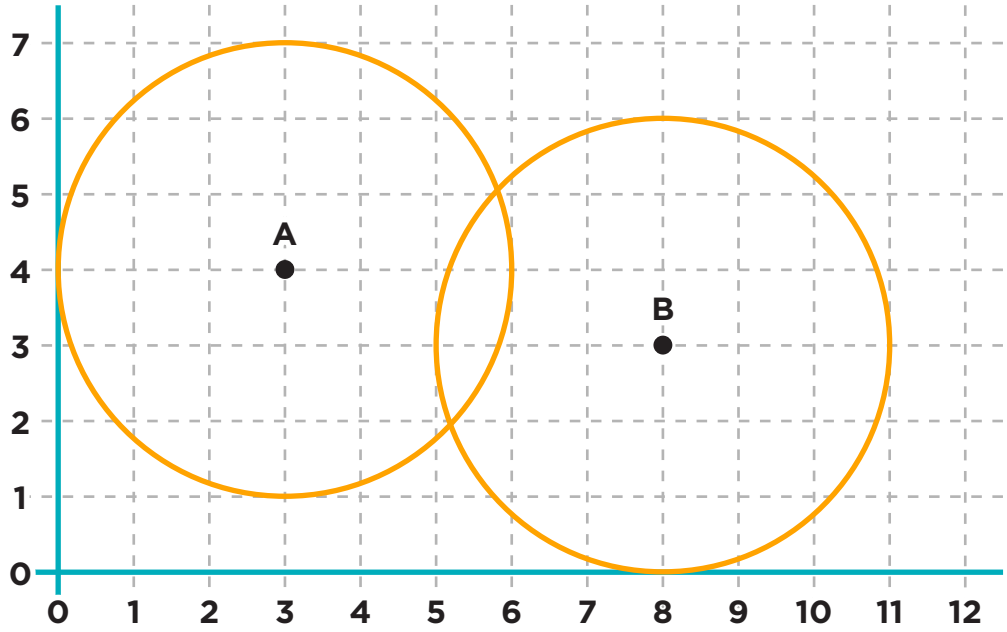
Label segment CB as a

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

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

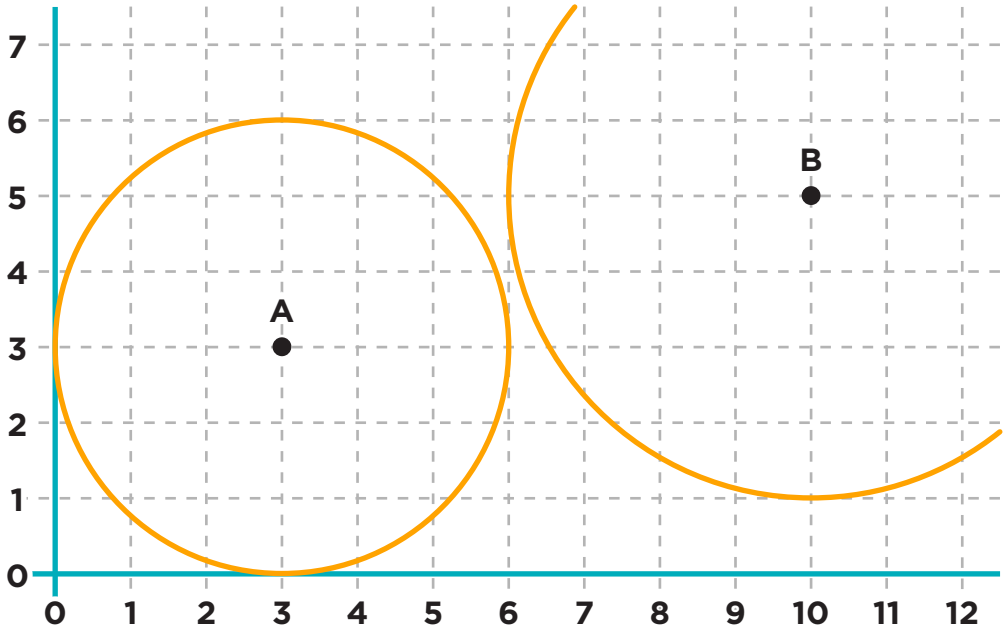
Label segment CB as a

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

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: _____

20 line-length (word problem)

Stage 20 Code.org Computer Science in Algebra

Description: 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: _____

20 The Distance Formula

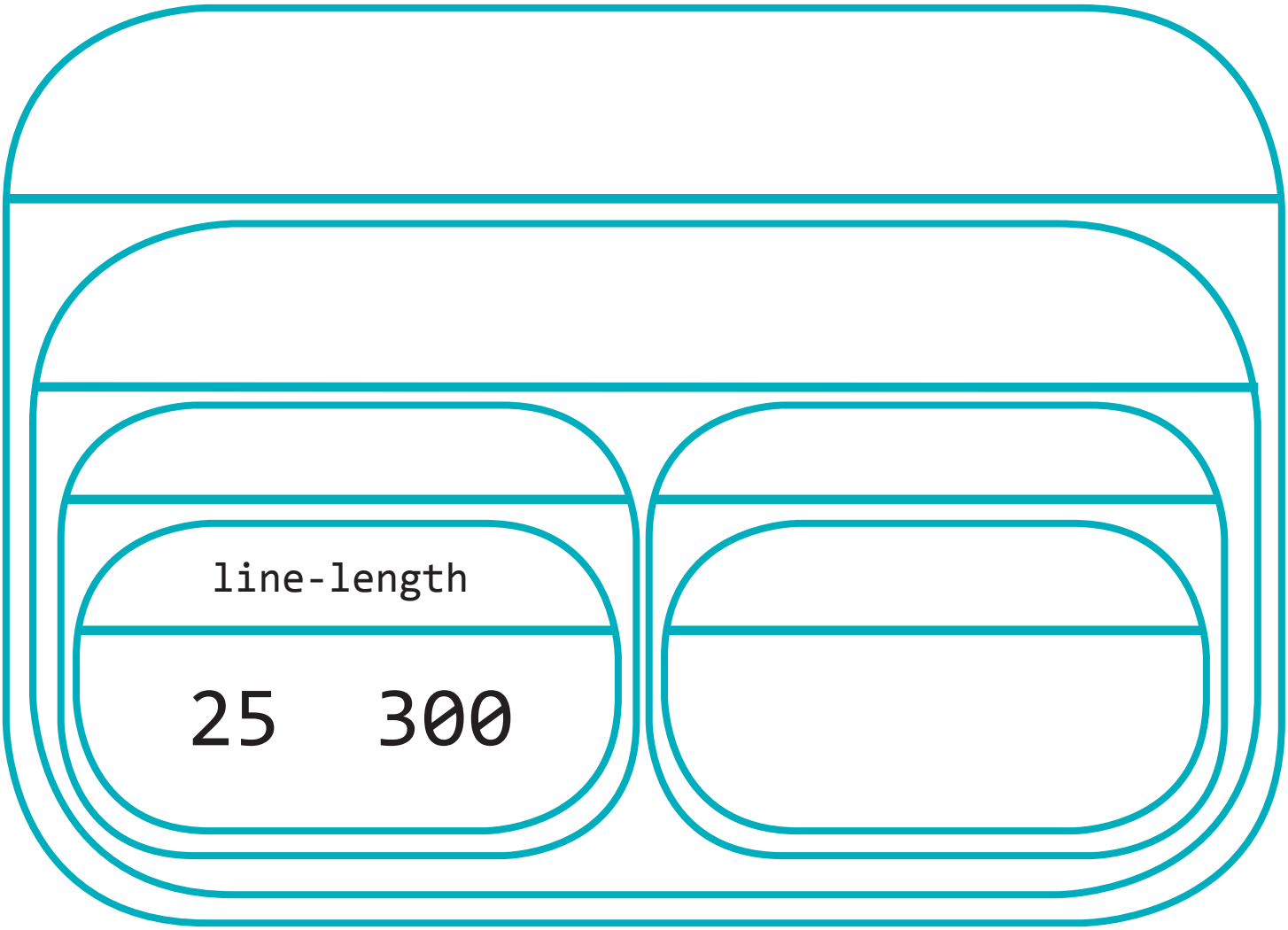
Code.org Computer Science in Algebra

Stage 20

The distance between two points (25, 50) and (300, 400) can be calculated with the distance formula as

$$\sqrt{\texttt{line-length(25, 300)}^2 + \texttt{line-length(50, 400)}^2}$$

Convert the formula in a circle of evaluation.



Name: _____ Date: _____ Per: _____

20 distance (word problem)

Code.org Computer Science in Algebra

Stage 20

Description: 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: _____

20 collide? (word problem)

Stage 20

Code.org Computer Science in Algebra

Description: 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