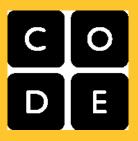
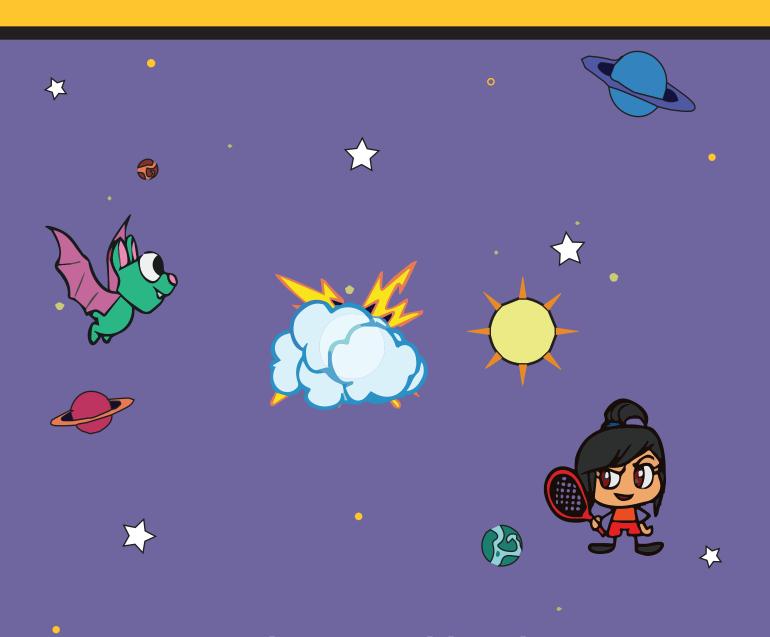
Name:	Course:	



Computer Science in Algebra

powered by BOOTSTRAP



Student Workbook

Name:

Date: _____ Per: ____



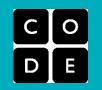
Reverse Engineering

Thing in the game	What changes about it?	More Specifically

4
T
Stage 1

Name:	Date:	Per:
1 1011101	Date.	1 011

Video Game Planning



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)			

Stage 2

Evaluation Blocks

Code.org Computer Science in Algebra

Complete the evaluation blocks for the provided equations.

2 * 5	*
4 - (3 / 2)	4 /
(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	

9	
Stage 9	

Name:	Date:	Per:
1 1011101	Date.	1 011

Fast Functions!



			->	
name ·	domain		~	range
Example:	() =		
Example:	_ () =		
Define:	_() =		
::			->	
name	domain		 -	range
Example:	() =		
Example:	_ () =		
Define:	() =		
	_ `			
name :				range
::::::	domain		->	range
name Example:	domain () =	->	range
:::	domain () =	->	range
name ::::::::	<i>domain</i> ((() =	>	range
name ::::::::	<i>domain</i> ((() =	>	range
name ::::::::	<i>domain</i> ((() =	>	range
name ::::::::	<i>domain</i> ((() =	>	range
name Example: Example: Define:	domain ((domain) =	>	range
name Example: Example: Define: : name Example:	domain) =	>	range
name Example: Example: Define: : name	domain) =	>	range

D	
Design	

Name:	Date:	Per:

The Design Recipe



Description:	
Contract and Purpose Statement	
Every contract has three parts	
function name domain rar	
ranetien name	90
what does the function do?	
What ages the fulletion ag.	
Evamples	
Examples	
Write some examples for your function in action	
Example : () = what the function production produc	es
Example : () = what the function production produc	
ranetion flame	203
Definition	
Write the definition, giving variable names to all your input values	
Define: () = function name variables	
function name variables	

D	
Design	

Name:	Date:	Per:
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The Design Recipe



Desci	ription:		
	ract and Purpo	ose Statement	
	·	domain	> range
		what does the function	do?
Exam	ples		
Write son	ne examples for you	ır function in action	
			what the function produces
Example:	function name	_ () =) =	what the function produces
Defin	ition		
Write the	definition, giving v	ariable names to all your i	input values
Define: _	function name	() = variables	

D
Design

Name:	Date:	Per:
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The Design Recipe



Description:		
Contract and Purpo	se Statement	
Every contract has three part	ts	
:		->
function name	domain	range
	what does the function o	103
	what does the function c	10:
Examples		
Write some examples for you	r function in action	
Evample	/	
function name	input(s)	what the function produces
Example:	_()=_	what the function produces
function name	input(s)	what the function produces
Definition		
Write the definition, giving va	ariable names to all your i	anut values
write the definition, giving ve	anabie names to an your n	ipat values
Define: (()=	
function name	variables	
what	the function does with th	iose variables

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Name:	Date:	Per:

rocket-height (word problem)



Stage 10 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.

the hei	ight of the rocl	ket at	that time		
Contr	act and Purp	ose S	Statemen	t	
Every con	tract has three par	rts			
	::				>
functio	n name		dom	ain	> range
			t does the fu	ınction d	lo?
Exam	ples				
Write som	e examples for you	ur fund	ction in actio	n	
Example:		() =	
					what the function produces
Example:	function name	_(input(s)) = _	what the function produces
Defini	ition				
Write the	definition, giving v	/ariabl	e names to a	ll your in	nput values
Define: _	function name	(variables	_)=	

10	
12	

Name:	Date:	Per:

update-target (word problem)



Stage 12

Code.org Computer Science in Algebra

Description: 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... domain function name what does the function do? **Examples** Write some examples for your function in action... **Example**: _____ (_____) = ____ metalon name input(s) what the function produces **Definition** Write the definition, giving variable names to all your input values

10	
12	

Name:	Date:	Per:

update-danger (word problem) Code.org Computer Science in Algebra



Stage 12

Description: Use the Design Recipe to write a function 'update-

_	coordinate, wh		_		left.
Contra	act and Purp	ose S	Statemen	t	
-	tract has three pa				
function	:::		dom	ain	> range
		wha	t does the fu	nction c	lo?
Exam	oles				
Write some	e examples for yo	ur fund	ction in actio	n	
Example: _	function name	_(input(s)) = _	what the function produces
Example: _	function name	_(input(s))=	what the function produces
Defini	tion				
Write the	definition, giving v	/ariabl	e names to a	ll your ir	nput values
Define :f	unction name	(,	variables	_)=	

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Name:	Date:	Per:
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safe-left? (word problem)



Stage 15

Code.org Computer Science in Algebra

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

Cont	ract and Purpo	ose Statement		
Every co.	ntract has three par	ts		
	::		.	> range
function	on name	doma	ıın	range
		what does the fur	nction c	do?
Exam	ples			
Write son	ne examples for you	ur function in action	·	
Example	function name	_ (input(s))=_	what the function produces
				what the function produces
	function name	input(s)		what the function produces
Defin	ition			
Write the	e definition, giving v	ariable names to al	your ir	nput values
Define: _	function name	(variables	_)=	

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T 5	

Name:	Date:	Per:
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safe-right? (word problem) Code.org Computer Science in Algebra



Stage 15

-	e a function 'safe-right?', v ecks to see if it is less than 42	
Contract and Purp	oose Statement	
Every contract has three po	arts	
:		->
function name	domain	range
Examples	what does the function do?	
Write some examples for yo		
Example : function name	() = input(s) what the	ne function produces
Example:	() = input(s) what the	
function name	input(s) what th	ne function produces
Definition		
Write the definition, giving	variable names to all your input value	es
Define :function name	_ () =) =	

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T5	

Stage 15

Name:	_ Date:	Per:
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onscreen? (word problem)



Code.org Computer Science in Algebra

	-				which takes in a character's on the left and on the right.
Contr	act and Purp	ose	Statemen	t	
-	tract has three pai				->
functio	n name		dom	ain	>range
		wh	at does the fu	nction d	lo?
Exam	ples				
	e examples for yo				
					what the function produces
Example:	function name	_(input(s)) = _	what the function produces
Defini	ition				
Write the	definition, giving v	⁄ariab	le names to a	ll your in	nput values
Define: _	function name	(variables	_)=	

16	

Name:	Date:	Per:
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cost (word problem)

Stage 16 Code.org 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.

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 po	arts						
:			>				
function name		omain	range				
	what does the	e function do?					
Examples							
Write some examples for ye	our function in ac	tion					
Example:							
Example:	() =					
Example:	() =					
Example:	() =					
Definition							
Write the definition, giving	variable names to	o all your input valu	ies				
Define:function name	_(variables) =					

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Т	. O

Name:	Date:	Per:

update-player (word problem)



Stage 16

the key pressed and the player's y-coordinate, and returns the new y-coordinate.							
Contract and Purpo	ose Statemen	t e					
Every contract has three par	ts						
::	- I		->				
function name	doma	ain		range			
	what does the function do?						
Examples							
Write some examples for your function in action							
Example: <u>update-player</u>	(<u>38 240</u>) =	240 + 10				
Example: <u>update-player</u>	(<u>40</u> 240	<u>) </u>	240 - 10				
Example: <u>update-player</u>	(<u>38</u> 250) =					
Example: <u>update-player</u>	(40 250) =					
Definition							
Write the definition, giving ve	ariable names to ali	your input valu	ies				
Define:	(_)=					
function name	variables						

Name:

Date: _____ Pe

Per: ___



Key Code Reference



Stage 16 Code.org Computer Science in Algebra

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.

		Code
37	G	71
38	Н	72
39	1	73
40	J	74
48	K	75
49	L	76
50	М	77
51	N	78
52	0	79
53	Р	80
54	Q	81
55	R	82
56	S	83
57	Т	84
65	U	85
66	V	86
67	W	87
68	X	88
69	Y	89
70	Z	90
	38 39 40 48 49 50 51 52 53 54 55 56 57 65 66 67 68 69	38 H 39 I 40 J 48 K 49 L 50 M 51 N 52 O 53 P 54 Q 55 R 56 S 57 T 65 U 66 V 67 W 68 X 69 Y

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Name: _____ Date: ____ Per: ____

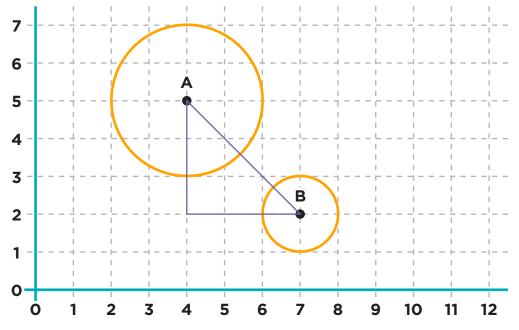
Collision Detection

Code.org Computer Science in Algebra



Graph #1

Stage 19



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 $a^2 + b^2$

9	

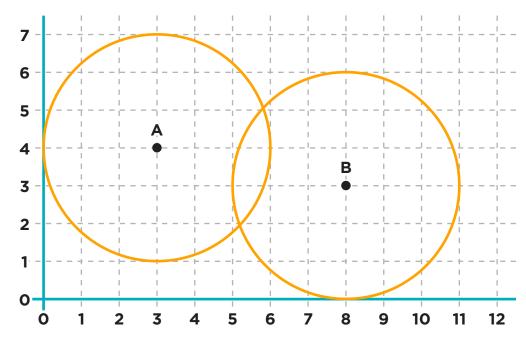
Name: _____ Date: ____ Per: _

Collision Detection

Stage 19 Code.org Computer Science in Algebra



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 $a^2 + b^2$

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9	

Name: ____

Date: _____

Per: _

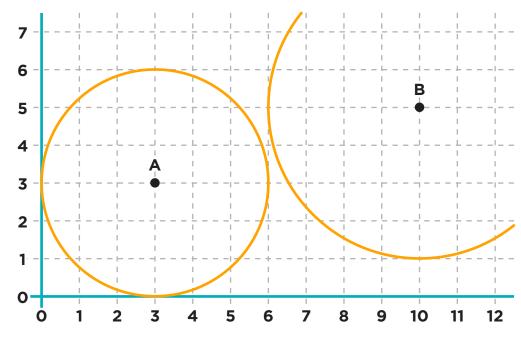
Stage 19

Collision Detection

C O E

Code.org Computer Science in Algebra

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 $a^2 + b^2$

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Name:	Date:	Per:
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line-length (word problem)



Code.org Computer Science in Algebra Stage 20

Description: Write a function called 'line-length', which takes in two

Contract and Purpose Statement Every contract has three parts	numbers and returns the difference between them. It should always subtract the smaller number from the bigger one					
function name what does the function do? Examples Write some examples for your function in action Example: line-length	Contr	act and Purp	ose S	Statemer	nt	
function name domain range what does the function do? Examples Write some examples for your function in action Example: $\frac{line-length}{function name}$ ($\frac{10}{input(s)}$) = $\frac{10-5}{input(s)}$ what the function produces Example: $\frac{line-length}{function name}$ ($\frac{2}{input(s)}$) = $\frac{8-2}{input(s)}$ what the function produces Definition	Every con	ntract has three pa	rts			
what does the function do? Examples Write some examples for your function in action Example: $\frac{line-length}{function name} ($:				>
Examples Write some examples for your function in action Example: $\frac{line-length}{function name} ($	functio	n name		don	nain	range
Write some examples for your function in action Example: $\frac{line-length}{function name}$ ($\frac{l0}{function name}$) = $\frac{l0-5}{function produces}$ Example: $\frac{line-length}{function name}$ ($\frac{2}{function name}$) = $\frac{8-2}{function produces}$ Definition			wha	t does the f	unction c	do?
Example: $\frac{line-length}{function name}$ ($\frac{10}{input(s)}$) = $\frac{10-5}{input(s)}$ what the function produces Example: $\frac{line-length}{function name}$ ($\frac{2}{input(s)}$) = $\frac{8-2}{input(s)}$ what the function produces Definition	Exam	ples				
Example: $\frac{\textit{line-length}}{\text{function name}} (\frac{2}{\text{input(s)}} 8) = \frac{8-2}{\text{what the function produces}}$ Definition	Write som	ne examples for yo	ur fund	ction in acti	on	
Example: $\frac{\textit{line-length}}{\text{function name}} (\frac{2}{\text{input(s)}} 8) = \frac{8-2}{\text{what the function produces}}$ Definition	Example:	line-length	_ (10	<u></u>	10 - 5
Definition						
Definition	Example:	line-length	_(2		8 - 2
		function name		input(s)		what the function produces
Write the definition, giving variable names to all your input values	Defin	ition				
	Write the	definition, giving v	ariable	names to a	all your in	put values
Define: () = function name variables		function name	(variables)=	
Tarrection marrie		ranceion name	•	ariables		

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Stage 20

Name:	Date:	Per:

distance (word problem)

Code.org Computer Science in Algebra



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							
Cont	Contract and Purpose Statement						
Every co	ntract has three pa	rts					
functi	: on name		dom	 nain	> range		
		wha	t does the fu	unction c	?ok		
Exan	nples						
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	() =			
	ranetion name		variables				

20	

Name:	Date:	Per:
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collide? (word problem)

C O D E

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

·			·		
Contr	act and Purpo	ose S	Statemen	it	
Every con	tract has three par	ts			
functio	n name		dom	nain	> range
		wha	t does the fu	ınction d	lo?
Exam	ples				
Write som	ne examples for you	ır fund	ction in actio	n	
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	()=	
·	iunction name	·	variables		

Example Contract Log Range Domain Name

Example Contract Log Range Domain Name