

Nombre: \_\_\_\_\_



**BOOTSTRAP**  
www.bootstrapworld.org

Libro de trabajo del estudiante

Clase: \_\_\_\_\_



Libro de trabajo v2.7

Traído para ti por el equipo de Bootstrap:

- Emmanuel Schanzer
- Kathi Fisler
- Shriram Krishnamurthi
- Emma Youndtsmith
- Rosanna Sobota

Diseño visual: Colleen Murphy

---

El uso de Bootstrap está regido por una licencia Creative Commons 3.0. Basado en un trabajo de [www.BootstrapWorld.org](http://www.BootstrapWorld.org). Permisos fuera del alcance de esta licencia pueden tramitarse contactando a [schanzer@BootstrapWorld.org](mailto:schanzer@BootstrapWorld.org).

# Unidades de Bootstrap

**01**    **Videojuegos y  
Planos de  
Coordenadas**

**02**    **Contratos, series  
de caracteres e  
Imágenes**

**03**    **Introducción a  
las Definiciones**

**04**    **Fórmula del  
Diseño**

**05**    **Animación  
Del Juego**

**06**    **Comparando  
Funciones**

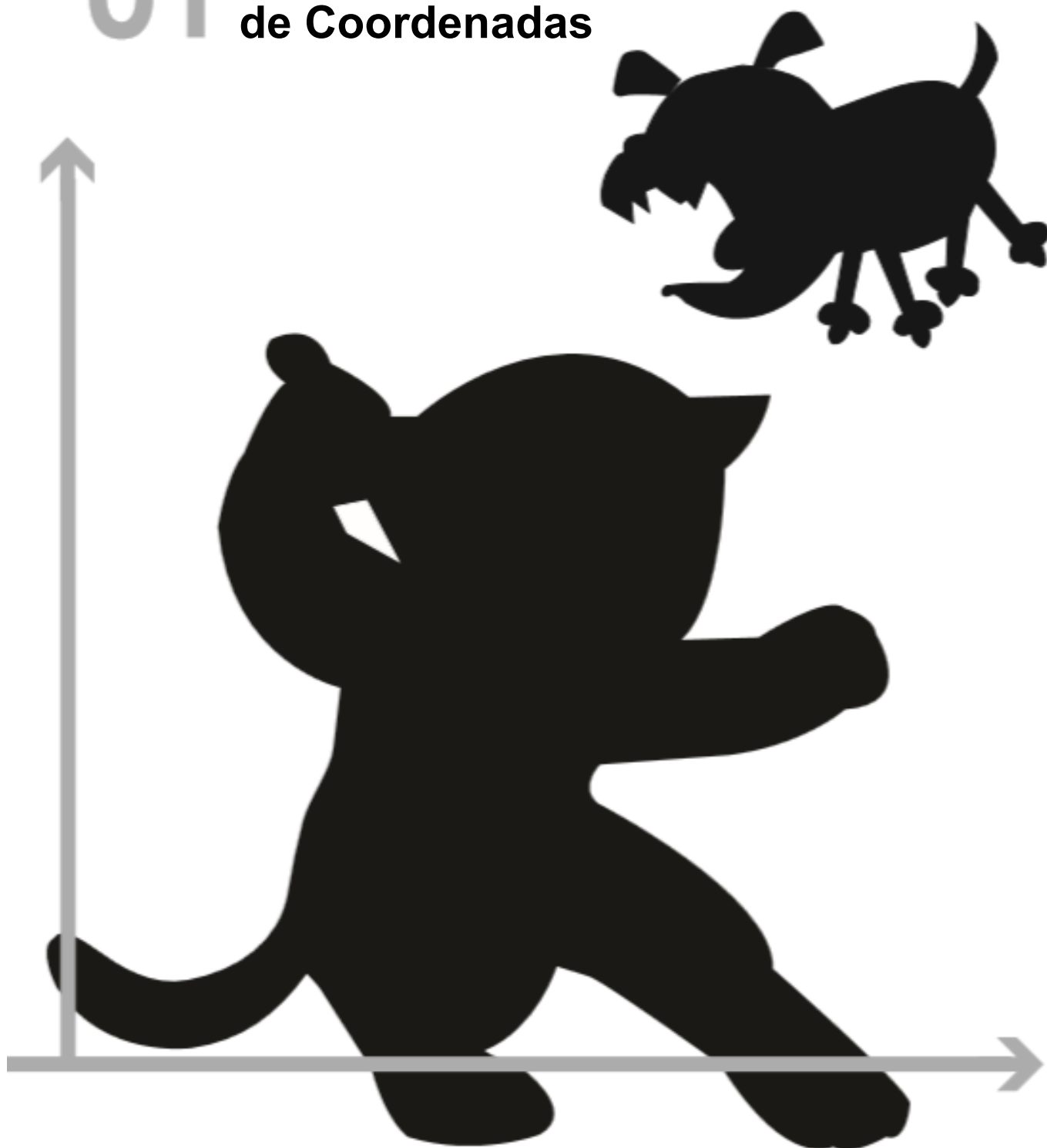
**07**    **Bifurcación  
Condicional**

**08**    **Detección de  
Colisiones**

**09**    **Preparándonos  
para el  
Lanzamiento**

**10**    **Materiales  
Adicionales**

# 01 Videojuegos y Planos de Coordenadas



## *Nuestro videojuego*

Creado por (escribe tu nombre): \_\_\_\_\_

### **El ambiente**

Nuestro juego se desarrolla en: \_\_\_\_\_  
(¿El espacio? ¿El desierto? ¿Un centro comercial?)

### **El jugador**

El jugador es un \_\_\_\_\_.

El jugador se mueve solamente hacia arriba y abajo.

### **El objetivo**

Tu jugador **GAN**A puntos cuando golpea el objetivo.

El Objetivo es un \_\_\_\_\_.

El Objetivo se mueve solamente de izquierda a derecha.

### **El peligro**

Tu jugador **PIERDE** puntos cuando golpea el peligro.

El Peligro es un \_\_\_\_\_.

El Peligro se mueve solamente de izquierda a derecha.

### **I. Círculo de prácticas de evaluación Tiempo: 5 minutos**

No olvides usar los símbolos de la computadora para operaciones como multiplicar y dividir!

<b>Operación matemática</b>	<b>Círculo de evaluación</b>	<b>Código Racket</b>
-----------------------------	------------------------------	----------------------

$5 \times 10$		
$8 + (5 \times 10)$		
$(8 + 2) - (5 \times 10)$		
$\frac{5 \times 10}{8 - 2}$		

# Lección 2

(Dibuja círculos de evaluación aquí si necesitas papel borrador adicional)

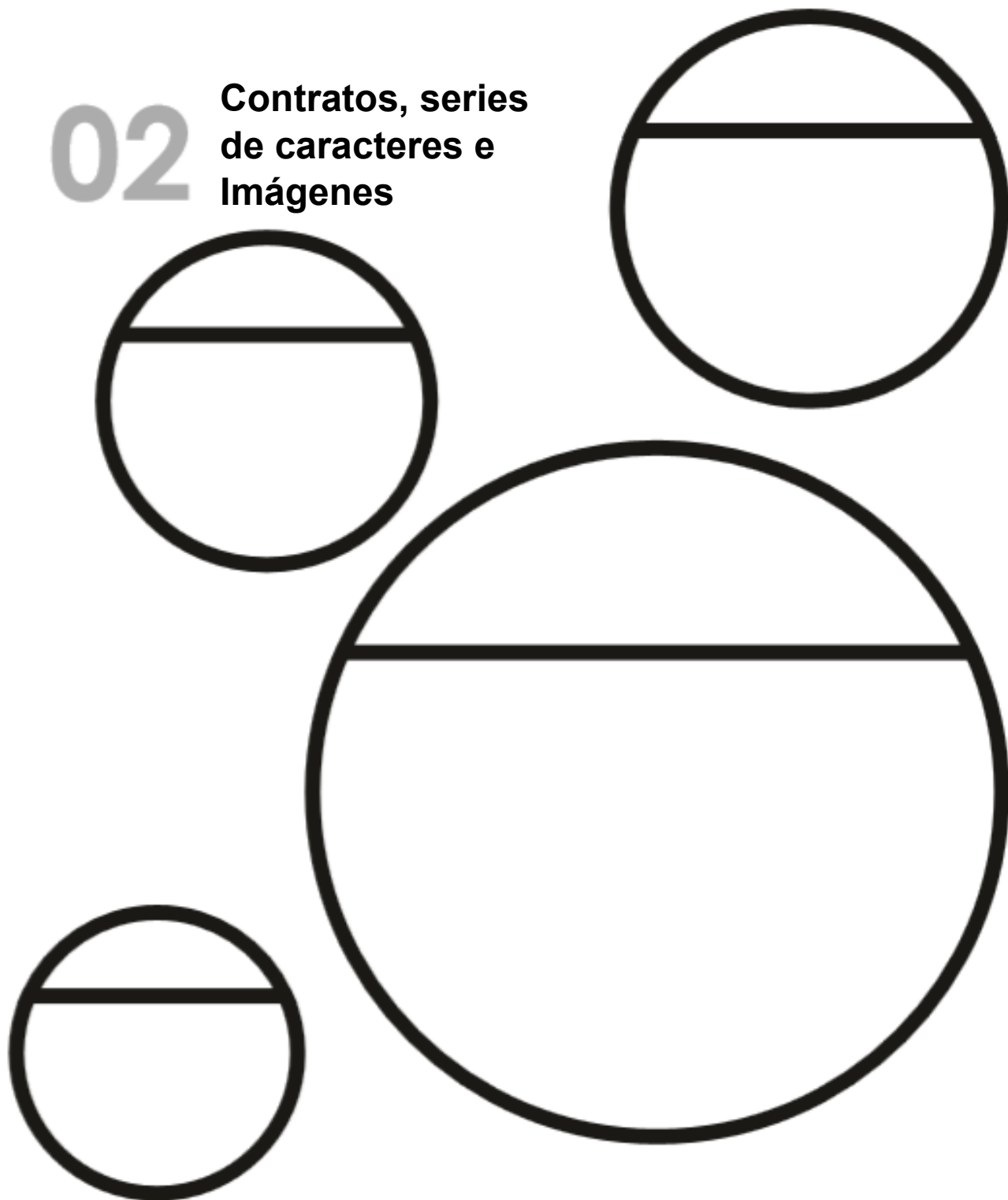
## Competencia de círculos Tiempo: 5 minutos

	<i>Operación</i>	<i>Círculo de evaluación</i>	<i>Código Racket</i>
Ronda 1	$(3 * 7) - (1 + 2)$		
Ronda 2	$3 - (1 + 2)$		
Ronda 3	$3 - (1 + (5 * 6))$		
Ronda 4	$(1 + (5 * 6)) - 3$		



02

**Contratos, series  
de caracteres e  
Imágenes**



nombre	dominio	rango
(EJEMPLO (	)	)
(EJEMPLO (	)	)
(define (	)	)

nombre	dominio	rango
(EJEMPLO (	)	)
(EJEMPLO (	)	)
(define (	)	)

nombre	dominio	rango
(EJEMPLO (	)	)
(EJEMPLO (	)	)
(define (	)	)

nombre	dominio	rango
(EJEMPLO (	)	)
(EJEMPLO (	)	)
(define (	)	)

# 03 **Introducción a las Definiciones**



# Fast Functions

`; _____ : _____ -> _____`  
name domain range

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(define ( \_\_\_\_\_ ) \_\_\_\_\_)

`; _____ : _____ -> _____`  
name domain range

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(define ( \_\_\_\_\_ ) \_\_\_\_\_)

`; _____ : _____ -> _____`  
name domain range

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(define ( \_\_\_\_\_ ) \_\_\_\_\_)

`; _____ : _____ -> _____`  
name domain range

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(EXAMPLE ( \_\_\_\_\_ ) \_\_\_\_\_)

(define ( \_\_\_\_\_ ) \_\_\_\_\_)

## Fast Functions

$$; \text{ \_\_\_\_\_\_ } : \text{ \_\_\_\_\_\_ } \rightarrow \text{ \_\_\_\_\_\_ }$$

name                  domain                  range

range

```
(define (_____))
```

$$; \text{ \underline{\hspace{2cm}} } : \text{ \underline{\hspace{2cm}} } \rightarrow \text{ \underline{\hspace{2cm}} }$$

name
domain
range

range

```
(define (_____))
```

$$\text{; } \underline{\hspace{10em}} \text{ : } \underline{\hspace{10em}} \text{ -> } \underline{\hspace{10em}}$$

name
domain
range

range

```
(define (
```

$$\text{; } \underline{\hspace{10em}} \text{ : } \underline{\hspace{10em}} \text{ -> } \underline{\hspace{10em}}$$

name
domain
range

range

```
(define (
```

04

## Fórmula Del Diseño

1 Contrato

2 Ejemplo

3 Definición



Problema de palabras: rocket-height

Directions: A rocket blasts off, traveling at 7 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.

Declaración de contrato y propósito

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

Ejemplos

Write the code examples, keeping variables and names for consistency.

(Ejemplo)

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

Definición

Write the definition, numbers of variables and their use values of variables.

(define)

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

12

Problema de palabras: lawn-arc

Directions: Use the Design Recipe to write a function "lawn-area", which takes in the width and length of a lawn, and returns the area of the lawn. (Don't forget: area = length \* width!)

Declaración de contrato y propósito

2

lawn-area

width

length

2

Ejemplos

Escribe algunos ejemplos, luego circula y marca los correctos.

(Ejemplo)

width

length

area

(Ejemplo)

width

length

area

Definición

Escribe la definición, nombres de variables a modo de valores de ejemplo.

(define)

width

length

13



Problema de palabras: red-square

Directions: Use the Design Recipe to write a function 'red-square', which takes in a number (the length of each side of the square) and outputs a solid red rectangle whose length and width are the same size.

Declaración de contrato y propósito

2

function name

parameters

return

purpose

2

(what does the function do?)

Ejemplos

Escribe algunos ejemplos, luego circula y marca los correctos...

(Ejemplo( 

parameters

 ) 

return

 what the function produces )

(Ejemplo( 

parameters

 ) 

return

 what the function produces )

Definición

Escribe la definición, nombres de variables a todos sus valores de variables.

(define( 

parameters

 ) 

what the function does with those variables

 )

# objetivo



# peligro



**05** Animación  
Del Juego

Problema de palabras: update-danger

Directions: Use the Design Recipe to write a function 'update-danger', which takes in the danger's x-coordinate and produces the text's x-coordinate, which is 50 pixels to the left.

Declaración de contrato y propósito

2

danger-name

update

new

danger

2

(x) (x) (x) (x)

(x) (x) (x) (x)

Ejemplos

Escribe algunos ejemplos, luego evalúa y muestra los cambios...

(Ejemplo( 

danger-name

update

new

danger

 )

(Ejemplo( 

danger-name

update

new

danger

 )

Definición

Escribe la definición, nombres de variables o todas sus variables de entrada...

(define( 

danger-name

update

new

danger

 )

16

## Problema de palabras: update-target

**Direcciones:** Write a function 'update-target', which takes in the target's x-coordinate and produces the next x-coordinate, which is 50 pixels to the right.

## Declaración de contrato y propósito

...that constant term  $\beta$  plus...

function name	domain	range
$f(x) = 2x + 3$	$\mathbb{R}$	$\mathbb{R}$
$g(x) = x^2$	$\mathbb{R}$	$\mathbb{R}_{\geq 0}$
$h(x) = \sin(x)$	$\mathbb{R}$	$[-1, 1]$
$k(x) = \log(x)$	$\mathbb{R}_{> 0}$	$\mathbb{R}$
$m(x) = e^x$	$\mathbb{R}$	$\mathbb{R}_{> 0}$
$n(x) = \frac{1}{x}$	$\mathbb{R}_{\neq 0}$	$\mathbb{R}_{\neq 0}$
$p(x) = x^3$	$\mathbb{R}$	$\mathbb{R}$
$q(x) = \sqrt{x}$	$\mathbb{R}_{\geq 0}$	$\mathbb{R}_{\geq 0}$
$r(x) = \cos(x)$	$\mathbb{R}$	$[-1, 1]$
$s(x) = \tan(x)$	$\mathbb{R} \setminus \{\frac{\pi}{2} + k\pi\}$	$\mathbb{R}$
$t(x) = \arcsin(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
$u(x) = \arccos(x)$	$[-1, 1]$	$[0, \pi]$
$v(x) = \arctan(x)$	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
$w(x) = \sinh(x)$	$\mathbb{R}$	$\mathbb{R}$
$x(x) = \cosh(x)$	$\mathbb{R}$	$\mathbb{R}_{\geq 1}$
$y(x) = \tanh(x)$	$\mathbb{R}$	$(-1, 1)$
$z(x) = \ln(x)$	$\mathbb{R}_{> 0}$	$\mathbb{R}$
$aa(x) = e^x$	$\mathbb{R}$	$\mathbb{R}_{> 0}$
$ab(x) = \frac{1}{x}$	$\mathbb{R}_{\neq 0}$	$\mathbb{R}_{\neq 0}$
$ac(x) = x^2$	$\mathbb{R}$	$\mathbb{R}_{\geq 0}$
$ad(x) = \sin(x)$	$\mathbb{R}$	$[-1, 1]$
$ae(x) = \cos(x)$	$\mathbb{R}$	$[-1, 1]$
$af(x) = \tan(x)$	$\mathbb{R} \setminus \{\frac{\pi}{2} + k\pi\}$	$\mathbb{R}$
$ag(x) = \arcsin(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
$ah(x) = \arccos(x)$	$[-1, 1]$	$[0, \pi]$
$ai(x) = \arctan(x)$	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
$aj(x) = \sinh(x)$	$\mathbb{R}$	$\mathbb{R}$
$ak(x) = \cosh(x)$	$\mathbb{R}$	$\mathbb{R}_{\geq 1}$
$al(x) = \tanh(x)$	$\mathbb{R}$	$(-1, 1)$
$am(x) = \ln(x)$	$\mathbb{R}_{> 0}$	$\mathbb{R}$
$an(x) = e^x$	$\mathbb{R}$	$\mathbb{R}_{> 0}$
$ao(x) = \frac{1}{x}$	$\mathbb{R}_{\neq 0}$	$\mathbb{R}_{\neq 0}$
$ap(x) = x^3$	$\mathbb{R}$	$\mathbb{R}$
$aq(x) = \sqrt{x}$	$\mathbb{R}_{\geq 0}$	$\mathbb{R}_{\geq 0}$
$ar(x) = \sin(x)$	$\mathbb{R}$	$[-1, 1]$
$as(x) = \cos(x)$	$\mathbb{R}$	$[-1, 1]$
$at(x) = \tan(x)$	$\mathbb{R} \setminus \{\frac{\pi}{2} + k\pi\}$	$\mathbb{R}$
$au(x) = \arcsin(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
$av(x) = \arccos(x)$	$[-1, 1]$	$[0, \pi]$
$aw(x) = \arctan(x)$	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
$ax(x) = \sinh(x)$	$\mathbb{R}$	$\mathbb{R}$
$ay(x) = \cosh(x)$	$\mathbb{R}$	$\mathbb{R}_{\geq 1}$
$az(x) = \tanh(x)$	$\mathbb{R}$	$(-1, 1)$
$ba(x) = \ln(x)$	$\mathbb{R}_{> 0}$	$\mathbb{R}$
$bb(x) = e^x$	$\mathbb{R}$	$\mathbb{R}_{> 0}$
$bc(x) = \frac{1}{x}$	$\mathbb{R}_{\neq 0}$	$\mathbb{R}_{\neq 0}$
$bd(x) = x^2$	$\mathbb{R}$	$\mathbb{R}_{\geq 0}$
$be(x) = \sin(x)$	$\mathbb{R}$	$[-1, 1]$
$bf(x) = \cos(x)$	$\mathbb{R}$	$[-1, 1]$
$bg(x) = \tan(x)$	$\mathbb{R} \setminus \{\frac{\pi}{2} + k\pi\}$	$\mathbb{R}$
$bh(x) = \arcsin(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
$bi(x) = \arccos(x)$	$[-1, 1]$	$[0, \pi]$
$bj(x) = \arctan(x)$	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
$bk(x) = \sinh(x)$	$\mathbb{R}$	$\mathbb{R}$
$bl(x) = \cosh(x)$	$\mathbb{R}$	$\mathbb{R}_{\geq 1}$
$bm(x) = \tanh(x)$	$\mathbb{R}$	$(-1, 1)$
$bn(x) = \ln(x)$	$\mathbb{R}_{> 0}$	$\mathbb{R}$
$bo(x) = e^x$	$\mathbb{R}$	$\mathbb{R}_{> 0}$
$bp(x) = \frac{1}{x}$	$\mathbb{R}_{\neq 0}$	$\mathbb{R}_{\neq 0}$
$bq(x) = x^3$	$\mathbb{R}$	$\mathbb{R}$
$br(x) = \sqrt{x}$	$\mathbb{R}_{\geq 0}$	$\mathbb{R}_{\geq 0}$
$bs(x) = \sin(x)$	$\mathbb{R}$	$[-1, 1]$
$bt(x) = \cos(x)$	$\mathbb{R}$	$[-1, 1]$
$bu(x) = \tan(x)$	$\mathbb{R} \setminus \{\frac{\pi}{2} + k\pi\}$	$\mathbb{R}$
$bv(x) = \arcsin(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$
$bw(x) = \arccos(x)$	$[-1, 1]$	$[0, \pi]$
$bx(x) = \arctan(x)$	$\mathbb{R}$	$(-\frac{\pi}{2}, \frac{\pi}{2})$
$by(x) = \sinh(x)$	$\mathbb{R}$	$\mathbb{R}$
$bz(x) = \cosh(x)$	$\mathbb{R}$	$\mathbb{R}_{\geq 1}$

---

### Ejemplos

Escibe algunos ejemplos, luego circula y marca los cambios...

(Ejemplo( \_\_\_\_\_ ) \_\_\_\_\_ )

*function name                  inputs                  what the function produces*

function name	description	what the function produces
Ejemplo( )		

#### Definición

Escribe la definición, nombres de variables e indica sus valores de entrada...

```
(define( function name variables )
```

Age Group	Percentage of Respondents
18-29	65
30-49	75
50-69	85
70+	88

What the participants said with their evaluation



¿“Izquierda segura”?

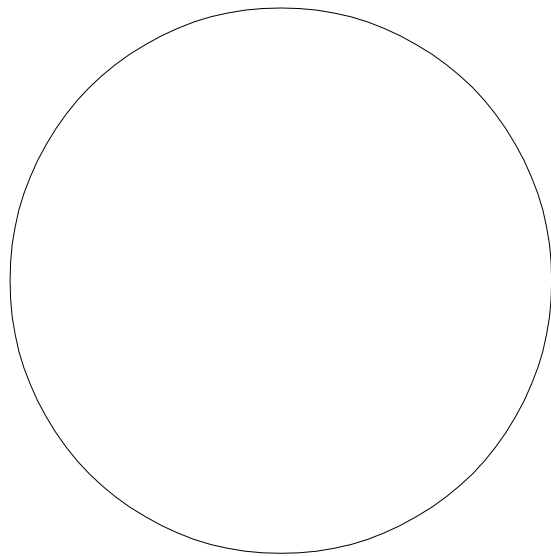
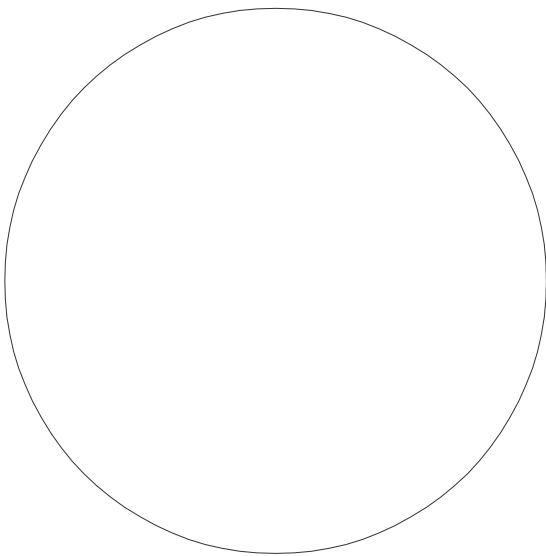
06

**Comparando  
Funciones**

## DESIGN RECIPE

Sam is in a 640 x 480 yard. How far he can go to the left and right before he's out of sight?

1. A piece of Sam is still visible on the left as long as...  $( > \frac{x}{-50} )$  \_\_\_\_\_
2. A piece of Sam is still visible on the right as long as... \_\_\_\_\_
3. Draw the Circle of Evaluation for these two expressions in the circles below:



Problema de palabras: safe-left?

Directions: Use the Design Recipe to write a function "safe-left?", which takes in an x-coordinate and checks to see if it is greater than .50.

Declaración de contrato y propósito

2

function name

parameters

return

purpose

2

(what does the function do?)

Ejemplos

Escribe algunos ejemplos, luego circula y marca los correctos...

(Ejemplo( 

function name

parameters

 ) 

what the function produces

 )

(Ejemplo( 

function name

parameters

 ) 

what the function produces

 )

Definición

Escribe la definición, nombres de variables y marca sus valores de variables...

(define( 

function name

parameters

 ) 

what the function does with those variables

 )

20

Problema de palabras: safe-right?

Directions: Use the Design Recipe to write a function "safe-right?", which takes in an x-coordinate and checks to see if it is less than 0.0.

Declaración de contrato y propósito

2

function name

parameters

return

purpose

2

(what does the function do?)

Ejemplos

Escribe algunos ejemplos, luego elícelo y muestra los cambios...

(Ejemplo( 

parameters

 ) 

what the function produces

 )

(Ejemplo( 

parameters

 ) 

what the function produces

 )

Definición

Escribe la definición, nombres de variables o todos sus valores de variables.

(define( 

parameters

 ) 

what the function does with those variables

 )

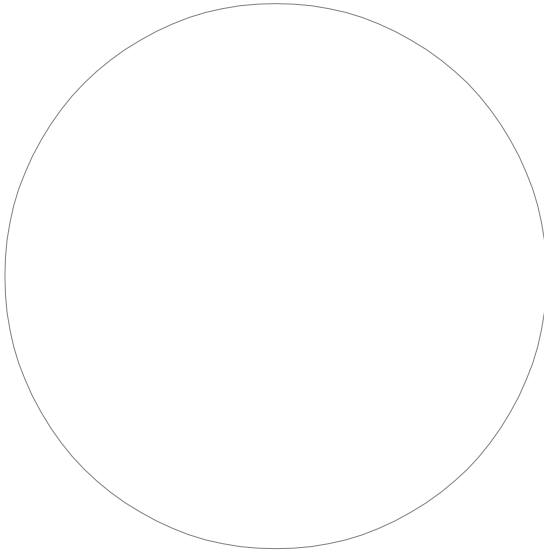
21



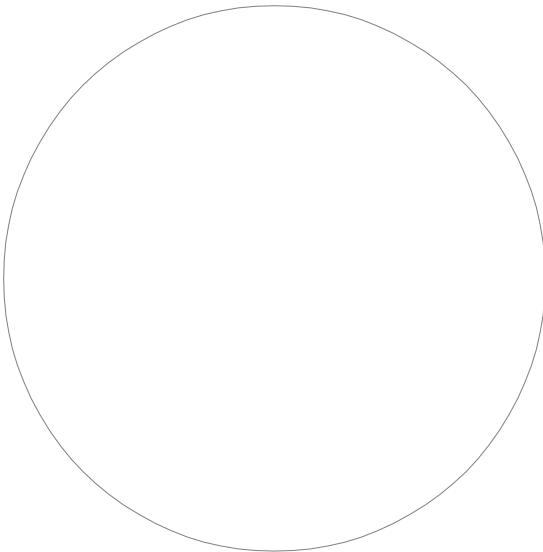
## and / or

**Write the Circles of Evaluation for these statements, and then convert them to Racket**

1. Two is less than five, and zero is equal to six.



2. Two is less than four or four is equal to six.



Problema de palabras: onscreen?

Directions: Use the Design Recipe to write a function "onscreen?", which takes in the x-coordinate and checks to see if Sam is safe on the left AND safe on the right.

Declaración de contrato y propósito

2

function name

parameters

return

purpose

2

(what does the function do?)

Ejemplos

Escribe algunos ejemplos, luego circula y marca los correctos...

(Ejemplo)

function name

parameters

return

what the function produces

(Ejemplo)

function name

parameters

return

what the function produces

Definición

Escribe la definición, nombres de variables e incluye sus valores de entrada...

(define)

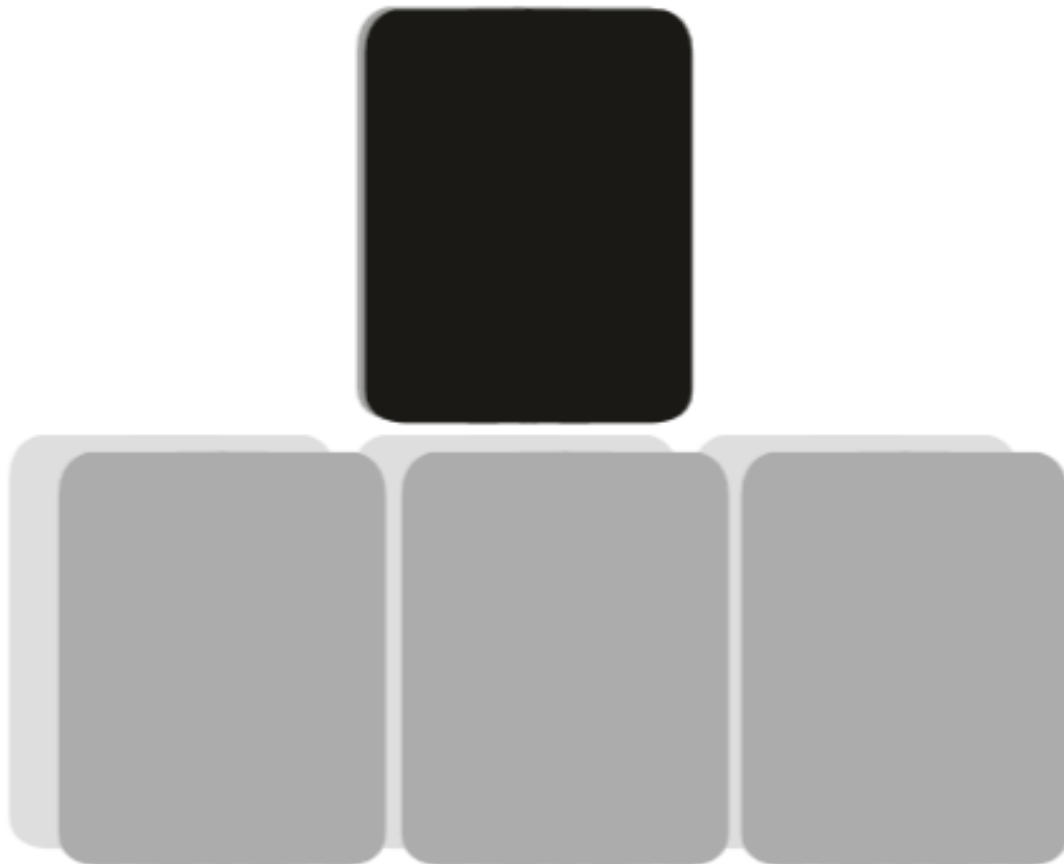
function name

variables

what the function does with those variables

23

# 07 Bifurcación Condicional



Problema de palabras: cost

Directions: Luigi's Pizzeria has hired you as a programmer. They offer Pepperconi (\$10.50), Cheese (\$9.00), Chicken (\$11.25) and Bruschetta (\$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.

Declaración de contrato y propósito

1

2

3

Ejemplos

Write the code examples. Keep it simple & make it readable.

(Ejemplo( cost "pepperconi" ) )

(Ejemplo( cost "cheese" ) )

(Ejemplo( cost "chicken" ) )

(Ejemplo( cost "bruschetta" ) )

Definición

Write the definition, number of variables & make sure you're clear.

(define (cost topping))

(cond ( (topping = "pepperconi" )

(topping = "cheese" )

(topping = "chicken" )

(topping = "bruschetta" )

25

Problema de palabras: update-player

Directions: Write a function called update-player, which takes in the player's y-coordinate and the name of the list passed, and returns the new y-coordinate.

Declaración de contrato y propósito

2

player-name

player

new

update

2

(new-list-the-player-obj)

Ejemplos

Escribe algunos ejemplos, luego elige el mejor de los cuatro.

(Ejemplo( update-player 320 "up" ) )

player-name

player

new

update

(Ejemplo( update-player 100 "up" ) )

player-name

player

new

update

(Ejemplo( ) )

player-name

player

new

update

(Ejemplo( ) )

player-name

player

new

update

Definición

Escribe la definición, nombra de variables a todas sus valores de entrada.

(define( ) )

player-name

player

{

}

{

}

{

}

26

## 08 Detección de Colisiones

# colisión

---



distancia

Problema de palabras: line-length

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

Declaración de contrato y propósito

Indica contract entre 2 parâmetros:

1

2

3

1

2

3

1

2

3

Exemplos

Explain the examples, highlight relevant features and conditions.

(Exemplo( line-length 10 5 ) (- 10 5) )

10 5

(- 10 5)

1

(Exemplo( line-length 2 8 ) (- 8 2) )

2 8

(- 8 2)

1

Definição

Explain the definition, number of variables and their use values or constants.

(define (

1

2

3

cond

1

2

3

1

2

3

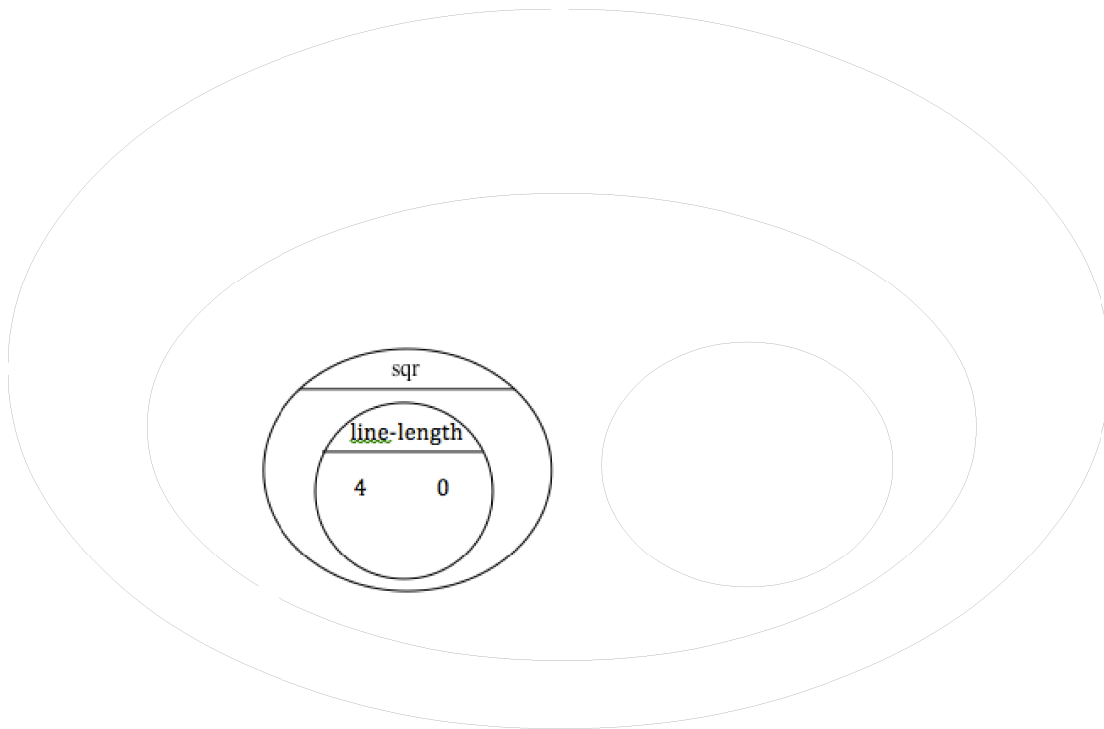
28

## The Distance Formula (an example)

The distance between the points (0, 0) and (4, 3) is given by:

$$\sqrt{(\text{line-length } 4 \ 0)^2 + (\text{line-length } 3 \ 0)^2}$$

Convert the formula above into a Circle of Evaluation. (We've already gotten you started!)



Convert the Circle of Evaluation into Racket code:



Problema de palabras: distance

**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 return the distance between the two, using the Distance formula. (HINT: look at what you did on the previous page)

**Declaración de contrato y propósito**

Indica qué devuelve y para qué.

```
2
def distance(px, py, cx, cy):
    """
    distance: takes four inputs (px, py, cx, cy) and returns the distance between the player and the other game character.
    """
    return
```

**Ejemplos**

Escribe algunos ejemplos, luego cópialos y mézclalos con los comentarios.

```
(Ejemplo)
def distance(px, py, cx, cy):
    """
    distance: takes four inputs (px, py, cx, cy) and returns the distance between the player and the other game character.
    """
    return
```

```
(Ejemplo)
def distance(px, py, cx, cy):
    """
    distance: takes four inputs (px, py, cx, cy) and returns the distance between the player and the other game character.
    """
    return
```

**Definición**

Escribe la definición, nombres de variables e indica sus valores de retorno.

```
(define)
def distance(px, py, cx, cy):
    """
    distance: takes four inputs (px, py, cx, cy) and returns the distance between the player and the other game character.
    """
    return
```

Problema de palabras: collide?

Directrices: 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

Are the coordinates of the player within 50 pixels of the coordinates of the other character?

Declaración de contrato y propósito

Write contract later / preface...

2

function collide(

px

py

cx

cy

→

)

3

What does the function do?

Ejemplos

Write two more examples, longer or shorter, and make sure they collide...

(Ejemplo(

px for example

py for example

)

What does this function produce?

)

(Ejemplo(

px for example

py for example

)

What does this function produce?

)

Definición

Write the definition, names of variables and make sure names are spelled correctly...

(define(

function name

variables

)

What does this function do? Write here: variables

31



09

## Preparación de la presentación



# Lesson 9

Catchy Intro:

---

---

---

Name, Age, Grade:

---

Game Title:

---

Back Story:

---

---

---

---

Characters:

---

---

---

---

---

Explain a piece of your code:

---

---

---

---

[illegible]

## Presentation Feedback

*For each question, circle the answer that fits best.*

Was the introduction catchy?      No way!      A little.      Definitely!

Did they talk about their characters?      No way!      A little.      Definitely!

Did they explain the code well?      No way!      A little.      Definitely!

Did they speak slowly enough?      No way!      A little.      Definitely!

Did they speak loudly enough?      No way!      A little.      Definitely!

Were they standing confidently?      No way!      A little.      Definitely!

Did they make eye contact?      No way!      A little.      Definitely!

## Presentation Feedback

*For each question, circle the answer that fits best.*

Was the introduction catchy?      No way!      A little.      Definitely!

Did they talk about their characters?      No way!      A little.      Definitely!

Did they explain the code well?      No way!      A little.      Definitely!

Did they speak slowly enough?      No way!      A little.      Definitely!

Did they speak loudly enough?      No way!      A little.      Definitely!

Were they standing confidently?      No way!      A little.      Definitely!

Did they make eye contact?      No way!      A little.      Definitely!

## Problema de palabras: red-shape

**Direcciones:** Write a function called `red-shape`, which takes in the name of a shape and draws that shape (solid and red). Add an `else` clause that produces a sensible output.

## Declaración de contrato y propósito

*Toda contracta tiene 3 partes...*

$x$	$y$	$z$
function name	domain	range

---

## Ejemplos

Escibe algunos ejemplos, luego circula y marca los cambios...

```
(Ejemplo( red-shape "circle" ) (circle 50 "solid" "red") )
```

<i>function name</i>	<i>inputs</i>	<i>what the function produces</i>
(Ejemplo(	)	)

function name	inputs	what the function produces
Example(		)

`(Example(` \_\_\_\_\_ `)`

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

Definición
------------

Escriba la definición, nombres de variables a todos sus valores de entrada...

```
(define( function name expression )
```

(cond \_\_\_\_\_)

```
( _____ (circle 50 "solid" "red") _____ )
```

( \_\_\_\_\_ )

( \_\_\_\_\_ )

( \_\_\_\_\_ )

\_\_\_\_\_ )



## Translating into Algebra

### Value Definitions

Racket Code	Algebra
<code>(define x 10)</code>	$x = 10$
<code>(define y (* x 2))</code>	$y = x \cdot 2$
<code>(define z (+ x y))</code>	
<code>(define age 14)</code>	
<code>(define months (* age 12))</code>	
<code>(define days (* months 30))</code>	
<code>(define hours (* days 24))</code>	
<code>(define minutes (* hours 60))</code>	

### Function Definitions

Racket Code	Algebra
<code>(define (area length width)   (* length width))</code>	$\text{area}(\text{length}, \text{width}) = \text{length} \cdot \text{width}$
<code>(define (circle-area radius)   (* pi (sqr radius)))</code>	
<code>(define (distance x1 y1 x2 y2)   (sqrt (+ (sqr (- x1 x2))            (sqr (- y1 y2)))))</code>	

## Design Recipe

A rocket is flying from Earth to Mars at 80 miles per second. Write a function that describes the distance  $D$  that the rocket has traveled, as a function of time  $t$ .

## I. Contract+Purpose Statement

Every contract has three parts:

;

<u>D</u>	:		->	
name		Domain		Range

;

<i>What does the function do?</i>				

## II. Give Examples

Write an example of your function for some sample inputs

D(1) = \_\_\_\_\_

Use the function here                      What should the function produce?

**D( 2 )=** \_\_\_\_\_  
 Use the function here                      What should the function produce?

**D( )** = \_\_\_\_\_

Use the function here \_\_\_\_\_ What should the function produce?

	=
Use the function here	What should the function produce?

### III. Definition

Write the formula, giving variable names to all your input values.

$$D(\quad) =$$

# Design Recipe

A rocket is traveling from Earth to Mars at 80 miles per second. Write a function that describes the time the rocket has been traveling, as a function of distance.

## I. Contract+Purpose Statement

Every contract has three parts:

;  
: \_\_\_\_\_ -> \_\_\_\_\_  
name Domain Range  
;  
\_\_\_\_\_  
What does the function do?

## II. Give Examples

Write an example of your function for some sample inputs

\_\_\_\_\_  
= \_\_\_\_\_  
Use the function here What should the function produce?

\_\_\_\_\_  
= \_\_\_\_\_  
Use the function here What should the function produce?

\_\_\_\_\_  
= \_\_\_\_\_  
Use the function here What should the function produce?

\_\_\_\_\_  
= \_\_\_\_\_  
Use the function here What should the function produce?

## III. Definition

Write the Formula, giving variable names to all your input values.

\_\_\_\_\_  
= \_\_\_\_\_

# Design Recipe

A rocket leaves Earth, headed for Mars at 80 miles per second. **At the exact same time**, an asteroid leaves Mars traveling towards Earth, moving at 70 miles per second. If the distance from the Earth to Mars is 50,000,000 miles, how long will it take for them to meet?

## I. Contract+Purpose Statement

Every contract has three parts:

;  
name : Domain -> Range  
;  
What does the function do?

## II. Give Examples

Write an example of your function for some sample inputs

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

## III. Definition

Write the Formula, giving variable names to all your input values.

=

# Design Recipe

## I. Contract+Purpose Statement

Every contract has three parts:

;  
name : Domain -> Range  
;  
What does the function do?

## II. Give Examples

Write an example of your function for some sample inputs

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

## III. Definition

Write the Formula, giving variable names to all your input values.

=

# Design Recipe

## I. Contract+Purpose Statement

Every contract has three parts:

;  
; \_\_\_\_\_ : \_\_\_\_\_ -> \_\_\_\_\_  
name Domain Range  
;  
; \_\_\_\_\_  
What does the function do?

## II. Give Examples

Write an example of your function for some sample inputs

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

=  
Use the function here What should the function produce?

## III. Definition

Write the Formula, giving variable names to all your input values.

=  
\_\_\_\_\_

# Contracts

[illegible]

# Contracts

[illegible]