Key

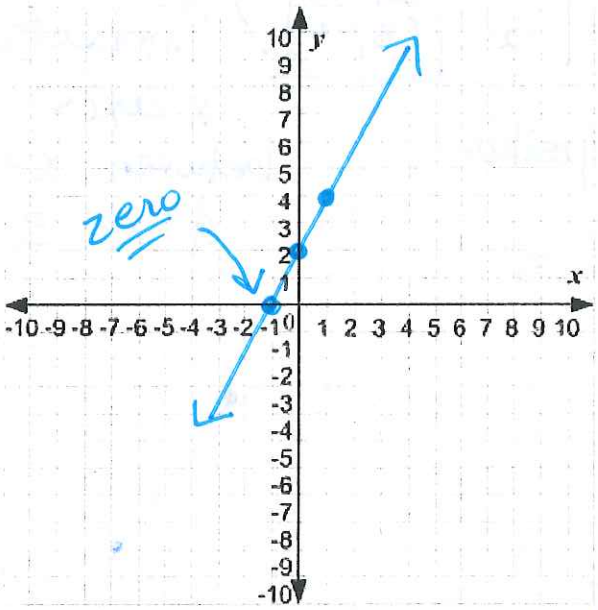
3-2 Notes: Zeros of a Linear Function

Find Zeros of a Function: You can find the zeros of a function by graphing the function. The zero is located at the x-intercept of the function. Specifically, the "zero" of a function represents the x-value that will make the function have an output of 0.

Example: Find the zero of the function f(x) = 2x + 2

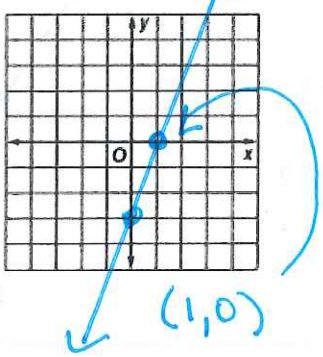
x	2x + 2		y	(x,y)
-1	2(-1) + 2	=	0	(-1, 0)
0	2(0) + 2	=	2	(0, 2)
1	2(1) + 2	=	4	(1, 4)

← zero of function!

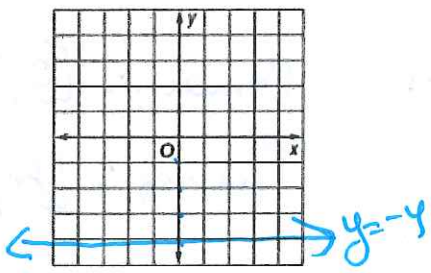


Find the zero of each function by graphing.

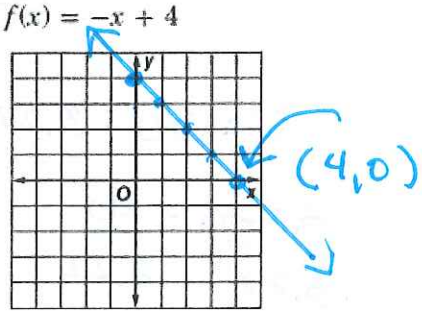
1. $f(x) = 3x - 3$



2. $f(x) = -4$



3. $f(x) = -x + 4$



Using Graphs and Equations to find the zeros of the function: Sometimes graphs are not the best method for finding an exact solution to a problem. Graphs are only used to find estimates of the solution. In many cases it is best to use the function rule to find specific function inputs and outputs.

Example: You and your cousin decide to walk a 7-mile trail to the ranger station at the local state park. Let the function $d(t) = 7 - 3.2(t)$ represent your distance from the ranger station as a function of time in hours. Find the zero of the function and describe its meaning in the context of the problem situation.

t	7 – 3t	d(t)	(x,y)
0	7 − 3(0) =	7	(0,7)
1	7 − 3(1) =	4	(1,4)
2	7 − 3(2) =	1	(2,1)
3	7 − 3(3) =	−2	(3,−2)

graph intersects x axis between x=2 & x=3

* y value changes from positive to negative between x = 2 and x = 3

Exercises

1. **GIFT CARDS** Enrique uses a gift card to buy coffee at a coffee shop. The initial value of the gift card is \$20. The function $n = 20 - 2.75c$ represents the amount of money still left on the gift card n after purchasing c cups of coffee. Find the zero and describe its meaning in the context of this situation.

$0 = 20 - 2.75c$

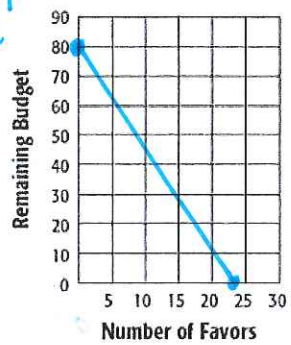
$-20 = -2.75c$

$\frac{-20}{-2.75} = \frac{-2.75c}{-2.75}$

$c = 7.27$

Zero is just over 7 so only 7 cups of coffee

2. **BABY SHOWER** Madison wants to buy favors for her sister's baby shower. The function $B = 80 - 3.22n$ represents her budget B left after n favors are purchased. Find the zero and describe its meaning in the context of this situation. Identify the domain and range and describe their significance.



$0 = 80 - 3.22n$

$\frac{3.22n}{3.22} = \frac{80}{3.22}$

$n = 24.84$

Domain: [0, 24]

Range: [0, 80]

Madison can only purchase 24 favors. not enough $ for 25 favors ∴ domain = [0, 24]