## Lesson 11: Zeros of Functions and Intercepts of Graphs

* Let’s see what happens when a function’s input or output is 0.

### 11.1: Which Output is 0?

Which of these functions have an output of 0 when the input is -4?

* $v(x)=4x$
* $w(x)=-4x$
* $y(x)=8+2x$
* $z(x)=2x−8$

### 11.2: Intercept Detective

Here are the definitions of some functions, followed by some possible inputs for the functions.

$a(x)=x−5$

$b(x)=x+5$

$c(x)=x−3$

$d(x)=x+1$

$f(x)=3x−6$

$g(x)=3x+6$

$h(x)=(x+5)(x+3)$

$m(x)=(x+1)(x−3)$

$n(x)=(3x−6)(x−5)$

Possible inputs: -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, and 5.

1. For each function, decide which input or inputs would give an output of 0.
2. Here are graphs of $b$, $f$, and $m$. Label each intercept with its coordinates, and be prepared to explain how you know.
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### 11.3: Making More Connections

1. For each function, identify the input that would give an output of 0.
	* $p(x)=x+10$
	* $q(x)=x−10$
	* $r(x)=8−x$
	* $s(x)=-8−x$
	* $t(x)=2x−8$
	* $u(x)=2x+8$
2. Match each graph to a function in the previous question. Be prepared to explain your matches.
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1. Label the intercepts on each graph with their coordinates.
2. For each function, identify the inputs that would give an output of 0.
	* $v(x)=(x+10)(2x−8)$
	* $w(x)=(2x+8)(10−x)$
3. Create three different functions whose output is 0 when the input is 7. At least one of your functions must be quadratic.



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