# 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.

$a(x) = x - 5$

$b(x) = x + 5$

$c(x) = x - 3$

$d(x) = x + 1$

$f(x) = 3x - 6$

$g(x) = 3x + 6$

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

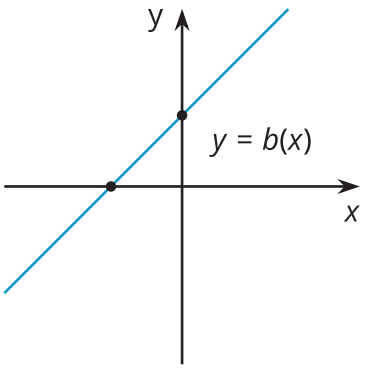
$m(x) = (x + 1)(x - 3)$

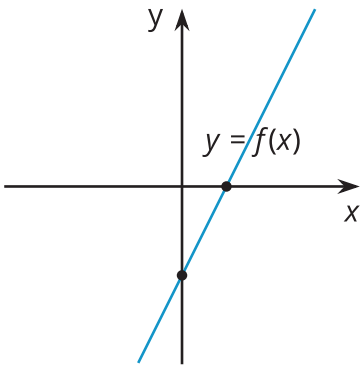
$n(x) = (3x - 6)(x - 5)$

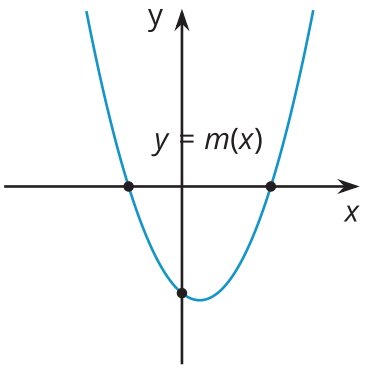
Possible inputs: -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, and 5.

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.



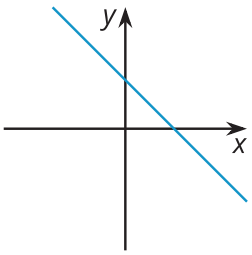



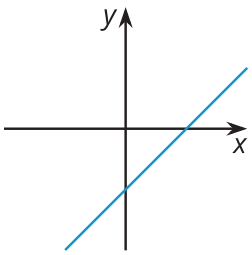
# 11.3 Making More Connections

1. For each function, find 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.

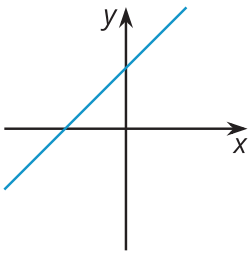
A



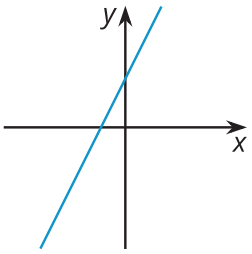

B



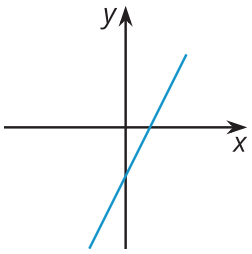

C



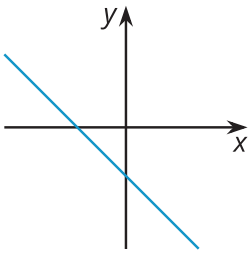

D




E




F




3. Label the intercepts on each graph with their coordinates.
4. For each function, find the inputs that would give an output of 0.
   - $v(x) = (x + 10)(2x - 8)$
   - $w(x) = (2x + 8)(10 - x)$
5. Create three different functions whose output is 0 when the input is 7. At least one of your functions must be quadratic.