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.

$a(x) = x - 5$

$b(x) = x + 5$

$c(x) = x - 3$

$d(x) = x + 1$

$f(x) = 3x - 6$

$g(x) = 3x + 6$

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

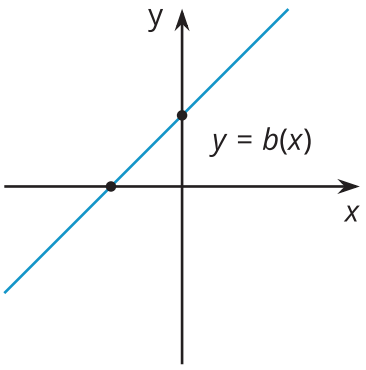
$m(x) = (x + 1)(x - 3)$

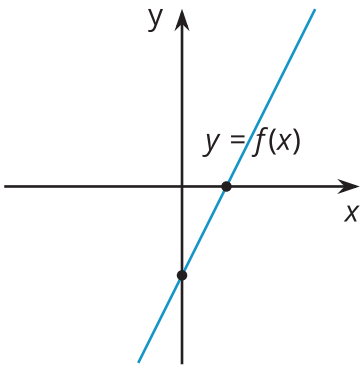
$n(x) = (3x - 6)(x - 5)$

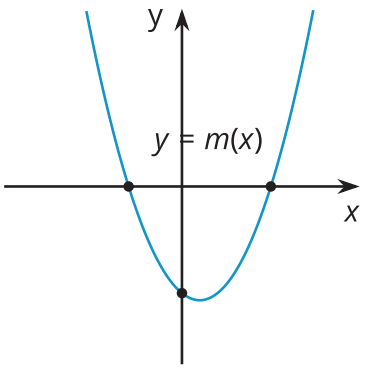
Possible inputs: -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, and 5.

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.



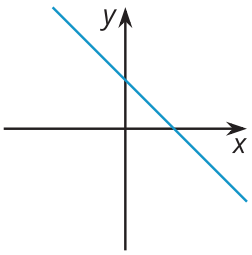




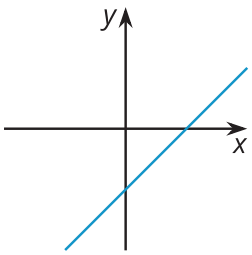
11.3 Making More Connections

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.

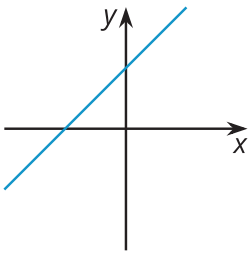
A



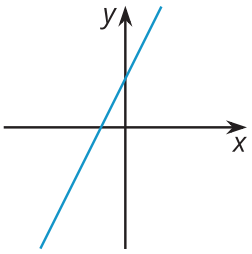
B



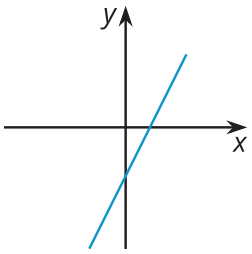
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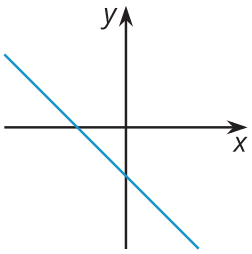
D



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.