

# Unit 6 Lesson 11: Zeros of Functions and Intercepts of Graphs

## 1 Which Output is 0? (Warm up)

### Student Task Statement

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

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

## 2 Intercept Detective

### Student Task Statement

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

$$a(x) = x - 5$$

$$g(x) = 3x + 6$$

$$b(x) = x + 5$$

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

$$c(x) = x - 3$$

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

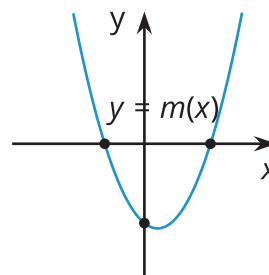
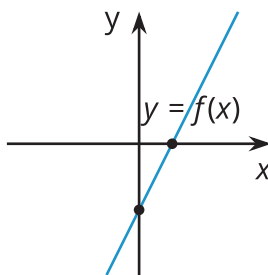
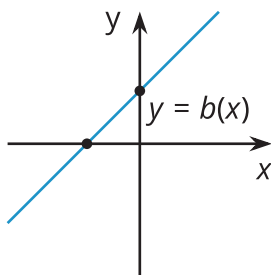
$$d(x) = x + 1$$

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

$$f(x) = 3x - 6$$

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.



### 3 Making More Connections

#### Student Task Statement

1. For each function, identify the input that would give an output of 0.

◦  $p(x) = x + 10$

◦  $q(x) = x - 10$

◦  $r(x) = 8 - x$

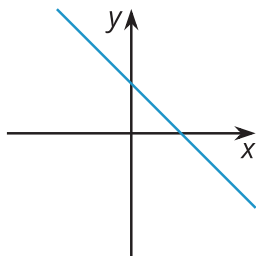
◦  $s(x) = -8 - x$

◦  $t(x) = 2x - 8$

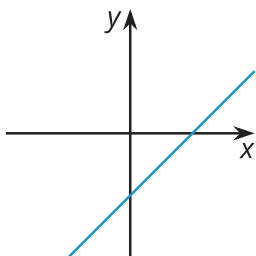
◦  $u(x) = 2x + 8$

2. Match each graph to a function in the previous question. Be prepared to explain your matches.

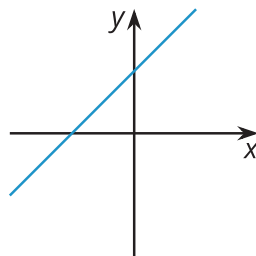
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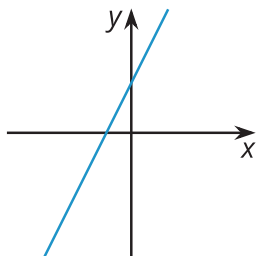
B



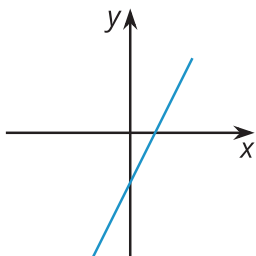
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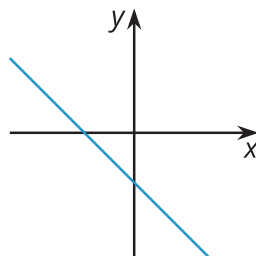
D



E



F



3. Label the intercepts on each graph with their coordinates.

4. For each function, identify the inputs that would give an output of 0.

◦  $v(x) = (x + 10)(2x - 8)$

◦  $w(x) = (2x + 8)(10 - x)$

5. Create three different functions whose output is 0 when the input is 7. At least one of your functions must be quadratic.