

Linear Factors and Zeros of Polynomials

Name: _____ Date: _____

Use Desmos to create the following graphs. For each function, sketch its graph and then state its zeros.

1. a) Graph $y = (x - 1)(x + 2)(x + 3)$ below. Note this function is the product of $y_1 = x - 1$, $y_2 = x + 2$, and $y_3 = x + 3$.
b) What are the zeros for this function?

2. a) Graph $y = -x(x + 1)(x - 4)$ below. This function is the product of $y_1 = -x$, $y_2 = x + 1$, and $y_3 = x - 4$.
b) What are the zeros for this function?

3. Graph $y = 3x(x - 5)(x + 1)(x + 2)$. Note this function is the product of $y_1 = 3x$, $y_2 = x - 5$, $y_3 = x + 1$, and $y_4 = x + 2$.
- b) What are the zeros for this function?

4. a) Graph $y = (x - 3)(x + 1)^2$. Note this function is the product of y_1 , y_2 , and y_3 where $y_1 = x - 3$ and $y_2 = y_3 = x + 1$.
- b) What are the zeros for this function?
- c) Note that one of the linear factors, $(x + 1)$, is squared. How does its resulting zero differ from the zero associated with the linear factor $(x - 3)$?

5. Compare the graph of $y = (x - 2)(x + 3)$ to each of the following graphs, one at a time. State how each graph is similar to the original and how each is different.

a. $y = (x - 2)^2(x + 3)$

b. $y = (x - 2)(x + 3)^2$

c. $y = (x - 2)^2(x + 3)^2$

d. $y = (x - 2)^2(x + 3)^3$