ALBERT

Name _____ Date _____

Zeros of Polynomials Worksheet

Algebra 2 · Common Core HSA-APR.B.3

> Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Practice

Builds the skill step by step.

1. What are the zeros of $f(x) = (x - 2)(x + 3)$? List them from least to greatest.

2. What are the zeros of $f(x) = x(x - 4)(x + 1)$? List them from least to greatest.

3. What is the y-intercept of $f(x) = (x - 1)(x + 2)(x - 3)$?

4. What are the zeros of $f(x) = x^2 - 9$? List them from least to greatest.

5. Where does the graph of $f(x) = (x - 1)(x - 4)$ cross the x-axis?

   A. at $x = -1$ and $x = -4$

   B. at $x = 4$ only

   C. at $y = 4$

   D. at $x = 1$ and $x = 4$

6. How many x-intercepts does $f(x) = (x - 2)^2(x + 1)$ have?

7. How does a graph behave at a zero from a squared factor, like $(x - 2)^2$?

   A. It touches the x-axis and turns around.

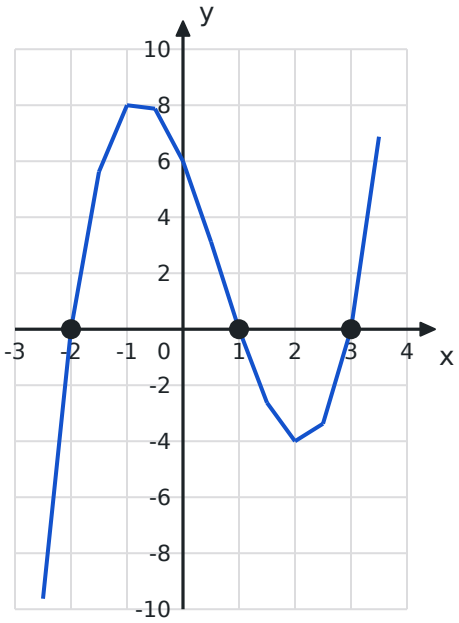
   B. It crosses the x-axis.

   C. It has a vertical asymptote.

   D. It never reaches the x-axis.

8. What are the zeros of $f(x) = x^3 - 4x$? List them from least to greatest.

9. The graph shows a polynomial function. What are its zeros? List them from least to greatest.



10. For $f(x) = (x - 1)(x - 4)$, is the graph above or below the x-axis at $x = 2$?

    A. above

    B. below

    C. on the axis

    D. it can't be told

ALBERT

Name _____ Date _____

Zeros of Polynomials Worksheet

Algebra 2 · Common Core HSA-APR.B.3

On Level

Grade-level practice.

1. What are the zeros of $f(x) = x^3 - x^2 - 6x$? List them from least to greatest.

2. What are the zeros of $f(x) = x^4 - 5x^2 + 4$? List them from least to greatest.

3. Describe how to sketch a rough graph of $f(x) = (x + 1)(x - 2)(x - 4)$.

4. What is the y-intercept of $f(x) = 2(x - 1)(x + 3)(x - 2)$?

5. How does the graph of $f(x) = (x - 3)^2(x + 1)$ behave at $x = 3$?

   A. It crosses the x-axis.

   B. It is undefined.

   C. It touches the x-axis and turns around.

   D. It has its y-intercept there.

6. $f(x) = (x + 1)(x - 2)(x - 5)$. What is its constant term?

7. At how many points does the graph of $f(x) = x(x - 1)^2(x + 3)$ cross (not just touch) the x-axis?

8. For which x is $f(x) = (x + 2)(x - 1)(x - 3)$ negative?

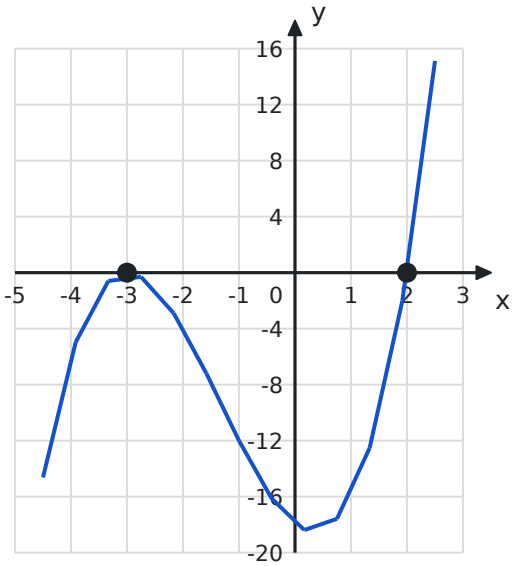
   A. x between −2 and 1, or x greater than 3

   B. x greater than 3 only

   C. x less than −2, or x between 1 and 3

   D. x between 1 and 3 only

9. Which function could match the graph?



   A. $f(x) = (x + 3)^2(x - 2)$

   B. $f(x) = (x - 3)^2(x + 2)$

   C. $f(x) = (x + 3)(x - 2)^2$

   D. $f(x) = (x + 3)(x - 2)$

10. What are the zeros of $f(x) = 2x^2 - x - 3$? List them from least to greatest.

ALBERT

Name _____ Date _____

Zeros of Polynomials Worksheet

Algebra 2 · Common Core HSA-APR.B.3

Challenge

Multi-step and word problems that stretch it.

1. What are the zeros of $f(x) = x^3 - 2x^2 - 9x + 18$? List them from least to greatest.

2. A cubic has zeros -2, 1 and 3 and passes through (0, 12). What is its leading coefficient?

3. What is the y-intercept of $f(x) = -(x - 1)(x + 2)(x - 4)$?

4. Describe the end behavior of $f(x) = -x^3 + 2x + 1$.

   A. It falls on the left and rises on the right.

   B. It rises on the left and falls on the right.

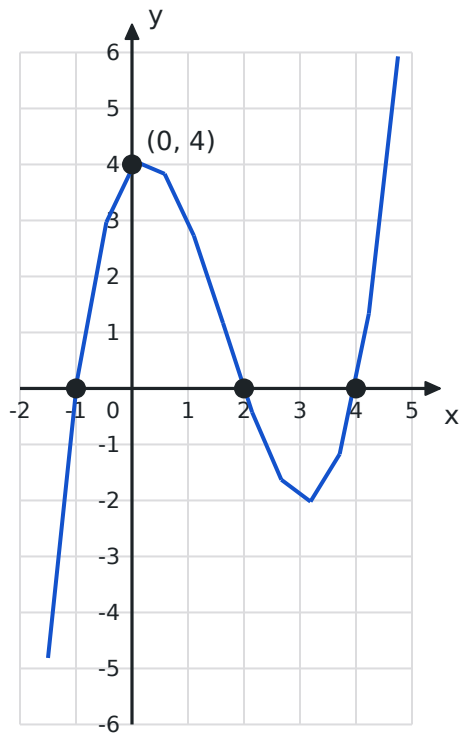
   C. It rises on both sides.

   D. It falls on both sides.

5. What are the zeros of $f(x) = x^4 - 13x^2 + 36$? List them from least to greatest.

6. At how many of its zeros does the graph of $p(x) = (x - 2)^3(x + 1)^2$ cross the x-axis?

7. The graph is $y = a(x + 1)(x - 2)(x - 4)$. Use the marked point $(0, 4)$ to find a.



8. Explain why the graph of $f(x) = (x - 2)^2(x + 1)$ touches the x-axis at $x = 2$ but crosses it at $x = -1$.

9. What is the sum of the zeros of $f(x) = (2x - 1)(x + 3)(x - 4)$?

10. What are the zeros of $f(x) = x^3 + 3x^2 - 4x - 12$? List them from least to greatest.