Name: **Date:**

Station Activities: Polynomial Functions

Station 1

Work with your group to answer the questions about each polynomial function.

1. $f(x) = 3x^5 + x^3 - 2x^2 + 6x + 7$
   a. How many zeros does this function have?
   b. Is 3 a zero of this function?
   c. What are all possible rational zeros?
   d. What is $f(-1)$?

2. $f(x) = 3x^4 + 2x + 1$
   a. How many zeros does this function have?
   b. What are all possible rational zeros?
   c. Is $\frac{1}{3}$ a zero of this function?
   d. Is $-\frac{1}{3}$ a zero of this function?
   e. Is –1 a zero of this function?

3. $g(x) = -2x^3 - 3x^2 + 5x + 10$
   a. How many zeros does this function have?
   b. What are all possible rational zeros?
   c. Is 1 a zero of this function?
   d. What is $g(5)$?

4. $g(x) = x^6 + 4x^5 + 2x^4 - 1$
   a. How many zeros does this function have?
   b. What are all possible rational zeros?
   c. What is $g(-1)$?
   d. What is $g(1)$?

© Walch Education

Name: **Date:**

Station 2

Work with your group to evaluate each polynomial function for the given value. Use a calculator to compute values.

1. $g(x) = -2x^3 + 2x^2 - 7x + 10$

   $g(2) =$

2. $f(x) = 4x^7 - 6x^5 + x^4 - 3x^3 - 4$

   $f(4) =$

3. $f(x) = -2x^8 - 7x^7 + x^6 - 2x^5 + x^4 + 5x^3 - x$

   $f(2) =$

4. $g(x) = x^4 - 5x + 2$

   $g(2) =$

5. $f(x) = 3x^6 - 2x^5 + x^4 - 2x^3 - 4x^2 + 5$

   $f(5) =$

6. $g(x) = 18x^5 - 10x^3 + 2x^2 - 6x - 3$

   $g(5) =$

7. $h(x) = 4x^4 - 3x^3 + 2x^2 - x - 10$

   $h(2) =$

© Walch Education

Name: **Date:**

Station 3

Work with your group to answer the questions about each polynomial function. Show all your work.

1. $g(x) = 4x^7 - 2x + 4$
   a. How many zeros does the function have?
   b. What is $g(1)$?
   c. What is $g(-1)$?

2. $f(x) = 2x^6 + 5x^5 - 3x^3 - x^2 - x + 1$
   a. How many zeros does the function have?
   b. What is $f(6)$?
   c. What is $f(1)$?

Factor the following polynomials. Use any method.

3. $x^4 - 4x^3 - 53x^2 + 60x + 108$

4. $x^5 - 2x^4 - 15x^3 + 20x^2 + 44x - 48$

5. If $\left(x + \sqrt{2}\right)$ is a factor of $3x^4 - 10x^3 - 14x^2 + 20x + 16$, what are the other factors?

6. If $3\sqrt{5}$ is a zero of $f(x) = 4x^4 - 7x^3 - 182x^2 + 315x + 90$, what are the other zeros?

7. If $(1 - 2i)$ is a zero of $f(x) = x^3 - 5x^2 - 11x - 15$, what are the other zeros?

8. If $(2 + 2i)$ is a zero of $f(x) = 2x^4 - 11x^3 + 26x^2 - 16x - 16$, what are the other zeros?

© Walch Education

Name: **Date:**

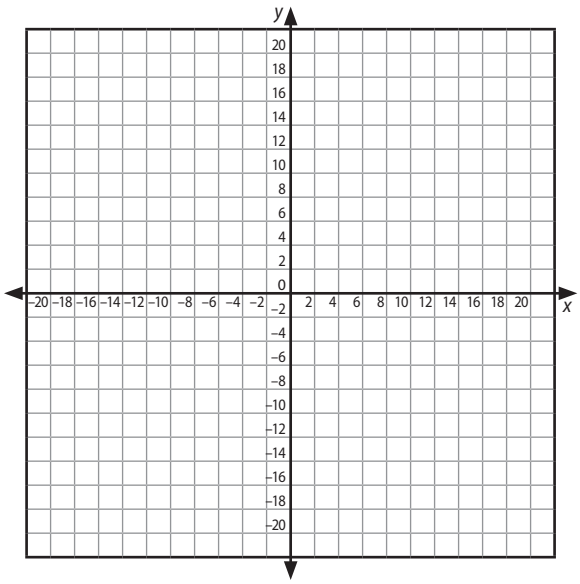
Station 4

Work with your group to answer the questions about each polynomial function. Then use a graphing calculator to find the graph of the function. Sketch the graphs.

1. $f(x) = x^3 + 3x^2 - 4x - 12$

   a. Factor the polynomial to find the zeros of the function.

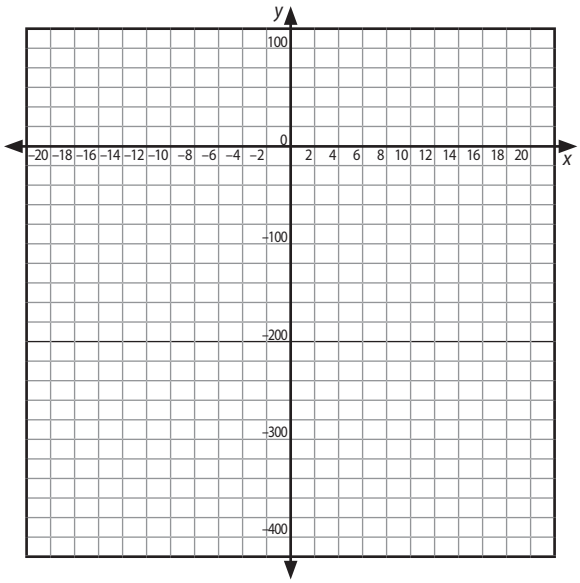
   b.



2. $f(x) = 3x^4 + 5x^3 - 49x^2 + 11x + 30$

   a. Factor the polynomial to find the zeros of the function.

   b.



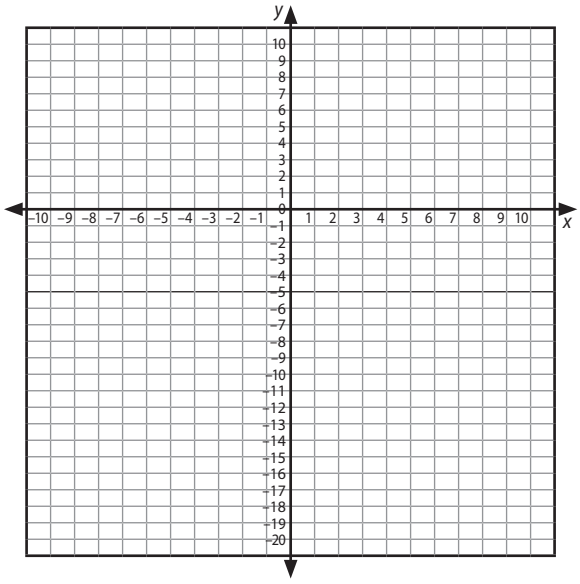
continued

© Walch Education

3. $f(x) = x^3 - 4x^2 + x - 4$

   a. Factor the polynomial to find the zeros of the function given that one of the zeros is $-i$.

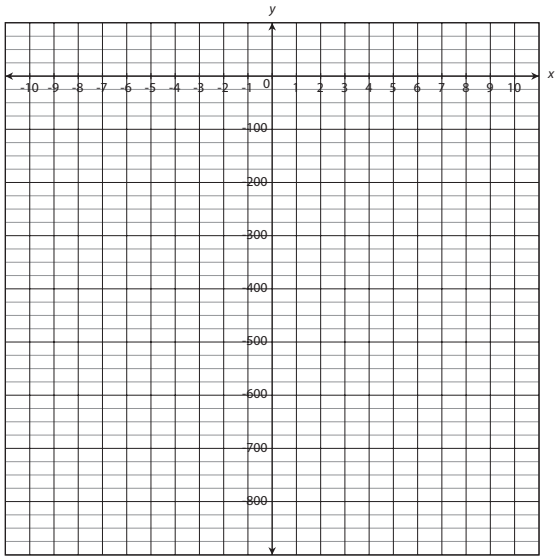
   b.



4. $f(x) = x^6 - 5x^5 + x^4 - 3x^2 + 3$

   a. State all possible rational zeros and find all rational zeros.

   b.



continued

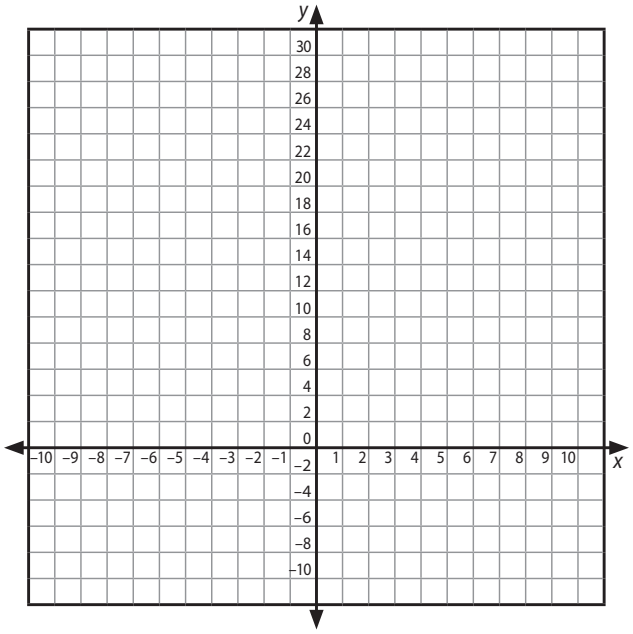
© Walch Education

Name: **Date:**

5. $f(x) = 10x^5 + 19x^3 - 10x^2 + x - 20$

   a. State all possible rational zeros and find all rational zeros.

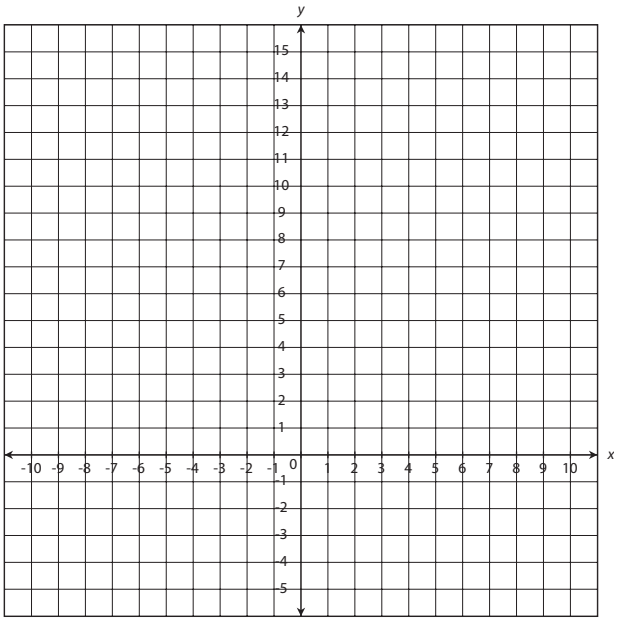
   b.



6. $f(x) = 9x^5 + 9x^4 + 37x^3 + 37x^2 + 4x + 4$

   a. State all possible rational zeros and find ALL zeros. (*Hint*: Use the quadratic formula after finding a rational zero.)

   b.



© Walch Education