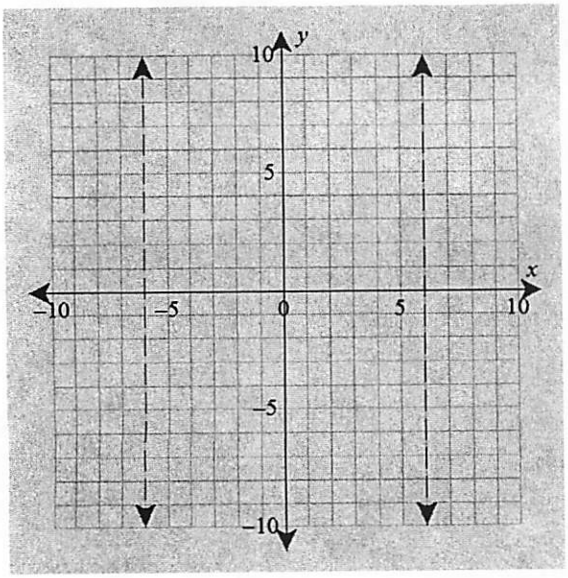
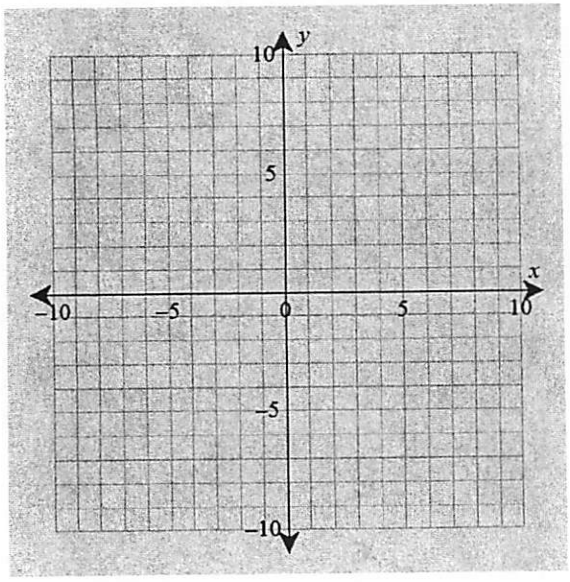
Step 2. Draw the horizontal asymptotes, if any, of this function on the graph provided. How many horizontal asymptotes does this function have?

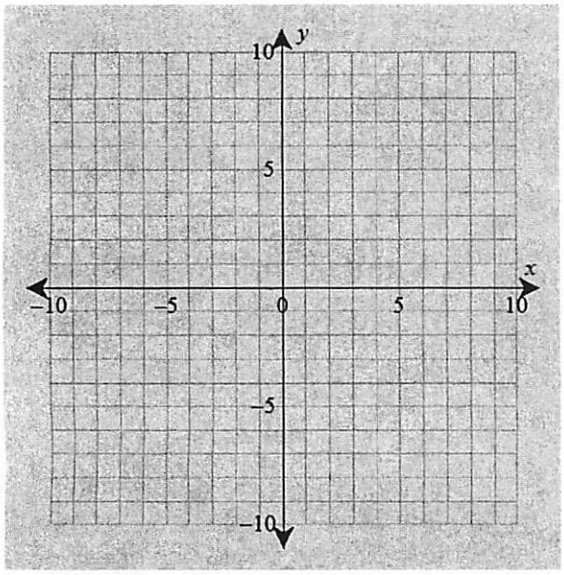


A) None B) One C) Two

Step 3. Sketch the complete graph of the function.



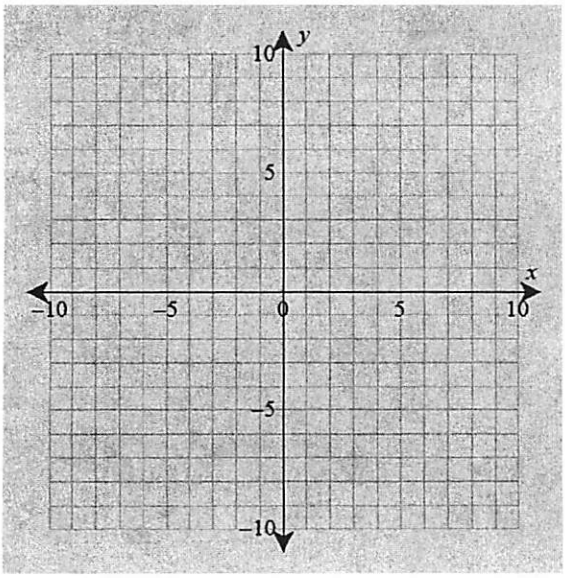
Step 3. Sketch the complete graph of the function.



29. Graph the following rational function.

$$f(x) = \frac{x-3}{x^2-36}$$

Step 1. Draw the vertical asymptotes, if any, of this function on the graph provided. How many vertical asymptotes does this function have?

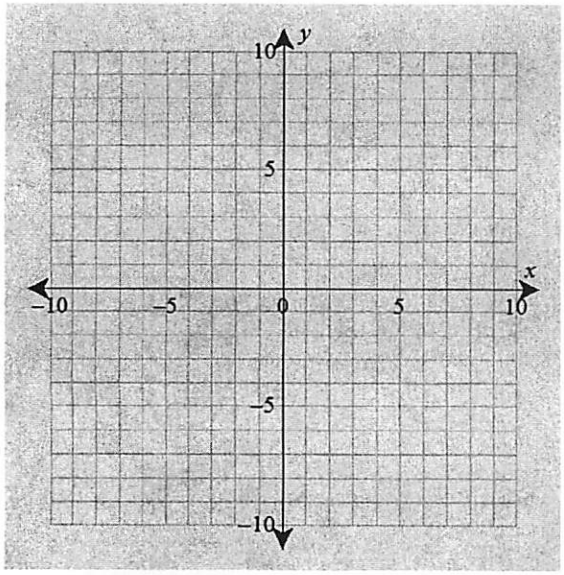


A) None B) One C) Two

28. Graph the following rational function.

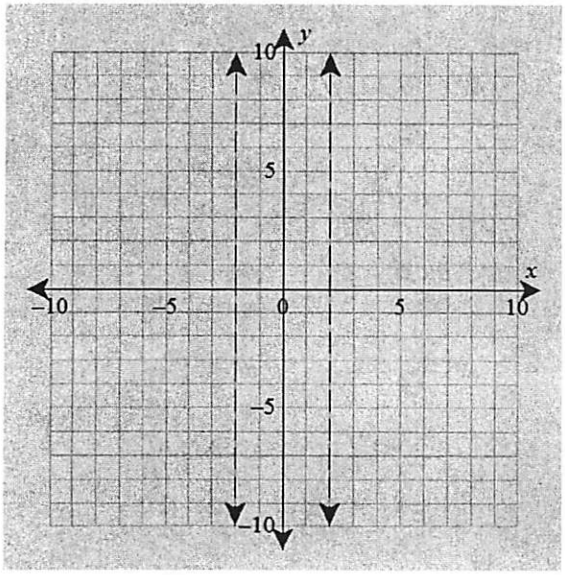
$$f(x) = \frac{4}{x^2 - 4}$$

Step 1. Draw the vertical asymptotes, if any, of this function on the graph provided. How many vertical asymptotes does this function have?



A) None B) One C) Two

Step 2. Draw the horizontal asymptotes, if any, of this function on the graph provided. How many horizontal asymptotes does this function have?



A) None B) One C) Two

Step 3. Find four ordered pairs on the graph of the rational function.

25. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

$$f(x) = \frac{-x^4 - x}{-x^4 + 3x^2 - 4}$$

26. Given the following rational function:

$$f(x) = \frac{-x^2 - 6x - 5}{-x + 9}$$

Step 1. Find equations for the vertical asymptotes, if any, for the rational function.

Step 2. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

Step 3. Find four ordered pairs on the graph of the rational function.

27. Given the following rational function:

$$f(x) = \frac{x^2 - 10}{x^3 - 125}$$

Step 1. Find equations for the vertical asymptotes, if any, for the rational function.

Step 2. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

20. Construct a polynomial function with the following properties: fifth degree, 4 is a zero of multiplicity 3, –3 is the only other zero, leading coefficient is 3.

21. Construct a polynomial function with the following properties: third degree, 3 is a zero of multiplicity 2, –4 is the only other zero, leading coefficient is 2.

22. Given the following rational function:

$$f(x) = \frac{2x - 9}{x + 9}$$

Step 1. Find equations for the vertical asymptotes, if any, for the rational function.

Step 2. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

Step 3. Find four ordered pairs on the graph of the rational function.

23. Given the following rational function:

$$f(x) = \frac{-16x^2 + 14x + 2}{-8x - 1}$$

Step 1. Find equations for the vertical asymptotes, if any, for the rational function.

Step 2. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

Step 3. Find four ordered pairs on the graph of the rational function.

24. Given the following rational function:

$$f(x) = \frac{-2x^2 - 4}{x^3 - 8}$$

Step 1. Find equations for the vertical asymptotes, if any, for the rational function.

Step 2. Find equations for the horizontal or oblique asymptotes, if any, for the rational function.

15. Consider the following polynomial function

$$f(x) = 3x^3 - 24x^2 + 63x - 54$$

Step 1. Use all available methods (e.g., the Rational Zero Theorem, Descartes' Rule of Signs, polynomial division, etc.) to factor the above polynomial function completely.

Step 2. Determine the degree and y-intercept (write the y-intercept as an ordered pair).

Step 3. Determine the x-intercept(s) at which f crosses the axis. If there are none, state "none".

Step 4. Determine the zero(s) of f at which it "flattens out". If there are none, state "none".

16. Consider the following polynomial function

$$f(x) = x^4 - 3x^3 - x^2 + 9x - 6$$

Step 1. Use all available methods (e.g., the Rational Zero Theorem, Descartes' Rule of Signs, polynomial division, etc.) to factor the above polynomial function completely.

Step 2. Determine the degree and y-intercept (write the y-intercept as an ordered pair).

Step 3. Determine the x-intercept(s) at which f crosses the axis. If there are none, state "none".

Step 4. Determine the zero(s) of f at which it "flattens out". If there are none, state "none".

17. Use all available methods (e.g., the Rational Zero Theorem, Descartes' Rule of Signs, polynomial division, etc.) to find the zeros of the following polynomial $f(x) = x^3 - 3x^2 + x + 5$. Use the Linear Factors Theorem to make sure you find the appropriate number of solutions, counting multiplicity.

18. Use all available methods (in particular, the Conjugate Roots Theorem, if applicable) to factor the following polynomial function completely, making use of the given zero, $f(x) = x^4 - 12x^3 + x^2 + 422x - 1392$; $5 - 2i$ is a zero.

19. Use all available methods (in particular, the Conjugate Roots Theorem, if applicable) to factor the following polynomial function completely, making use of the given zero, $f(x) = x^4 - 7x^3 + 22x^2 - 112x + 96$; $-4i$ is a zero.

11. Given the function below, does the Intermediate Value Theorem guarantee that a real zero exists between the indicated values?

$$g(x) = 6x^4 - 318x^3 + 258x^2 + 324x + 180 \; ; \; \frac{9}{2} \text{ and } \frac{11}{2}$$

Answer: A) YES B) NO

12. Given the equation below, does the Intermediate Value Theorem guarantee that a real zero exists between the indicated values?

$$24x^2 - 66x^3 + 66x = -3x^4 + 24 \; ; \; \frac{5}{6} \text{ and } \frac{11}{6}$$

Answer: A) YES B) NO

13. Consider the factored polynomial

$$f(x) = (x+4)^2 (x-2)^5 (x-1).$$

Step 1. Determine the degree and y-intercept (write the y-intercept as an ordered pair).

Step 2. Determine the x-intercept(s) at which f crosses the axis. If there are none, state "none".

Step 3. Determine the zero(s) of f at which it "flattens out". If there are none, state "none".

14. Consider the factored polynomial

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

Step 1. Determine the degree and y-intercept (write the y-intercept as an ordered pair).

Step 2. Determine the x-intercept(s) at which f crosses the axis. If there are none, state "none".

Step 3. Determine the zero(s) of f at which it "flattens out". If there are none, state "none".

4. Construct a polynomial function with the stated properties. Reduce all fractions to lowest terms.

Third-degree, with zeros of -4, -2, and 3, and a y-intercept of -8.

5. Construct a polynomial function with the stated properties. Reduce all fractions to lowest terms.

Fourth-degree and a single x-intercept of 3.

6. Construct a polynomial function with the stated properties. Reduce all fractions to lowest terms.

Third-degree, with zeros of $2 - i$, $2 + i$, and 3, and a leading coefficient of -2.

7. Given the following polynomial:

$$P(x) = x^3 - 2x^2 - 10x + 20$$

Step 1. Identify the potential rational zeros.

Step 2. Use polynomial division and the quadratic formula, if necessary, to identify the actual zeros.

8. Given the following polynomial:

$$P(x) = 2x^4 + 5x^3 - 5x - 2$$

Step 1. Identify the potential rational zeros.

Step 2. Use polynomial division and the quadratic formula, if necessary, to identify the actual zeros.

9. Using the Rational Zero Theorem, list all of the solutions of the following polynomial.

$$3 + 31x + 9x^3 + 37x^2 = 0$$

10. Given the function below, does the Intermediate Value Theorem guarantee that a real zero exists between the indicated values?

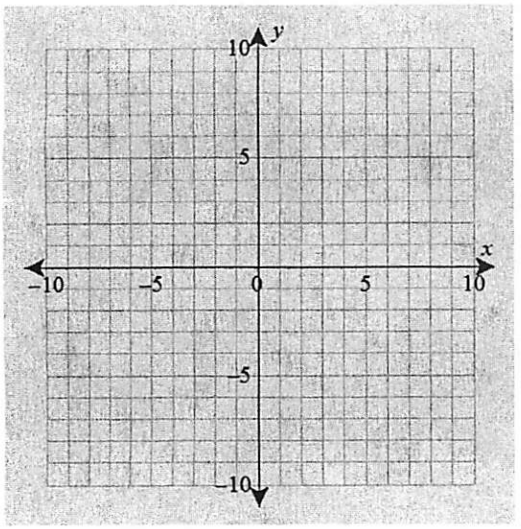
$$f(x) = 2x^4 + 22x^3 + 42x^2 - 162x + 90 \; ; \; \frac{1}{2} \text{ and } \frac{3}{2}$$

Answer: A) YES B) NO

3. Graph the following polynomial function.

$$g(x) = (x+2)(x+1)(x-1)(3-x)$$

Step 1. Plot the x-intercepts, if any, of this function on the graph. Indicate the number of x-intercepts.



A) none

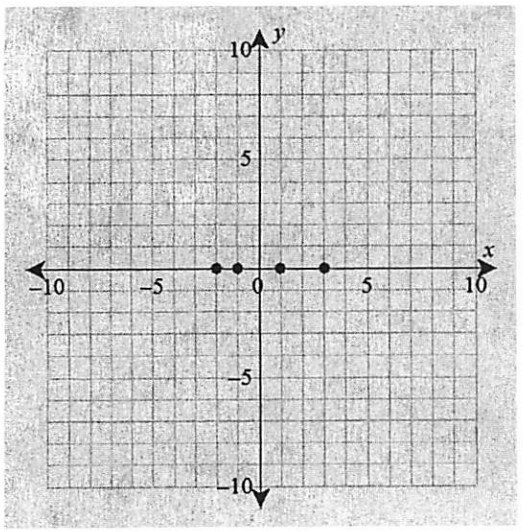
B) one

C) two

D) three

E) four

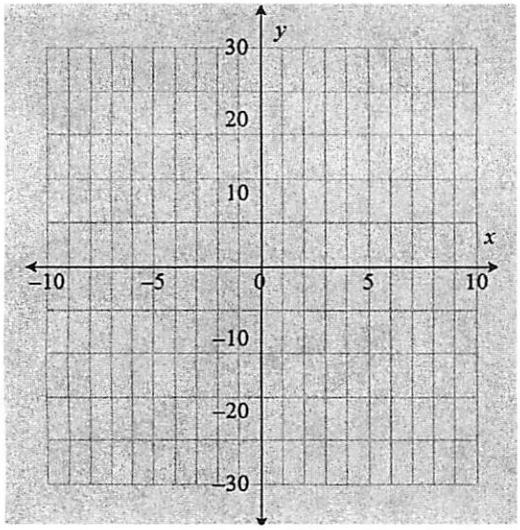
Step 2. Sketch the general shape of the graph in each region.



2. Graph the following polynomial function.

$$f(x) = (x - 1)(x + 1)(6 - x)$$

Step 1. Plot the x-intercepts, if any, of this function on the graph. Indicate the number of x-intercepts.



A) none

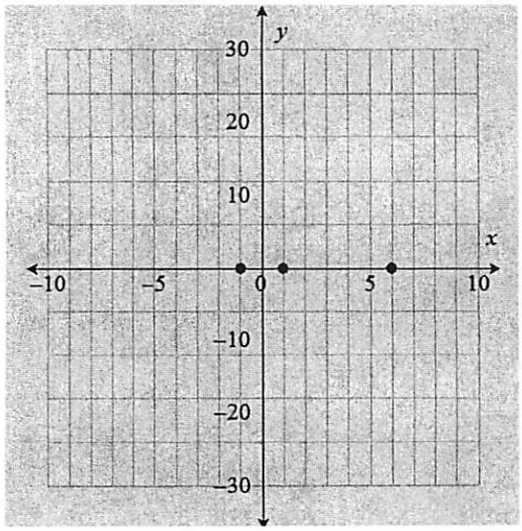
B) one

C) two

D) three

E) four

Step 2. Sketch the general shape of the graph in each region.

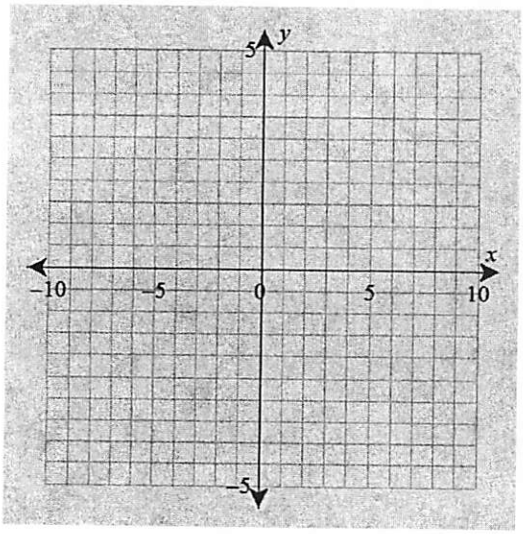


WebTest Name: Test 3 Study Guide(Test)

1. Graph the following polynomial function.

$$s(x) = x^3 + 6x^2 + 8x$$

Step 1. Plot the x-intercepts, if any, of this function on the graph. Indicate the number of x-intercepts.



A) none

B) one

C) two

D) three

E) four

Step 2. Sketch the general shape of the graph in each region.