

MATHEMATICS 260 SAMPLE TEST CHAPTER 3 --- STEWART'S PRECALCULUS
INSTRUCTOR: ANNE SISWANTO; TOTAL POINTS: 100; TIME: 70 MINUTES

DIRECTION: GRAPHING CALCULATORS ARE NOT ALLOWED. SHOW ALL WORKS ON THE TEST PAPER FOR FULL CREDIT. USE ALL STEPS OUTLINED IN CLASS TO GRAPH. THE SAMPLE TEST HAS MORE PROBLEMS THAN THE ACTUAL TEST.

Factor $f(x)$ into linear factors given that k is a zero of $f(x)$.

1) $f(x) = 8x^3 + 34x^2 + 27x - 9$; $k = \frac{1}{4}$

2) $f(x) = x^4 + 6x^3 + 1x^2 - 48x - 72$; $k = -3$
 (multiplicity 2)

For the polynomial, one zero is given. Find all others.

3) $P(x) = x^3 + 3x^2 - 8x + 10$; $1 + i$

Give all possible rational zeros for the following polynomial.

4) $P(x) = 2x^3 - 5x^2 + 7x - 7$

Find all rational zeros and factor $f(x)$.

5) $f(x) = x^3 + 2x^2 - 45x - 126$

6) $f(x) = 10x^3 + 13x^2 + 2x - 1$

Find a polynomial of degree 3 with real coefficients that satisfies the given conditions.

7) Zeros of 1, -2, 3 and $P(2) = 16$

Find a polynomial of lowest degree with only real coefficients and having the given zeros.

8) -4 (multiplicity 2) and $\sqrt{11}$

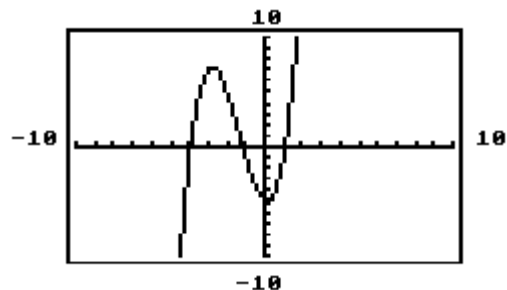
Use Descartes' Rule of Signs to determine the possible number of positive real zeros and the possible number of negative real zeros for the function.

9) $-8x^4 + 4x^3 - 2x^2 + 4x - 4 = 0$

10) $-4x^4 - 3x^3 - 8x^2 - 9x + 3 = 0$

Find the equation that the given graph represents.

11)



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

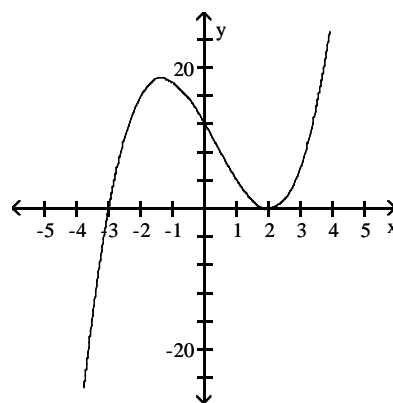
B) $P(x) = -x^3 + 4x^2 + x - 5$

C) $P(x) = x^3 + x^2 + x + 5$

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

Solve the problem.

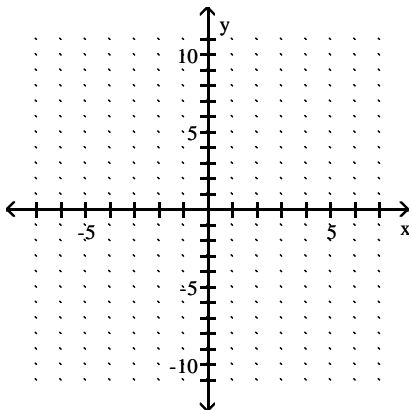
12) The graph of $f(x) = x^3 - x^2 - 8x + 12$ is shown below. Use the graph to factor $f(x)$.



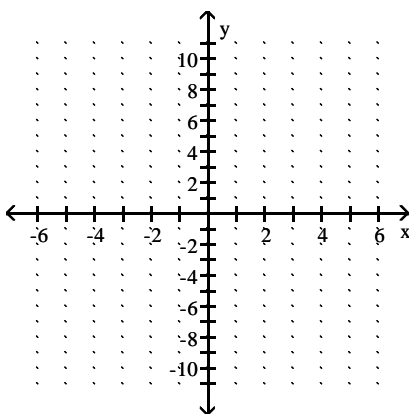
Graph the polynomial function.

- Find all the real zeros and state the multiplicities.
- List all the x-intercepts.
- List the y-intercept.
- Draw the end behavior.
- Graph

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



14) $f(x) = x^3 + 5x^2 + 7x + 3$



Use the intermediate value theorem to show that the polynomial has a real zero between the given values of a and b.

15) $a = -2$ and $b = -1$

$$f(x) = 4x^5 + 3x^3 + 2x^2 + 10$$

Solve the problem.

- 16) A rectangular piece of cardboard measuring 21 inches by 38 inches is to be made into a box with an open top by cutting equal size squares from each corner and folding up the sides. Let x represent the length of a side of each such square. What is the maximum volume of this box? If necessary, round to 2 decimal places.

Answer the question

- 17) How can the graph of $f(x) = \frac{6}{x + 11}$ be obtained from the graph of $y = \frac{1}{x}$?

- 18) How can the graph of $f(x) = \frac{1}{(x - 9)^2} + 7$ be obtained from the graph of $y = \frac{1}{x^2}$?

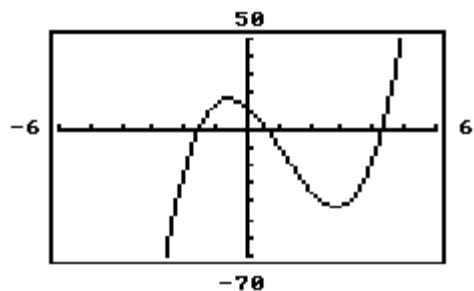
Give the equation of the oblique asymptote, if any.

19) $f(x) = \frac{x^2 + 2x - 7}{x - 5}$

20) $f(x) = \frac{x^2 - 5x + 4}{x + 3}$

Answer the question.

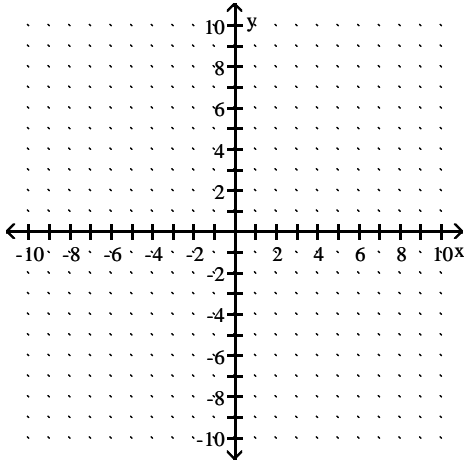
- 21) How many positive real zeros does this graph have?



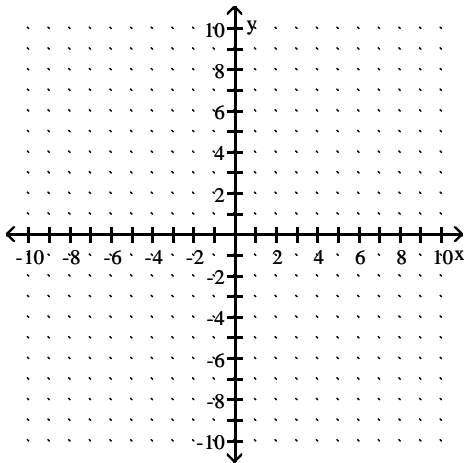
Sketch the graph of the rational function.

- List the vertical asymptote(s).
- List the horizontal or oblique asymptote.
- Find the x-intercept(s).
- Find the y-intercept.
- Determine if the graph will intersect its non-vertical asymptotes.
- Graph.

$$22) f(x) = \frac{x(x+4)}{(x-5)^2}$$

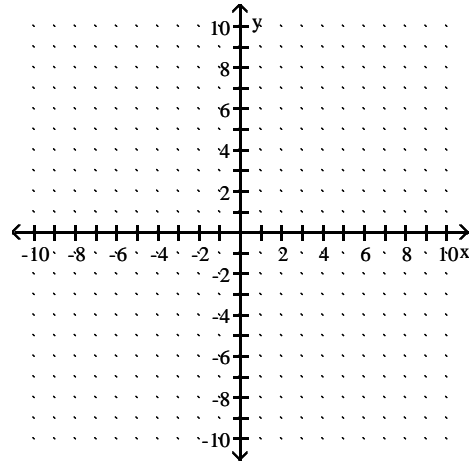


$$23) f(x) = \frac{x+2}{x^2-9}$$

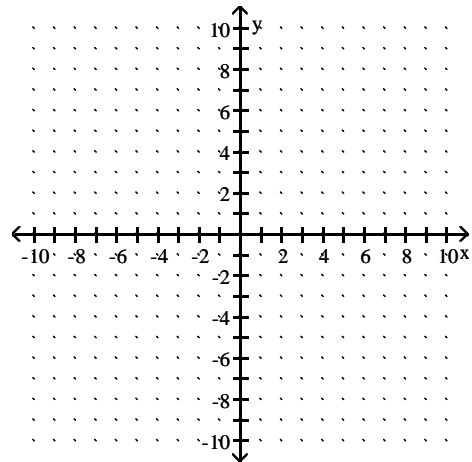


Graph the function.

$$24) f(x) = \frac{x^2 + 3x - 4}{2x^2 + 1}$$



$$25) f(x) = \frac{x^2 - x - 12}{x + 4}$$



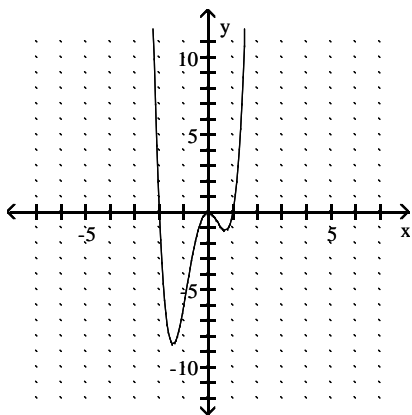
Solve the problem.

- The resistance of a wire varies directly as the length of the wire and inversely as the square of the diameter of the wire. A 20 foot length of wire with a diameter of .1 inch has a resistance of 3 ohms. What would the resistance be for a 42 foot length, with diameter .01 inch, of the same kind of wire?

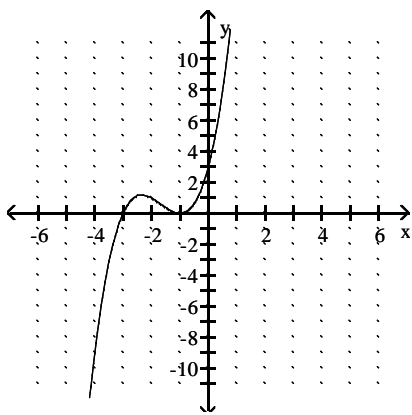
Answer Key

Testname: M260T3S_STEWART

- 1) $(4x - 1)(2x + 3)(x + 3)$
- 2) $f(x) = (x + 3)^2(x - \sqrt{8})(x + \sqrt{8})$
- 3) $1 - i, -5$
- 4) $\pm 1, \pm 7, \pm 1/2, \pm 7/2$
- 5) $-3, -6, 7; f(x) = (x + 3)(x + 6)(x - 7)$
- 6) $-\frac{1}{2}, \frac{1}{5}, -1; f(x) = (2x + 1)(5x - 1)(x + 1)$
- 7) $P(x) = -4x^3 + 8x^2 + 20x - 24$
- 8) $f(x) = x^4 + 8x^3 + 5x^2 - 88x - 176$
- 9) Positive $(4, 2, 0)$, negative (0)
- 10) Positive (1) , negative $(3, 1)$
- 11) D
- 12) $f(x) = (x + 3)(x - 2)^2$
- 13)



14)



15) $f(a) = -134$ and $f(b) = 5$

16) 1567.71

17) By making a horizontal shift of 11 units to the left and stretching vertically by a factor of 6

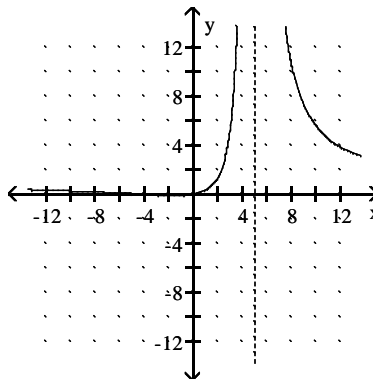
18) By making a horizontal shift of 9 units to the right and a vertical shift of 7 units up

19) $y = x + 7$

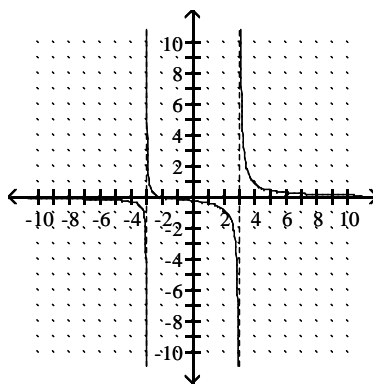
20) $y = x - 8$

21) 2

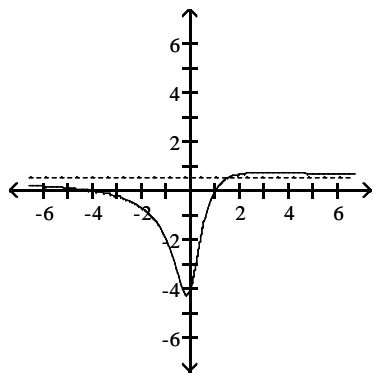
22)



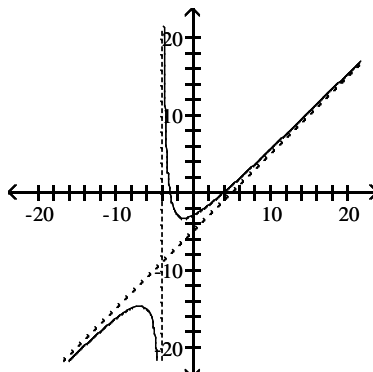
23)



24)



25)



26) 630 ohms