

MAC1105 College Algebra Sample Test 4 Name _____

Write out the complete word TRUE or FALSE

- 1) _____ The graph of a rational function could cross its vertical asymptote.
- 2) _____ Using End Behavior, $f(x) = -2x^5 + bx^4 + cx^3 + dx + 4$ falls on the right.
- 3) _____ The real zeros of a polynomial correspond to the x-intercepts of its graph.
- 4) _____ If $(x - 5)$ is a factor of $f(x)$, then $x = -5$ is a zero of the polynomial $f(x)$.
- 5) _____ $f(x) = x^4 + 1$ has exactly four x-intercepts.
- 6) Use the **Rational Zero Theorem** to list ALL of the **POSSIBLE Rational** zeros of the polynomial:

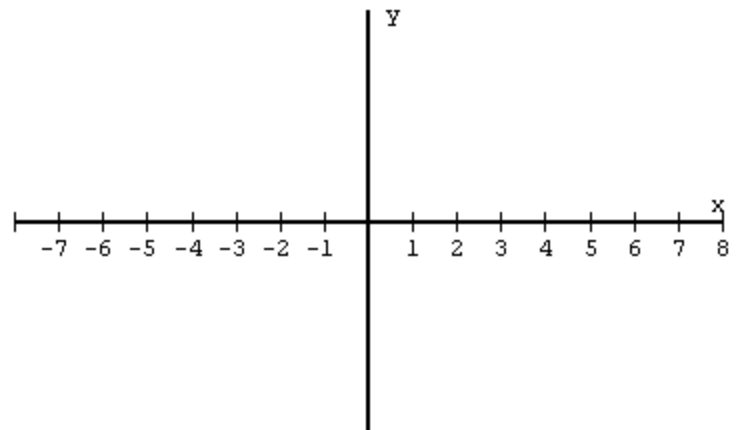
$$f(x) = 6x^4 + bx^3 - cx^2 + dx + 10$$

- 7) Divide, Using Synthetic Division:

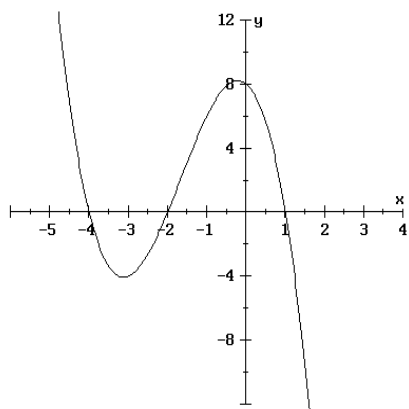
$$\frac{x^5 - 7x^4 + 30x^2 - 5}{x - 2}$$

- 8) Sketch a Graph of a polynomial with the given zeros and corresponding multiplicities.
(note: the graph is not unique)

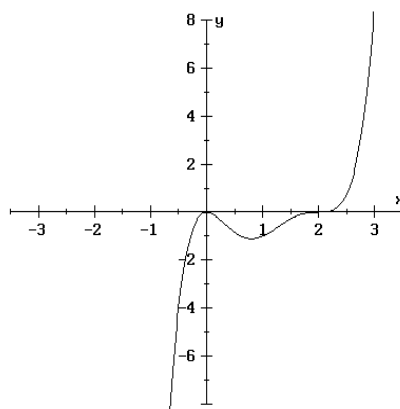
- $x = -5$, of multiplicity 3
- $x = -3$, of multiplicity 2
- $x = 1$, of multiplicity 1
- $x = 4$, of multiplicity 2



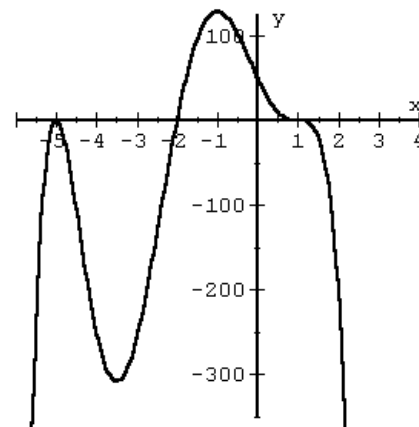
Find an equation of the following polynomials. Leave your answer in factored form; Do NOT multiply the factors! Use the **Leading Coefficient Test** and **Repeated Zeros (Multiplicity)**.



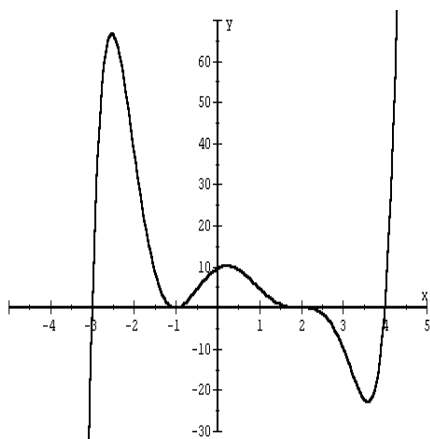
9) _____



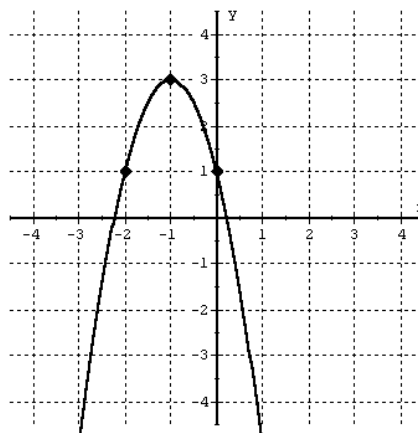
10) _____



11) _____



12) _____



13) _____

Hint: $f(x) = a(x - h)^2 + k$

Where is (x-values):

 $f(x)$ increasing? $f(x)$ decreasing?

14) Find the zeros of the following polynomial function and state the multiplicity of each zero.

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

15) Find a polynomial function of degree 3 with the given zeros. **Multiply the factors.**

Write your answer in the form: $f(x) = ax^3 + bx^2 + cx + d$

$$x = 2, \quad x = -1, \quad x = 3$$

- 16) Find a polynomial function (**factored form**) of degree 3 having the corresponding table of values to the right.

x	y
4	18
3	0
2	-4
1	0
0	6
-1	8
-2	0
-3	-24
-4	-70

Factor the following polynomial functions completely. Exact answers only. No Decimal approximations allowed. Show your work.

17) **FACTOR:** $f(x) = -x^6 - 2x^5 + 4x^4 + 6x^3 - 7x^2 - 4x + 4$

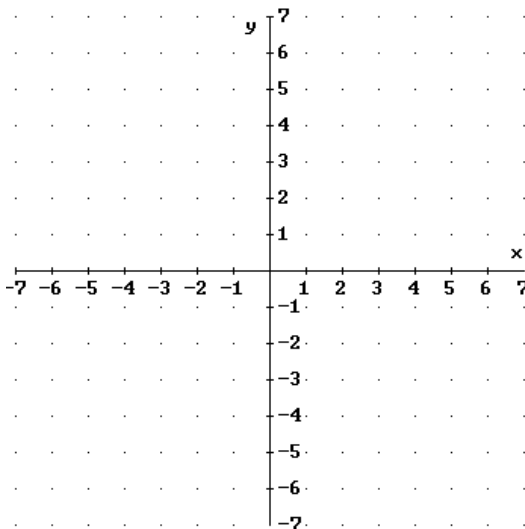
18) **FACTOR:** $f(x) = 8x^3 - 2x^2 - 29x + 14$

19) **FACTOR:** $f(x) = x^4 + 4x^3 - 12x^2 - 28x + 35$

A) Sketch the **graphs** of the following functions. (Be sure to show all asymptotes with dotted lines)

B) State the **equations** of all asymptotes.

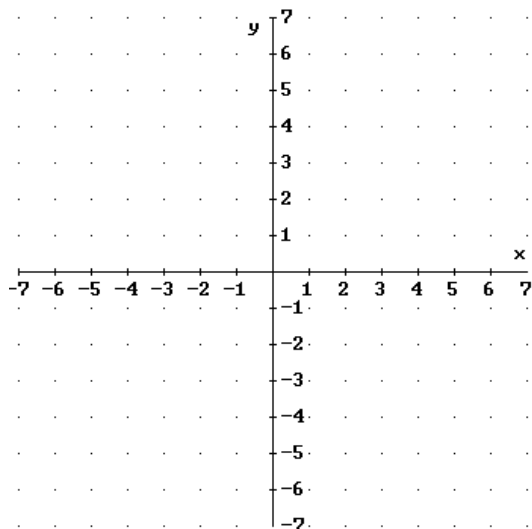
20) $f(x) = \frac{x - 1}{x^2 + x - 6}$



Equations of Asymptotes:
 Vertical Asymptote(s):
 Horizontal Asymptote:

Where is (x-values):
 $f(x) \geq 0$
 $f(x) \leq 0$

21) $f(x) = \frac{x^2 - 9}{x^2 - 4}$

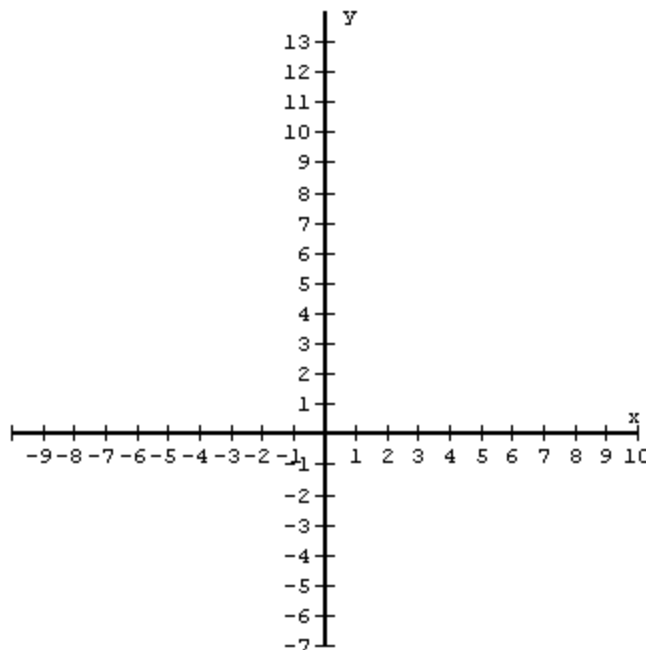


Equations of Asymptotes:
 Vertical Asymptote(s):
 Horizontal Asymptote:

Where is (x-values):
 $f(x) \geq 0$
 $f(x) \leq 0$

BONUS PROBLEM

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



Equations of Asymptotes:
 Vertical Asymptote(s):
 Slant Asymptote: