**Sketch the graph of f. Label the vertical and horizontal asymptotes.**

1. f(x) = 2. f(x) = 3. f(x) =

  

4. f(x) = 5. f(x) = 6. f(x) =

  

**Simplify f(x), and sketch the graph of f.**

7. f(x) = 8. f(x) = 9. f(x) =

  

**Find an equation of a rational function f that satisfies the given conditions.**

10. vertical asymptote: x=4 11. vertical asymptotes: x = -2, x = 0

horizontal asymptote: y = -1 horizontal asymptote: y = 0

x-intercept: 3 x-intercept: 2; f(3) = 1

12. vertical asymptotes: x = -3, x = 1

horizontal asymptote: y = 0

x-intercept: -1; f(0)= -2

hole at x = 2

13. (a) A student has finished 48 credit hours with a GPA of 2.75. How many additional credit hours y at 4.0 will raise the student's GPA to some desired value x? (Determine y as a function of x.)

(b) Create a table of values for x and y, starting with x=2.8 and using increments of 0.2.

(c) Graph the function in part (a) in the viewing rectangle [2,4] by [0,1000,100].

(d) What is the vertical asymptote of the graph in part (c)?

(e) Explain the practical significance of the value x = 4.