1. The equation of the x-axis is __________ and the equation of the y-axis is __________.

2. The equation of the unit circle is __________.

3. For the polynomial $-2x^4 + 5x^2 - 2x - 5$ the degree is _____, the leading coefficient is _____ and the constant is _____.

4. A polynomial with degree 5 has at most _____ zeros.

5. If $2 + \sqrt{7}$ is a root of a polynomial with integer coefficients, then so is __________.

6. The expression $|x - 5| \geq 7$ means the distance between ____ and ____ is greater than or equal to _____. Therefore the solution will contain _____ interval(s).

7. An even function is symmetric with respect to __________, whereas an odd function is symmetric with respect to ________________.

8. An example of an even function is ________________, and an example of an odd function is ________________.

9. A function is one to one if ____________________________________________

10. Any line defines a function except a _________________ line.

11. The slope of a horizontal line is ______________, whereas the slope of a vertical line is ________________.

12. The graph of $y = x^2$ looks like 

   \[ \begin{array}{c}
   \text{Vertical Axis} \\
   \text{Horizontal Axis}
   \end{array} \]
13. The graph of \( y = (x - 1)^2 + 2 \) looks like

Problems 14 through 23 are worth 4 points each.

14. Find the distance between the points (2,5) and (-4,3), and find the midpoint.

Distance _________ Midpoint ( , )

15. Simplify the compound fraction:

\[
\frac{1}{x - 2}
\]

16. Factor the difference of two cubes: \( x^3 - 8y^3 \)
17. Rationalize the denominator: \( \frac{7}{2 - \sqrt{5}} \)

18. Simplify, using positive exponents only: \( \frac{(2y^2)^{-1}3x^{-2}}{xy^{-3}} \)

19. Write the equation for the circle with center (0,0) and radius 2.

20. Find the domain of the function \( f(x) = \frac{x}{2x - 2} \)

21. Solve the equation \( (x + 5)^2 = 9 \)
22. Solve the equation \( x^2 - 2x - 6 = 0 \)

23. Solve the inequality \( |x - 5| \geq 2 \). Write your answer in interval notation.

Problems 24 through 34 are worth 5 points each.

24. Find the inverse of the function \( f(x) = 2x - 3 \).

25. Find the equation of the line through the points (1,3) and (6,-2). Write your answer in the slope intercept form, i.e. in the form \( y = mx + b \)
26. Write the equation for the line with slope 2 through the point (1,5)

For 27 and 28, let \( f(x) = x^2 \), \( g(x) = x + 1 \)

27. Find \( \frac{g}{f}(3) \)

28. Find \( f \circ g \) and \( g \circ f \)

29. Find the vertex and intercepts for the graph of \( y = x^2 - 2x - 3 \)

30. Use synthetic division to show that \(-1\) is a root of \( f(x) = 2x^3 + 3x^2 - 5x - 6 \), and factor \( f(x) \) into a linear factor times a quadratic.
31. Find the other two roots for the function in problem 30.

32. Write the function in factored completely as a product of three linear factors.

33. Find the horizontal and vertical asymptotes if any for the functions 
\[ f(x) = \frac{2x}{1-2x} \text{ and } g(x) = \frac{x}{1-x^2} \]

34. Write the partial fraction decomposition for the rational expression 
\[ \frac{x-8}{(x+1)(x-2)} \]