Precalculus/Trig 1.1-1.4 Test Review

Determine algebraically whether the function is even, odd, or neither even nor odd.

1) $f(x) = -8x^4 + 4x + 7$

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

Perform the requested operation. Find the domain of each. Write in interval notation.

3) $f(x) = 5x + 6, g(x) = 5x^2$

Find $(f + g)(x)$.

4) $f(x) = \sqrt{x} \; ; \; g(x) = 2x - 5$

Find f/g.

Determine if the function is bounded above, bounded below, bounded on its domain, or unbounded on its domain.

5) $y = 5^{-x} + 2$

Perform the requested operation or operations and find their domain in interval notation.

6) $f(x) = f(x) = \dfrac{1}{x - 9} \; ; g(x) = \sqrt{x}$ Find $g(f(x))$.

7) $f(x) = x^2 + 2; g(x) = \sqrt{x - 5}$ Find $f(g(x))$.

Identify which of the twelve basic functions listed below fit the description given.

$y = x, y = x^2, y = x^3, y = |x|, y = \dfrac{1}{x}, y = e, y = \sqrt{x}, y = \ln x, y = \sin x, y = \cos x, y = \text{int}(x), y = \dfrac{1}{1 + e^{-x}}$

8) The one function that is decreasing from $(0, \infty)$

Graph the function on your calculator in order to answer the following questions:
On what intervals is the function increasing? decreasing?
Is the function odd, even, or neither?
Give the function's extrema, if any.
Find the horizontal asymptotes, if any.
How does the graph relate to a graph of one of the twelve basic functions?

9) $f(x) = e^{-x}$

Graph the function and determine if it has a point of discontinuity at $x = 0$. If there is a discontinuity, tell whether it is removable or non-removable.
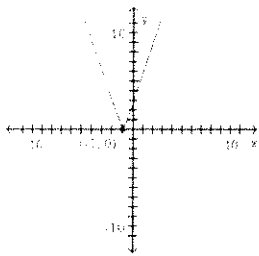
10) $f(x) = \dfrac{|x + 4|}{x}$

11) $f(x) = \dfrac{x^3 + 2}{x}$

Find the domain of the given function algebraically. Show work.

12) $f(x) = \dfrac{x}{x^2 + 3x}$

Determine the intervals on which the function is increasing, decreasing, and constant.

13)

Find ALL of the asymptote(s) of the given function.
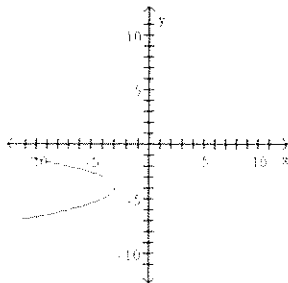
14) $g(x) = \dfrac{x - 5}{(x - 9)(x + 5)}$

15) $h(x) = \dfrac{(x - 3)(x + 3)}{x^2 - 1}$

Solve the equation algebraically. Confirm graphically.

16) $(x - 12)^2 = 64$

Determine whether the graph is the graph of a function. Explain why.

17)

Solve the problem.

18) Determine graphically the local maximum and local minimum
of $f(x) = -5x^{2/3} - 1$.

Graph the piecewise-defined function.

19) $g(x) = \begin{cases} x^2 & \text{if } x \le 0 \\ e^x & \text{if } x > 0 \end{cases}$

Add this to your studyguide:

20. Graph the following piecewise function on graph paper.
Plot 3 points per piece. Then find domain and range.

$$f(x) = \begin{cases} -2 & \text{if } x < -1 \\ -x^2 + 1 & \text{if } -1 \le x < 1 \\ 2x & \text{if } x \ge 1 \end{cases}$$