Math 150 Exam 2 Review Problem Set

Note: This exam review does not cover every topic that could be covered on your exam. It is more heavily weighted on Sections 4.5 and 5.1-5.4. Please take a look at the previous Week in Reviews for more practice problems on other sections.

1. Find the terminal points determined by the following values of t.
   (a) $t = \frac{23\pi}{6}$
   (b) $t = \frac{5\pi}{4}$
2. Determine the sign of the expression $\sec t \csc t \tan^2 t$ in Quadrant IV.
3. Evaluate the following.
   (a) $\csc \frac{10\pi}{3}$
   (b) $\cot \frac{5\pi}{6}$
4. Find all other trig values of t if $\csc t = -5$ and the terminal point of t is in Quadrant III.
5. Express $\sin t$ in terms of $\cot t$ if the terminal point of t is in Quadrant IV.
6. Find the amplitude, period, and phase shift, and sketch a graph of the function $f(x) = -3\sin(2x - \frac{2\pi}{3})$.
7. Find the period and sketch graphs for the following functions.
   (a) $f(x) = \tan(\frac{1}{4}(x + \pi))$
   (b) $f(x) = 2\sec(x - \pi) + 1$
8. Suppose the amount of a radioactive substance in grams after t years is modeled by the equation $m(t) = 25e^{-0.05t}$.
   (a) What is the half-life of this substance?
   (b) At what time t will there be 5 grams remaining?
9. Solve the following equations.
   (a) $1 + 2^{3x-4} = 6$
   (b) $\log_{16} x + 2\log_{16}(x - 2) - \log_{16}(3x - 4) = \frac{1}{4}$
10. Evaluate $\frac{\log_4 8}{\log_4 32} \cdot (\log_4 \frac{3}{8} + \log_4 \frac{1}{6})$.
11. Find the domain and range of the following functions and describe any asymptotes.
    (a) $f(x) = -e^{x+3} - 2$
    (b) $f(x) = -\ln(x - 2) + 1$
12. Find the domain of the function $f(x) = \log_9(-x^2 - 2x + 24)$.
13. Graph the polynomial $P(x) = 2(x - 1)^2(x + 2)(x - 3)$.

14. Graph the rational function $r(x) = \dfrac{3x^2 - 27}{x^2 + 3x - 4}$.

15. Find ALL zeros, both real and nonreal, for the following polynomials. Then, factor the polynomial completely.

    (a) $P(x) = x^3 + 5x^2 - 12x - 60$

    (b) $P(x) = x^4 - x^3 - 6x^2 + 15x - 9$

16. Simplify the expression: $\dfrac{(2 + \sqrt{-4})(-1 - 3i)}{-2 + 5i}$.

17. How many positive or negative real zeros are possible for the polynomial $P(x) = 5x^5 - 4x^4 - 2x^3 + 6x^2 - 8x + 17$.

18. Find the quotient and remainder for $\dfrac{x^4 - 4x^3 - 5x^2 - 4}{2x^2 + 4x - 6}$.