AB Calculus
Test # 2 (1–20) Review

11. A) When f(3) does not equal $\lim_{x\to 3} f(x)$ what does this tell you about the graph of f(x)?
    B) Evaluate: $\lim_{x\to 2^+} [x]$
    C) Evaluate: $\lim_{x\to 2^-} [x]$

12. A) Write the sine, cosine, and tangent of a sum identities.
    B) From the above identities develop the double angle identities.
    C) Find the **exact** value of sin 15° using identities.
    D) From the above identities develop the reduction identities.
    E) From the above identities develop the half angle identities.
    F) On the same set of axes graph $y = e^x$, $y = e^{-x}$, and $y = -e^x$.
    G) On the same set of axes graph $y = \ln x$, $y = \ln(-x)$, and $y = -\ln x$.

13. Solve each of the following equations.
    A) $\sec x = \frac{2\sqrt{3}}{3}, \quad 0 \le x < 2\pi$
    B) $2\cos^2 x + \sin x - 1 = 0, \quad 0 \le x < 2\pi$

14. A) Evaluate: $\lim_{x\to -2} \frac{x^3 + 8}{x + 2}$
    B) Evaluate: $\lim_{x\to 2} [x]$
    C) Use a graphing calculator as necessary to evaluate $\lim_{x\to 0} \frac{\sin x}{e^x - 1}$.
    D) Find the equation of all points in a plane that are equidistant from (–2, –2) and (4, 3).
    E) Find the equation of the circle whose center is the point (1, –2) and that passes through the point (–2, 3).

15. A) Graph $f(x) = -x(x + 3)(-x + 2)$.
    B) Use interval notation to describe where f(x) is positive.
    C) Use interval notation to estimate where f(x) is decreasing.
    D) Estimate the x values where f(x) has horizontal tangents.
    E) As accurately as possible graph y = sin x. Draw a line tangent to the graph at x = π/6. Estimate the slope of the tangent line.

16. A) Solve: $\log_4(x + 3) + \log_4 x = 1$.
    B) Solve $7^{2x+3} = 8^{3x-4}$.

17. Evaluate each of the following limits.

A) $\lim_{x\to\infty} \frac{3x^2 - 2x}{3x^2 + 4x^3}$

B) $\lim_{x\to\infty} \frac{3x^2 + 4x^4}{5x^3 - 6x}$

C) $\lim_{x\to\infty} \frac{3 - 4x^2}{5x^2 + 3x - 2}$

D) $\lim_{x\to 2} \frac{1}{x - 2}$

E) $\lim_{x\to -3} \frac{1}{(x+3)^2}$

18. Let $f(x) = \sqrt{x}$ and $g(x) = 2x + 3$.

A) Find $f \circ g$.

B) Find the domain of $f \circ g$.

C) Find the range of $f \circ g$.

19. A) **Use the definition of derivative** to find $\frac{d}{dx}\left(2x^2 - 3x + 4\right)$.

B) Find the slope of $y = \sin x$ at $x = 0.5$.

20. A) Evaluate: $\log_7 36$

B) Evaluate: $3\log_4 8 + 5\log_{12} 7$

C) Write the two equations that must be used to graph $x^2 + y^2 = 9$ on the graphing calculator. Graph these two equations to verify your solutions.

D) Write the two equations that must be used to graph $\frac{x^2}{5} + \frac{y^2}{10} = 1$ on the graphing calculator. Graph these two equations to verify your solutions.