PC 12 LG 9 Review Sheet (Midterm)

Lg 1 & 2

1. Given f(x) = $x^2 - 4$ sketch the graph of each of the following:
   a. $y = f(-x)$ b. $y = -f(x)$
   c. $y + 3 = f(x - 2)$ d. $y = \frac{1}{2} f(\frac{1}{2}x)$
2. If $f(x) = 2x^2 + 3$, find the inverse of this function.
3. Find the domain and range of $y = -2\sqrt{x-4} + 5$
4. If (a, b) is a point on $y = f(x)$, find a point on $y - 5 = -3f(4x - 8)$
5. If the domain of $y = f(x)$ is x ≥ 6 and the range is -2 ≤ y ≤ 8, find the domain and range of $y = 2f(3x - 12) + 5$

Lg 3 & 4

6. The number of bacteria in a culture doubles every 5 minutes. If the initial population is 1200, write an equation that will give the number of bacteria, N(t) at any time, t.
7. Solve for x: $27^{2x+5} = 81^{3x-1}$
8. $\left(\frac{1}{8}\right)^{2x+3} = (4)^{5x-1}$
9. Solve $\log_9 3\sqrt{3} = x$ for x.
10. Solve $\log_2 x + \log_2(x-2) = 3$ for x.
11. Write as a single logarithm:
    $\log A - \frac{1}{2}\log B - \log C$
12. For $g(x) = 2(3)^{x+3} - 4$, find the following:
    a. domain b. range
    c. eqs. of asymptotes d. any x-intercepts
    e. any y-intercepts
13. For , $y = 2\log_5(x+5) = 6$ find the following:
    a. domain b. range
    c. eqs. of asymptotes d. any x-intercepts
    e. any y-intercepts
14. Find x to the nearest hundredth: $128 = 6^x$
15. The intensity of light shining through water is reduced by 6% for each meter of water. What percent of light is remaining at a depth of 10 meters?

Lg 5 & 6

16. Convert $\frac{3\pi}{5}$ radians to degrees.
17. Find an expression for all of the angles co-terminal with $\frac{-5\pi}{4}$.
18. If the terminal arm of $\angle A$ in standard position contains the point (-4, 6) find tanA, secA and cscA exactly.
19. Evaluate $\cot\frac{5\pi}{7}$.
20. Give the exact value of $\sec\frac{-7\pi}{6}$.
21. Give the exact value of $\sin\frac{-3\pi}{2} - \cos\frac{-5\pi}{6}$.
22. Give the exact value of:
    $-4\csc\left(\frac{-5\pi}{6}\right) - 2\sec\frac{3\pi}{4} + 5\tan(-3\pi)$
23. Give the exact value of:
    2Sin 270° – 5Cos 180° + 3Cot 90°
24. If Sin A = $\frac{2}{5}$, Cos A > 0, find Tan A exactly:
25. If Tan B = $\frac{1}{5}$, $\frac{\pi}{2} \le B < \frac{3\pi}{2}$. find all values of Sec A exactly.
26. A circle has a radius of 20 cm. Determine the arc length subtended by a central angle of $\frac{7\pi}{6}$.

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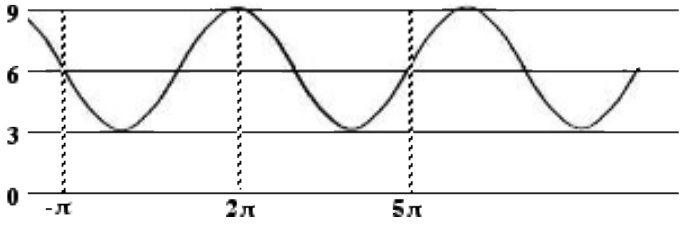
Lg 7 & 8

27. Determine the amplitude, period, phase shift,, vertical displacement, domain and range of:
$f(x) = -2\cos\left(4x + \frac{\pi}{2}\right) - 8$

28. Determine the period and phase shift for:
$y = 3\tan(6x - 5)$

29. A sinusoidal curve has a maximum at $(2,8)$ and the nearest minimum to the right is at $(10,-2)$. Find a sine and a cosine function for this curve.

30. Find a sine and a cosine function for the curve sketched below.



31. If the period of the function y = SinBx + D is $\frac{8\pi}{3}$, find B.

32. Graph y = 2Sin3(A – $\frac{\pi}{4}$) – 4 for 2 cycles.

33. The depth of water in a harbour can be approximated by the equation:
$d(t) = -3\cos 0.16\pi x + 12$, where d(t) is the depth, in metres, and t is the time in hours after low tide. For how many hours per cycle is the water in the harbour less than 11m deep?

Graphing Calculator

34. Graph the function y = $4\log_2$ x – 6 and find x when y = -3

35. Find the number of zeroes when:
$y = 10\sin x - x$

Don't forget to do the appropriate Deja Revu questions to review previous LG material.

Answer Key

1. a. $y = x^2 - 4$ b. $y = -x^2 + 4$
c. $y = x^2 - 4x - 3$ d. $y = \frac{1}{8}x^2 - 2$
2. If $f^{-1}(x) = \pm\sqrt{\frac{x-3}{2}}$
3. Domain: x ≥ 4, Range: y ≤ 5
4. $\left(\frac{1}{4}a + 2, -3b + 5\right)$ 5. x ≥ 2, 1 ≤ y ≤ 21

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6. N(t) = $1200(2)^{t/5}$ 7. x = $\frac{19}{6}$
8. x = $\frac{-7}{16}$ 9. x = $\frac{3}{4}$
10. 4, reject -2 11. $\log\frac{A}{\sqrt{BC}}$
12. domain: all real #'s, range: y > -4, asymp: y = -4
x-int: $(-2.37,0)$, y-int: $(0,50)$
13. domain: x > -5, range: all real #'s, asymp: x = -5
x-int: $\left(-4\frac{124}{125},0\right)$, y-int: $(0,8)$
14. x = 2.71 15. I(t) = 53.86

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16. 108° 17. $\frac{-5\pi}{4} + 2n\pi,\ n \in I$
18. TanA = $\frac{-3}{2}$, SecA = $\frac{-\sqrt{13}}{2}$, and CscA = $\frac{\sqrt{13}}{3}$
19. -0.797 20. $\frac{-2}{\sqrt{3}}$
21. $1 + \frac{\sqrt{3}}{2}$ 22. $8 + 2\sqrt{2}$
23. 3 24. $\frac{-2}{\sqrt{21}}$
25. $\frac{-\sqrt{26}}{5}$ 26. 73.30 cm

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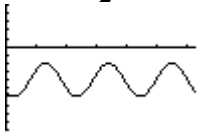
27. amp = 2, per = $\frac{\pi}{2}$, ph shift = $\frac{\pi}{8}$ (left), v disp = -8, domain: all Real#'s, and range: -10 ≤ y ≤ -6:
28. per = $\frac{\pi}{6}$, ph shift = $\frac{5}{6}$ (right)
29. $y = 5\cos\frac{\pi}{8}(x-2) + 3$ or $y = -5\sin\frac{\pi}{8}(x-6) + 3$
30. $y = 3\cos\frac{1}{2}(x - 2\pi) + 6$ or $y = -3\sin\frac{1}{2}(x - 3\pi) + 6$
31. . B = $\frac{3}{4}$ 32. 
33. 4.90 hours 34. x = 1.68
35. 7 zeroes