NO graphing calculators, NO pda's NO phones;

TEST : Ch 12 13

NAM E_____ Math 96 SPRING PINK

For all problems: NO Work = NO Credit. Miracles do not occur in math. Show neat, organized work using techniques I've modeled in class. Yada, yada, yada … if you don't know by now, you probably don't care.

#1 Let f(x) = x^2 – 3x and g(x) = 3x + 1, find the following: CIRCLE your simplified answer.

(a) $f(g(-3))$

(b) $(f \circ g)(x)$

(c) $(g(g(x))$

#2. **Find f^{-1} (x) for each**

(a) $f(x) = \frac{2x}{3} + 1$

(b) $f(x) = \log_2(x+5)$

#3. **BONUS (all or zero) Find g^{-1}(x)** if $g(x) = \frac{5x-1}{2x+3}$

#4. Evaluate each with EXACT solutions.

(a) $\log_{27} x = \frac{2}{3}$

(b) $\log_{\sqrt{25}} 125$

(c) $\log_x 64 = \frac{3}{4}$

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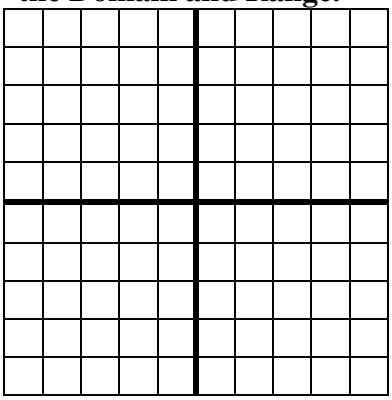
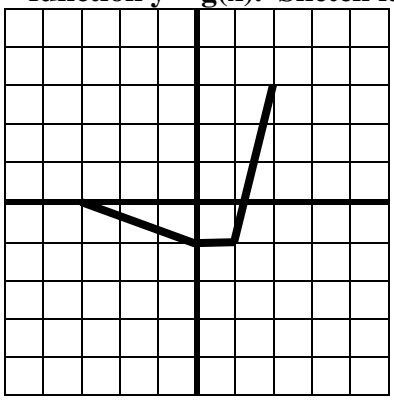
#5 Sketch the graph of $y = 3^x - 2$, and state the Domain and Range.



Domain _____

Range _____

#6. Below is the graph of some function y = g(x). Sketch its <u>inverse</u>.



Domain of g(x) _____

Range of g(x) _____

#7 . If $\log_b 2 = A$ and $\log_b 3 = B$ and $\log_b 5 = C$, find in terms of A, B, or C. (Do NOT use a scientific calculator)

(a) $\log_b 12$

(b) $\log_b 1.5$

(c). $\log_b 10b^2$

#8 SOLVE. Give an <u>exact</u> answer in proper solution set. SHOW WORK

(a) $\log_2 (5x - 6) = 4$

(b) $\log_{15} (x^2 - 2x) = 1$

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(c) $\log_4 (x - 9) - \log_4 (x) = 3$

(d) $16^{(2x+1)} = 8^{x-3}$

(e) $\log_3 x + \log_3 (2x+17) = 2$

#9. SOLVE. If necessary, round your answer(s) to the nearest hundredth. SHOW WORK

(a) $e^{2x} = 1700$

(b) $5 + 3.2^x = 402$

(c) $\log (12x) = 3.1$

(d) $\ln (2x+1) = 2.7$

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#10. The height of an object launched upward is given by: $h(t) = -16t^2 + V_o t + h_o$, where t = time in seconds. If the initial velocity is 64 feet per second, at the object is launched from the top of an 80 foot building, determine the following (if necessary, round your final answers to the nearest 10^{th} of a unit):

- The function representing the height of the object at a given time.
- What is the objects maximum height?
- When does the object hit the ground?
- When does the object reach a height of 128 feet?

#11. A culture of bacteria grows <u>continuously</u> at a rate of 2.5% per hour. If you start with 10,000 bacteria, (a) how many will you have after 1 day? **[use:** $A(t) = A_o e^{rt}$ **]**

11 (b) When will the original number of bacteria triple?

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#12. Given two points, A (-2, $5\sqrt{3}$) and B(7, $-9\sqrt{3}$) , find the following:

a) midpoint of segment $\overline{AB}$ = _____

b) length of segment $\overline{AB}$ = _____

c) slope of segment $\overline{AB}$ = _____

#13. Find the center and radius of the circle: $x^2 + y^2 + 16x - 10y + 53 = 0$. Show appropriate work.

Center = _____

Radius = _____

#14. Put the equation of this conic section into *graphing form* . Identify the type of conic (see # 16 for a list of 'types.')

$4x^2 + 3y^2 - 16x - 18y + 19 = 0$

Graphing Form: _____ type _____

#15. Choose only ONE… the other is bonus. Write "BONUS" next to the problem you want to be scored as a bonus. SOLVE each system of equations. Put your answer(s) into proper solution set form.

(a) $\begin{cases} x^2 + y^2 = 36 \\ y = x^2 - 6 \end{cases}$

(b) $\begin{cases} 2x^2 + 3y^2 = 45 \\ x^2 + y^2 = 15 \end{cases}$

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#16. Graph each of the following <u>on your own paper</u>. A GRAPHING calculator is NOT allowed. Make the graphs BIG and READABLE. Show the below information ON the graph, not off to its side.

For circles/ellipses: label center and "4 corners"
For parabolas: label vertex , x- and y-intercepts
For hyperbolas: label center, vertices, <u>show</u> the box and <u>show</u> all asymptotes!!

(a) $(x-3)^2+(y+1)^2=9$

(b) $\frac{(x+3)^2}{25}+\frac{(y-2)^2}{36}=1$

(c) $x=y^2-y-12$

(d) $x^2-y^2=16$

(e) $y=2x^2+4x-1$

BONUS: Find the <u>equation</u> of both asymptotes for problem #16d. Put your answers <u>ON the graph</u> for #16d