Summer Packet
AP Calculus AB/BC
Revised 4/24/15

Name: _____
Date:_____ Period:_____

Show all necessary work. (ALL PROBLEMS SOLVED WITHOUT A CALCULATOR ☺)

1. Solve. $x^2+8x=17$

2. Solve. $10-7x<4+2x$

3. $Solve\ for\ k.\ \frac{1}{3}e^{\frac{3}{2}k}+\frac{4}{9}ke^{\frac{3}{2}k}=0$

4. Simplify the expression. $\frac{x^2+8x-20}{x^2+11x+10}$

5. Find the equation of the line in slope-intercept form which satisfies the given conditions.
Use point-slope form: $y-y_1=m(x-x_1)$
Passes through $(-3,5)\,with\,slope=7$

6. Simplify the expressions. $A.\ \sqrt[3]{125x^3y^7}$ $B.\ \left(7^2-4\right)^{-\frac{1}{2}}$

7. Simplify the expression completely (no negative exponents). $\left(5x^{-3}y^2\right)^2\left(2x^4y^{-6}\right)^2$

8. Solve the following inequality by finding critical points and making an interval chart.

$6x^2+7x-5\le 0$

9. Find the domain. $f(x)=\sqrt{3x-7}$

10. Find the vertical asymptotes. $f(x)=\dfrac{3x}{x^2-2x-15}$

11. Find the horizontal asymptote. $f(x)=\dfrac{5x^2-x+1}{3x^2-2x-15}$

12. An object is projected vertically upward from the top of a building. Its distance *h(t)* in feet above the ground after *t* seconds is given by the following equation:

$$h(t)=-16t^2+256t+75$$

a. Find the maximum distance above the ground the object reaches. **a.** _____

b. How tall is the building? **b.** _____

13. Using the language of transformations describe how the graph of $y=-4f(x-3)+2$

compares to the graph of *y = f(x).*

_____

14. Given $f(x)=2x^2-4x$ and $g(x)=-x+5$, find the following:

a. (f + g)

b. (fg)(–1)

c. $(g\circ f)(4)$

d. $(f\circ g)(x)$

e. *f(–3)*

15. Use the tables at the right to find the following:

a. $(f \circ g)(0) =$ _____

b. $(g \circ f)(3) =$ _____

c. $(f \circ f)(0) =$ _____

d. $g^{-1}(2) =$ _____

e. $f^{-1}(0) =$ _____

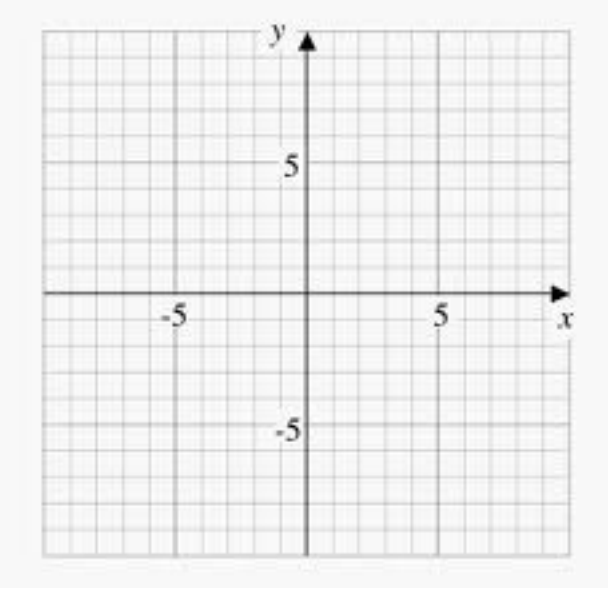
f. $(g \circ f^{-1})(1) =$ _____

x	0	1	2	3
f(x)	2	3	1	0

x	0	1	2	3
g(x)	1	0	3	2

16. Graph the following piecewise defined function.

$$f(x) = \begin{cases} -4 & \text{for } x \le -2 \\ x - 3 & \text{for } |x| < 2 \\ 5 & \text{for } x \ge 2 \end{cases}$$



17. Simplify. $A.\ e^{2x+\ln 5} =$ $B.\ x^2 \bullet x^3 =$

18. Simplify. $\left(\frac{1}{2}\right)9^{\frac{1}{2}} + \left(\frac{1}{2}\right)9^{\frac{3}{2}} + \left(\frac{1}{2}\right)9^2 + \left(\frac{1}{2}\right)9$

19. Simplify. A. $e^{\ln 5}$ B. $\ln 1$ C. $\frac{1}{2}(\ln 10 - \ln 5)$

20. $Solve.\ -1 = \cos 2\pi t \quad 0 \le t \le 1$

21. $If\ x(t) = -\sin t + \cos t,\ find\ x\left(\frac{3}{4}\pi\right) and\ simplify.$

22. Simplify. $If\ x < 3,\ simplify\ \frac{|x-3|}{x-3}$

23. $If\ x(t) = -\frac{1}{2}\cos 3t + \frac{9}{2},\ find\ x\left(\frac{\pi}{3}\right).$

24. $If\ f(x) = x^2 + 2x,\ find\ \frac{f(x+h) - f(x)}{h}$.

NOTE:
Know all log properties, all special trig values on the unit circle, and how to sketch all basic graphs.