



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. $(7^2 - 4)^{-\frac{1}{2}}$

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

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

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

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

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

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

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

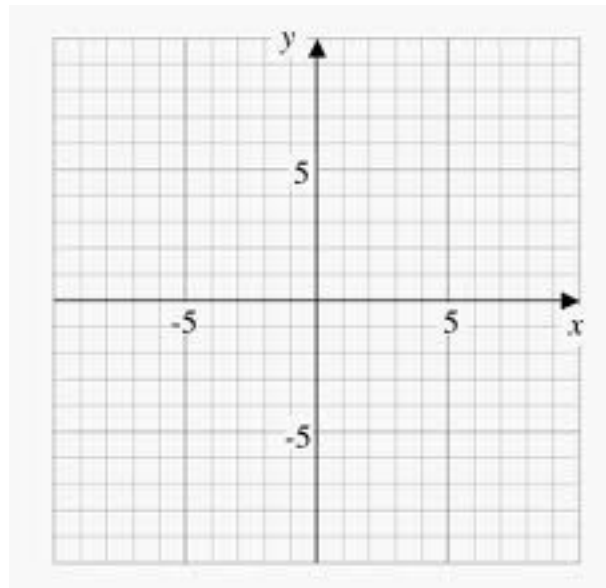
f. $(g \circ f^{-1})(1) =$ _____

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.

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



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

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. $-1 = \cos 2\pi t$ $0 \leq t \leq 1$

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.