Calculus AP/Dual Worksheet Rev 2017 **Name:** _____

§5.3: Inverse Function Derivatives **Date:** _____ **Per:** _____

Find the inverse function of f .

1) $f(x)=2x-3$ 2) $f(x)=\sqrt{x-2}$ 3) $f(x)=x^3+1$

Find $g(x)$ to which $g=f^{-1}(x)$ for the function f and the given real number of x.

4) $f(x)=3x+4$ find $g'(16)$ 5) $f(x)=(x+2)^2$, $(36,4)$; find $g'(36)$

6) $f(x)=x^3+2x-1$ find $g'(2)$ given $f^{-1}(1)=2$ 7) $f(x)=\sqrt{x-4}$; $g'(2)$

8) $f(x)=\sin x, -\frac{\pi}{2}\le x\le\frac{\pi}{2}$; $g\left(\frac{1}{2}\right)$

Use the following tables to determine the indicated derivatives or state the derivative cannot be determined for questions 9-12.

	–2	–1	0	1	2
$f(x)$	2	3	4	6	7
$f'(x)$	1	$\frac{1}{2}$	2	$\frac{3}{2}$	1

9) $\left(f^{-1}\right)'(4)$ 10) $\left(f^{-1}\right)'(6)$

11) $\left(f^{-1}\right)'(1)$ 12) $\left(f^{-1}\right)'\left(f'(1)\right)$

13) For the given values of $f(x)$, $f(3)=15$, $f(6)=3$, $f'(3)=-8$, and $f'(6)=-2$, solve for $g'(3)$ where g is differentiable and $g(x)=f^{-1}(x)$ for all x.

14) The functions f and g are differentiable and $f\big(g(x)\big) = x$ for all x. If $f(3) = 8$ and $f'(3) = 9$, what are the values of $g(8)$ and $g'(8)$?

Practice AP Questions. Write answers in CAPITAL letters.

____ 15) Find $\frac{dy}{dx}$ for $e^{x+y} = y$

(A) $\frac{e^{x+y}}{(1-e^{x+y})}$

(B) $\frac{e^{x+y}}{(1+e^{x+y})}$

(C) $\frac{e^{x+y}}{(e^{x+y}-1)}$

(D) e^{x+y}

____ 16) What does the limit statement $\lim_{x\to 1}\frac{\ln(x+1)-\ln 2}{x-1}$ represent?

(F) 0

(G) $\frac{d}{dx}[\ln(x+1)]$

(H) $f'(1)$, if $f(x) = \ln(x+1)$

(J) 1

____ 17) If $f(2) = -3$, $f'(2) = \frac{3}{4}$, and $g(x) = f^{-1}(x)$, what is the equation of the tangent line to $g(x)$ at $x = -3$?

(A) $y + 2 = -\frac{3}{4}(x-3)$

(B) $y - 2 = -\frac{3}{4}(x+3)$

(C) $y + 2 = \frac{4}{3}(x-3)$

(D) $y - 2 = \frac{4}{3}(x+3)$

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	**3**	**1**	**−2**	**4**
2	**5**	**3**	**1**	**−4**
3	**2**	**1**	**−2**	**1**
4	**4**	**−3**	**2**	**−1**

____ 18) Selected function and derivative values for the differentiable functions $f(x)$ and $g(x)$ are given in the table above. If $p(x) = x \cdot f(x) - g(3x-2)$, then $p'(2) =$

(F) 11

(G) 10

(H) 8

(J) 6