AP Calculus AB Name: _____

Unit 2 Test Review

Find the derivative of each equation using basic differentiation, the Chain Rule, and/or implicit differentiation.

1. $y = \sec x + \cos x$	2. $y = \tan^3 2x$
3. $2 = \tan x - \sec y$	4. $y = \frac{x^2}{\cos x^4}$
5. $y = \frac{x^2+3}{x^2-5}$	6. $3 = x^2 + xy - y^3$
7. $x^2 - 2xy = y^2 - 4$	8. $y = (2x^2 + 5)^7$
9. $y = 4x^{\frac{2}{3}} + 3x^{\frac{1}{3}} - 5x$	10. $y = \frac{4}{(3x-5)^4}$
11. $y = \sqrt{4x - 5}$	12. $y = (6x^2 + 2)^2(4 - x)^3$

13. Find all points on the graph of $f(x) = x^3 - 2x^2 + 5x - 16$ whose tangent lines are parallel to the line 15*x*-3*y*=12.

14. Find the equation of the tangent line to $f(x) = \dfrac{3x^3}{2x-5}$ at the point (1, –1).

15. Find an equation of the tangent line to the graph of $y = \cos x$ at $x = \dfrac{\pi}{2}$.

16. Consider the curve given by $xy^2 - x^3y = 6$.

a) Find the slope(s) of the tangent line(s) at x = 1.

b) Find the equations of the tangent lines that pass through x = 1.

17. A coin is dropped from a height of 750 feet. The height, s (measured in feet), at time, t (measured in seconds), is given by $s = -16t^2 + 750$.

a) Find the average velocity on the interval [1, 3].

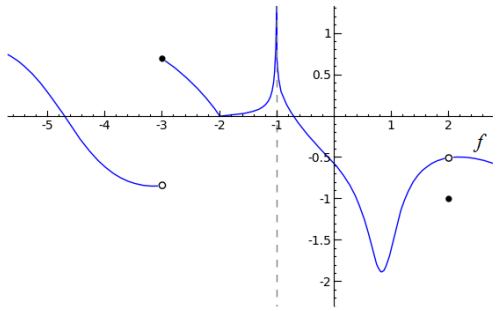
b) Find the instantaneous velocity when t = 3.

c) Find the acceleration at t = 2.

d) Is the coin speeding up or slowing down at t = 2?

e) Find the velocity of the coin when it hits the ground.

18. The graph of f(x) is shown below. At what value(s) of x does the graph appear to be nondifferentiable?



19. Is h(x) continuous and differentiable at x=3?

$$h(x) = \begin{cases} x^2 - 4x + 8, & x \le 3 \\ 2x - 1, & x > 3 \end{cases}$$

20. Find b and c so that f(x) is continuous and differentiable at x=1.

$$f(x)=\begin{cases}3x^2+4x, & x\le 1\\ 2x^3+bx+c, & x>1\end{cases}$$

21. Use the table to complete the problems below:

X	f(x)	f'(x)	g(x)	g'(x)
4	3	-2	7	1
7	5	-1	4	6

a) $h(x)=f(x)g(x),\quad find\ h'(4).$

b) $h(x)=\frac{f(x)}{g(x)},\quad find\ h'(4).$

c) $h(x)=3f(x)+4g(x)^2,\quad find\ h'(4).$

d) $h(x)=f(g(x)),\quad find\ h'(4).$