Chapter 5 AP Test Practice Name ______________________ Date _________________ Period _______

1. The height *h*, in meters, of an object at time *t* is given by $h(t) = 24t + 24t^{3/2} - 16t^2$. What is the height of the object at the instant it reaches its maximum upward velocity?
   (A) 2.545 meters (B) 10.263 meters (C) 34.125 meters
   (D) 54.889 meters (E) 89.005 meters

2. What are all values of *x* for which the function *f* defined by $f(x) = x^3 + 3x^2 - 9x + 7$ is increasing?
   (A) $-3 < x < 1$ (B) $-1 < x < 1$ (C) $x < -3$ or $x > 1$
   (D) $x < -1$ or $x > 3$ (E) All real numbers

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-1	6	5	3	-2
1	3	-3	-1	2
3	1	-2	2	3

3. The table above gives values of f, f', g, and g' at selected values of x. If $h(x) = f\left(g(x)\right)$, then $h'(1) =$
   (A) 5 (B) 6 (C) 9 (D) 10 (E) 12

4. The slope of the line tangent to the curve $y^2 + \left(xy+1\right)^3 = 0$ at $(2, -1)$ is
   (A) $-\frac{3}{2}$ (B) $-\frac{3}{4}$ (C) 0 (D) $\frac{3}{4}$ (E) $\frac{3}{2}$

5. If f and g are twice differentiable and if $h(x) = f\left(g(x)\right)$, then $h''(x) =$

(A) $f''(g(x))[g'(x)]^2 + f'(g(x))g''(x)$

(B) $f''(g(x))g'(x) + f'(g(x))g''(x)$

(C) $f''(g(x))[g'(x)]^2$

(D) $f''(g(x))g''(x)$

(E) $f''(g(x))$

6. A particle moves on a plane curve so that at any time $t > 0$ its *x*-coordinate is $t^3 - t$ and its *y*-coordinate is $(2t-1)^3$. The acceleration vector of the particle at $t = 1$ is

(A) $(0, 1)$ (B) $(2, 3)$ (C) $(2, 6)$ (D) $(6, 12)$ (E) $(6, 24)$

7. If f is a vector-valued function defined by $f(t) = (e^{-t}, \cos t)$, then $f''(t) =$

(A) $-e^{-t} + \sin t$ (B) $e^{-t} - \cos t$ (C) $(-e^{-t}, -\sin t)$

(D) $(e^{-t}, \cos t)$ (E) $(e^{-t}, -\cos t)$

8. If $\dfrac{dy}{dx} = \sqrt{1-y^2}$, then $\dfrac{d^2y}{dx^2} =$

(A) $-2y$ (B) $-y$ (C) $\dfrac{-y}{\sqrt{1-y^2}}$ (D) y (E) $\dfrac{1}{2}$