AP Calculus
Multiple Choice Review

Name_____Pd___
Derivatives (2) Day 8

1. Let $f(x)=4x^3-3x-1$. An equation of the line tangent to $y=f(x)$ at $x=2$ is

A. $y=25x-5$
B. $y=45x+65$
C. $y=45x-65$
D. $y=65-45x$
E. $y=65x-45$

2. $\frac{d}{dx}\sec^{-1}\left(x^2\right)$ =

A. $\frac{2}{x\sqrt{x^4-1}}$
B. $\frac{2}{x\sqrt{x^2-1}}$
C. $\frac{2}{x\sqrt{1-x^4}}$
D. $\frac{2}{x\sqrt{1-x^2}}$
E. $\frac{2x}{\sqrt{1-x^4}}$

3. If $g(x)=\frac{x-2}{x+2}$, then $g'(2)=$

A. 1
B. -1
C. $\frac{1}{4}$
D. $-\frac{1}{4}$
E. 0

4. If $y=\frac{3}{4+x^2}$, then $\frac{dy}{dx}=$

A. $\frac{3}{2x}$
B. $\frac{3x}{\left(1+x^2\right)^2}$
C. $\frac{6x}{\left(4+x^2\right)^2}$
D. $\frac{-6x}{\left(4+x^2\right)^2}$
E. $\frac{-3}{\left(4+x^2\right)^2}$

5. If $x+2xy-y^2=2$, then at the point (1, 1), $\frac{dy}{dx}=$

A. $\frac{3}{2}$
B. $\frac{1}{2}$
C. 0
D. $-\frac{3}{2}$
E. nonexistent

6. The derivative of $\sqrt{x}-\frac{1}{x\sqrt[3]{x}}$ is

A. $\frac{1}{2}x^{-1/2}-x^{-4/3}$
B. $\frac{1}{2}x^{-1/2}+\frac{4}{3}x^{-7/3}$
C. $\frac{1}{2}x^{-1/2}-\frac{4}{3}x^{-1/3}$
D. $-\frac{1}{2}x^{-1/2}+\frac{4}{3}x^{-7/3}$
E. $-\frac{1}{2}x^{-1/2}-\frac{4}{3}x^{-1/3}$

7. An object moves along the x-axis so that at time *t*, *t*>0, its position is given by $x(t) = t^4 + t^3 - 30t^2 + 88t$ At the instant when the acceleration becomes zero, the velocity of the object is approximately

A. 244 B. 12

C. 0 D. -12

E. -24

8. If the position of a particle on the x-axis at time t is $-5t^2$, then the average velocity of the particle for [0, 3]

A. -45 B. -30

C. -15 D. -10

E. -5

9. The slope of the line tangent to the graph of $\ln(xy) = x$ at the point where x = 1 is

A. 0 B. 1

C. e D. e^2

E. 1 – e

10. $\lim_{h\to 0}\left(\frac{\cos(x+h)-\cos x}{h}\right) =$

A. $\sin x$ B. $-\sin x$

C. $\cos x$ D. $-\cos x$

E. Does not exist

11. If $y = \cos^2 x - \sin^2 x$, then $y' =$

A. -1 B. 0

C. $-2(\cos x + \sin x)$ D. $2(\cos x + \sin x)$

E. $-4(\cos x)(\sin x)$

12. $\frac{d}{dx}\arcsin\left(\frac{x}{2}\right)$

A. $-\frac{2}{\sqrt{4-x^2}}$ B. $-\frac{1}{\sqrt{4-x^2}}$

C. $\frac{2}{4+x^2}$ D. $\frac{2}{\sqrt{4-x^2}}$

E. $\frac{1}{\sqrt{4-x^2}}$

13. An equation for a tangent to the graph of $y = \arctan\frac{x}{3}$ at the origin is:

A. $x - 3y = 0$ B. $x - y = 0$

C. $x = 0$ D. $y = 0$

E. $3x - y = 0$

14. A particle moves along the x-axis so that at any time t > 0, its position is given by $x(t) = t^3 - 3t^2 - 9t + 1$. For what values of t is the particle at rest?

A. None B. 1 only

C. 3 only D. 5 only

E. 1 and 3

15. $\frac{d}{dx}\left(\ln e^{3x}\right) =$

A. 1

B. 3

C. $3x$

D. $\frac{1}{e^{3x}}$

E. $\frac{3}{e^{3x}}$

16. Find $\frac{dy}{dx}$ for $e^y = xy$

A. $\ln x + \ln y$

B. $\frac{x+y}{xy}$

C. $\frac{xy}{x+y}$

D. $\frac{xy-x}{y}$

E. $\frac{y}{xy-x}$

17. If $\tan(x+y) = x$, then $\frac{dy}{dx} =$

A. $\tan^2(x+y)$

B. $\sec^2(x+y)$

C. $\ln\left|\sec(x+y)\right|$

D. $\sin^2(x+y)-1$

E. $\cos^2(x+y)-1$

18. $\frac{d}{dx}\left[Arc\tan(3x)\right] =$

A. $\frac{1}{1+9x^2}$

B. $\frac{3}{1+9x^2}$

C. $\frac{3}{\sqrt{4x^2-1}}$

D. $\frac{3}{1+3x}$

E. None of the above

19. If $f(x) = e^{2x}$ and $g(x) = \ln x$, then the derivative of $y = f(g(x))$ at $x = e$ is

A. e^2

B. $2e^2$

C. $2e$

D. 2

E. Undefined

20. If $x^2 + 2xy - 3y = 3$, then the value of $\frac{dy}{dx}$ at $x = 2$ is

A. 1

B. 2

C. -2

D. $\frac{10}{3}$

E. $-\frac{1}{2}$

21. If $h(x) = \left(x^2-4\right)^{3/4} + 1$, then the value of $h'(2)$ is

A. 3

B. 2

C. 1

D. 0

E. does not exist

22. If $\left(x-y\right)^2 = y^2 - xy$, then $\frac{dy}{dx} =$

A. $\frac{2x-y}{2y-x}$

B. $\frac{2x-y}{2x}$

C. $\frac{2x-y}{x}$

D. $\frac{2x+3y}{x}$

E. undefined

23. Consider the curve $x+xy+2y^2=6$. The slope of the line tangent to the curve at the point (2, 1) is

A. $\frac{2}{3}$

B. $\frac{1}{3}$

C. $-\frac{1}{3}$

D. $-\frac{1}{5}$

E. $-\frac{3}{4}$

24. $\frac{d}{dx}\cot^{-1}(3x)$

A. $-\frac{3}{1+9x^2}$

B. $-\frac{1}{1+9x^2}$

C. $\frac{1}{1+9x^2}$

D. $\frac{3}{1+9x^2}$

E. $\frac{3}{\sqrt{1-9x^2}}$

25. Let $f(x)=\frac{\ln e^{2x}}{x-1}$ for $x>1$. If g is the inverse of f, then $g'(3)=$

A. 2

B. 1

C. 0

D. -1

E. -2

26. If $y=x^{\ln x}$, then $y'=$

A. $\frac{x^{\ln x}\ln x}{x^2}$

B. $x^{1/x}\ln x$

C. $\frac{2x^{\ln x}\ln x}{x}$

D. $\frac{x^{\ln x}\ln x}{x}$

E. None of the above

27. If $\tan(xy)=x$, then $\frac{dy}{dx}=$

A. $\frac{1-y\tan(xy)\sec(xy)}{x\tan(xy)\sec(xy)}$

B. $\frac{\sec^2(xy)-y}{x}$

C. $\cos^2(xy)$

D. $\frac{\cos^2(xy)}{x}$

E. $\frac{\cos^2(xy)-y}{x}$

28. If $y^2-3x=7$, then $\frac{d^2y}{dx^2}=$

A. $\frac{-6}{7y^3}$

B. $\frac{-3}{7y^3}$

C. 3

D. $\frac{3}{2y}$

E. $\frac{-9}{4y^3}$

Answers:

1. C	2. A	3. C	4. D	5. E	6. B	7. B
8. C.	9. A	10. B	11. E	12. E	13. A	14. C
15. B	16. E	17. E	18. B	19. C	20. C	21. E
22. C	23. C	24. A	25. E	26. C	27. E	28. E