Name KEY Date 10/12/2016 Defunct Technology 5" Floppy Disc

AP Calculus 9-weeks TEST: 1.1-2.7 No Calculator

Write the CAPITAL LETTER in the blank to the left of the problem number.

A 1. $\lim_{x\to 0}\dfrac{3x^2+5\cos x-5}{2x}=$

(A) 0 (B) $\dfrac{5}{2}$ (C) 5 (D) DNE

C 2. Which of the following gives the derivative of the function $f(x)=x^2$ at the point $(2,4)$?

(A) $\lim_{h\to 0}\dfrac{(x+2)^2-x^2}{4}$ (B) $\lim_{x\to 2}\dfrac{(2+h)^2-2^2}{h}$ (C) $\lim_{h\to 0}\dfrac{(2+h)^2-2^2}{h}$ (D) $\lim_{h\to 0}\dfrac{(4+h)^2-4^2}{h}$

D 3. If $x^2-2xy+3y^2=8$, then $\dfrac{dy}{dx}=$

(A) $\dfrac{8+2y-2x}{6y-2x}$ (B) $\dfrac{3y-x}{y-x}$ (C) $\dfrac{2x-2y}{6y-2x}$ (D) $\dfrac{y-x}{3y-x}$

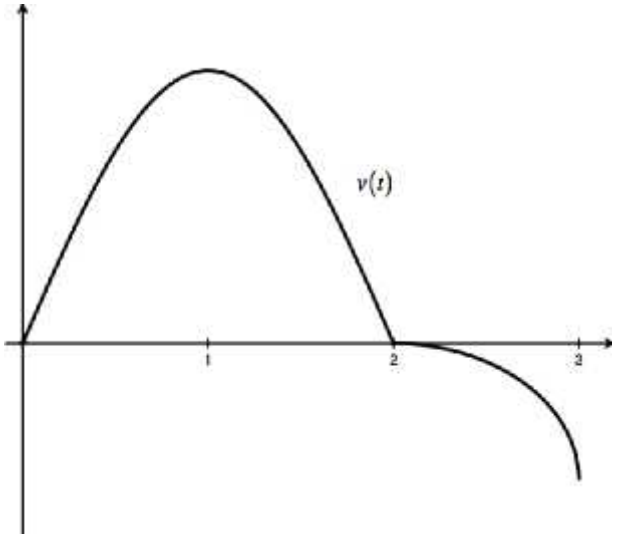
C 4. Find k so that $f(x)=\begin{cases}\dfrac{x^2-16}{x-4}, & x\neq 4\\ k, & x=4\end{cases}$ is continuous for all x.

(A) 0 (B) 16 (C) 8 (D) no such k exists

A 5. Which of the following is true regarding the asymptotic behavior or the function $f(x)=\dfrac{1}{\sqrt{x}}+3$, for $x>0$.

(A) HA at $y=3$, VA at $x=0$ (B) HA at $y=0$, VA at $x=3$

(C) HA at $y=0$, VA at $x=0$ (D) HA at $y=3$, VA at $x=3$



C 6. A particle moving along the *x*-axis is moving with a velocity $v(t)$ whose graph is given above. For what open intervals is the speed of the particle increasing?

I. $x \in (0,1)$

II. $x \in (1,2)$

III. $x \in (2,3)$

(A) I only (B) I and II only (C) I and III only (D) III only

D 7. If $f(x) = \begin{cases} x^2+1, & -1 \le x < 1 \\ -x+1, & 1 \le x < 2 \\ -1, & x > 2 \end{cases}$, at which of the following values of x is $f(x)$ **not** continuous?

I. $x = -1$

II. $x = 1$

III. $x = 2$

(A) II only (B) I and II only (C) I and III only (D) II and III only

A 8. $\dfrac{d}{dx}\left[x^3(x+4)^2\right] =$

(A) $5x^4+32x^3+48x^2$ (B) $5x^4+16x^3+48x^2$ (C) $6x^5+32x^3+48x^2$ (D) $6x^5+16x^3+48x^2$

B 9. If $f(x) = \cos^3(x+1)$, then $f'(\pi) =$

(A) $3\cos^2(\pi 1)$ (B) $-3\cos^2(\pi+1)\sin(\pi+1)$ (C) $3\cos^2(\pi+1)\sin(\pi+1)$ (D) $3\pi\cos^2(\pi+1)$

D

10. If $f(x) = \sec x + \csc x$, then $f'(x) =$

(A) $\sec^2 x + \csc^2 x$ (B) $\csc x - \sec x$ (C) $\sec x \tan x + \csc x \cot x$ (D) $\sec x \tan x - \csc x \cot x$

A

11. In the xy-plane, the line $x + y = k$, where k is a constant, is tangent to the graph of $y = x^2 + 3x + 1$. What is the value of k?

(A) -3 (B) -2 (C) -1 (D) 1

D

12. If $y = \dfrac{2x+3}{3x+2}$, then $\dfrac{dy}{dx} =$

(A) $\dfrac{12x+13}{(3x+2)^2}$ (B) $\dfrac{12x-13}{(3x+2)^2}$ (C) $\dfrac{5}{(3x+2)^2}$ (D) $\dfrac{-5}{(3x+2)^2}$

D

13. A particle moves along the y-axis so that at time $t \geq 0$, its position is given by $y(t) = 2t^3 - 21t^2 + 72t - 53$. At what time, t, is the particle at rest?

(A) $t = 3$ only (B) $t = \dfrac{7}{2}$ only (C) $t = 3$ and $t = \dfrac{7}{2}$ (D) $t = 3$ and $t = 4$

D

14. The function f is continuous on $[-3, 2]$ and has values given in the table below. If the equation $f(x) = 2$ has at least 2 solutions in the interval $(-3, 2)$ if $k =$

x	-3	0	2
$f(x)$	5	k	3.2

(A) 5 (B) 3.2 (C) 2 (D) -3

$$f(x)=\begin{cases} ax^3-6x, & x\le 1 \\ bx^2+4, & x>1 \end{cases}$$

B 15. If the above function $f(x)$ is differentiable for all x, then $a=?$

(A)1 (B) -14 (C) -24 (D) 26

D 16. An equation of the **normal** line to the grah of $y=\sqrt{3x^2+2x}$ at $(2,4)$ is

(A) $-4x+y=20$ (B) $4x+7y=20$ (C) $-7x+4y=2$ (D) $4x+7y=36$

C 17. A calculus book falling on the Planet Xelkji has a height, *h*, at any time, *t*, given by $h(t)=t^3-6t^2+9t$. What is the accelleration of the book at time $t=4$?

(A) 9 (B) -9 (C) 12 (D) -12

B 18. If $f(x)=\sqrt[3]{3x}$, then $f'\left(\sqrt{3}\right)=$

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt[3]{3}}$

A 19. If $f(x)=\left(3x^2-4x-1\right)\tan x$, then $f'(0)=$

(A) -1 (B) 0 (C) 1 (D) -4

D 20. If $f(x)=5-|7x+21|$ for all *x*, then the value of the derivative $f'(x)$ at $x=-3$ is

(A) -7 (B) 7 (C) 5 (D) DNE