Name: Keanu Vejfil Class: 5 Date: 2014-04-01 ID: G

PCH Calculus 1 Mulligan - no calculators permittited

Checked ✓✓✓✓ 4 times :)

Multiple Choice
Identify the choice that best completes the statement or answers the question.

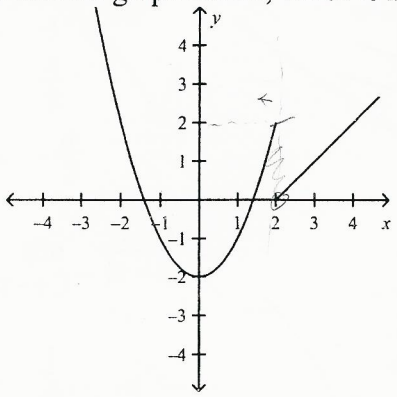
Limits

1. $\lim_{x \to 1^-} \sqrt{1-x^2} =$

a. -2
b. 0
c. does not exist
d. -1
e. 1
f. 2
g. none of these

B

2. From the graph shown, which is necessarily true:



I. $\lim_{x \to 2^-} f(x) = 2$

II. $\lim_{x \to 2^+} f(x) = 0$

III. $\lim_{x \to 2} f(x) = 0$

D

a. none are true.
b. I only
c. I, II and III
d. I and II only
e. III only
f. II only
g. II and III only

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3. $\lim_{h\to 0} \dfrac{\cos\left(\frac{\pi}{3}+h\right)-\frac{1}{2}}{h} =$

a. 1
b. does not exist
c. $\frac{\sqrt{3}}{2}$
d. $-\frac{1}{2}$
e. -1
f. $\frac{1}{2}$
g. $-\frac{\sqrt{3}}{2}$
h. none of these

4. $\lim_{x\to -2} \dfrac{x^3+8}{x+2} =$

a. $\frac{1}{12}$
b. -4
c. 4
d. does not exist
e. 12
f. 12
g. $-\frac{1}{12}$
h. none of these

5. $\lim_{x\to 0} \dfrac{\cos x - 1}{x} =$

a. e
b. 2
c. 0
d. 1
e. -1
f. does not exist

6. $\lim_{x\to 3^+} \dfrac{1}{x-3} =$

a. 1
b. ∞
c. $-\frac{1}{4}$
d. $-\infty$
e. -1
f. $\frac{1}{4}$
g. none of these

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7. $\lim_{h \to 0} \frac{\sqrt[3]{8+h} - 2}{h} =$

a. $-\frac{1}{8}$

b. does not exist

c. $\frac{1}{4}$

d. $-\frac{1}{12}$

e. $-\frac{1}{4}$

f. $\frac{1}{8}$

g. $\frac{1}{12}$

h. none of these

8. $\lim_{x \to 0^+} \csc x =$

a. ∞

b. -1

c. $\frac{\pi}{2}$

d. $-\frac{\pi}{2}$

e. 1

f. $-\infty$

g. none of these

9. $\lim_{x \to 3^-} \frac{x-3}{|x-3|} =$

a. $\frac{1}{4}$

b. 0

c. 1

d. -1

e. 2

f. -2

g. does not exist

h. none of these

10. $\lim_{x \to 0} \left(\frac{\sin x}{x} \right) =$

a. 0

b. e

c. 1

d. -1

e. -2

f. does not exist

g. 2

h. none of these

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11. $\lim_{x\to 0} \frac{\sin x}{4x} =$

$\frac{\sin x}{x} \cdot \frac{1}{4}$

B ✓

a. 4
b. $\frac{1}{4}$
c. $-\frac{1}{4}$
d. -4
e. does not exist
f. none of these

Applications of Derivatives

12. Suppose that u and v are functions of x that are differentiable at x = 3 and that u(3) = 2, u'(3) = -5, v(3) = -2 and v'(3) = 4. Find the values of $\frac{d}{dx}\left(\frac{u}{v}\right)$ at x = 3.

$\frac{vu' - v'u}{v^2} = \frac{(-2(-5)) - (4 \cdot 2)}{4}$

A ✓ $\frac{10-8}{4}$ $\frac{2}{4}$

a. $\frac{1}{2}$
b. $\frac{1}{4}$
c. 2
d. $-\frac{1}{2}$
e. $-\frac{1}{4}$
f. -2
g. 4
h. none of these

(1, 1)

13. Find the equation of the normal line to the graph of $f(x) = x^2 + \ln x$ when x = 1

$2x + \frac{1}{x}$

F ✓

a. ~~$y+1 = \frac{1}{3}(x+1)$~~
b. ~~$y-1 = -3(x-1)$~~
c. ~~$y-1 = \frac{1}{3}(x-1)$~~
d. $-\frac{1}{3}$
e. ~~$y-1 = 3(x-1)$~~
f. $y-1 = -\frac{1}{3}(x-1)$
g. $y+1 = -\frac{1}{3}(x+1)$
h. none of these

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

14. Find an equation of the line perpendicular to the tangent to the graph of $f(x) = x^3 - 3x + 1$ at the point (2,3).

$3x^2 - 3$

A ✓

a. $y-3 = -\frac{1}{9}(x-2)$
b. $y-3 = \frac{1}{9}(x-2)$
c. $y-2 = -\frac{1}{9}(x-3)$
d. ~~$y-2 = \frac{1}{9}(x-3)$~~
e. ~~$y-3 = 9(x-2)$~~
f. ~~$y-2 = 9(x-3)$~~
g. ~~$y-3 = -9(x-2)$~~
h. none of these

$-\frac{1}{3x^2-3}$

$-\frac{1}{9}$ (2, 3)

$y - 3 = -\frac{1}{9}(x-2)$

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15. Find the slope of the tangent line to $h(x) = 4\sin(2x)$ when $x = \frac{7\pi}{12}$

a. $-\frac{1}{4\sqrt{3}}$
b. -1
c. $\frac{1}{4\sqrt{3}}$
d. $2\sqrt{3}$
e. 1
f. $4\sqrt{3}$
g. $-4\sqrt{3}$
h. none of these

$8\cos(2x)$
$8\cos\frac{14\pi}{12}$
$8\cos\left(\frac{7\pi}{6}\right)$
$8 \cdot -\frac{\sqrt{3}}{2}$
$-4\sqrt{3}$
6 ✓

Derivatives

16. Find $\frac{dy}{dx}$ when $y = \frac{x^2+1}{2x+3}$ when x = 2

a. $\frac{38}{49}$
b. $-\frac{18}{7}$
c. $-\frac{38}{49}$
d. $\frac{38}{7}$
e. $\frac{18}{7}$
f. $\frac{18}{49}$
g. $-\frac{18}{49}$
h. none of these

$\frac{(2x)(2x+3)-(2x^2+2)}{(2x+3)^2}$
$\frac{(4x^2+6x)-(2x^2+2)}{(2x+3)^2}$
$\frac{2x^2+6x-2}{(2x+3)^2}$
$\frac{2(x^2+3x-1)}{(2x+3)^2}$
$\frac{2(4+6-1)}{49}$
$\frac{18}{49}$
F ✓

17. Evaluate $\frac{d}{dx}\left(\cos^2 x\right)$, when $x = \frac{\pi}{4}$

a. does not exist
b. $\frac{\sqrt{2}}{2}$
c. -1
d. $-\sqrt{2}$
e. 1
f. $-\frac{\sqrt{2}}{2}$
g. $\sqrt{2}$
h. none of these

$-2\cos x \sin x$
$-\sin(2x)$
-1
$-1 \cdot \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2}$
C ✓

18. Find $\frac{dy}{dx}$ when $y = \frac{x^3+2x-1}{x^2}$

a. $1+\frac{2}{x}+\frac{1}{x^2}$
b. $1+\frac{2}{x^2}+\frac{2}{x^3}$
c. $1-\frac{2}{x}-\frac{2}{x^2}$
d. $1-\frac{2}{x}+\frac{1}{x^2}$
e. $1-\frac{1}{x}+\frac{2}{x^2}$
f. $1+\frac{1}{x}+\frac{2}{x^2}$
g. $1-\frac{2}{x^2}+\frac{2}{x^3}$
h. none of these

$\frac{x^3}{x^2} + \frac{2x}{x^2} - \frac{1}{x^2}$
$x + 2x^{-1} - x^{-2}$
$1 + \left(\frac{-2}{x^2}\right) - \left(\frac{-2}{x^3}\right)$
$1 - \frac{2}{x^2} + \frac{2}{x^3}$
C ✓

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19. $\frac{d}{dx}\left(6x^2+3\right)^{-4} =$

a. $\frac{-4}{\left(6x^2+3\right)^5}$

b. $\frac{48x}{\left(6x^2+3\right)^3}$

c. $\frac{-4x}{\left(6x^2+3\right)^5}$

d. $\frac{-48x}{\left(6x^2+3\right)^3}$

e. $\frac{-48x}{\left(6x^2+3\right)^5}$

f. $\frac{48x}{\left(6x^2+3\right)^5}$

g. $\frac{-48}{\left(6x^2+3\right)^5}$

h. none of these

20. Find $\frac{dy}{dx}$ when $y = \ln(\cos x)$

a. ln (cos x)

b. tan x

c. ln (sin x)

d. - ln (sin x)

e. - ln (tan x)

f. $-\frac{1}{\sin x}$

g. - tan x

h. none of these

21. Find $\frac{dy}{dx}$ when $y = \sqrt{\sin 3x}$

a. $3\sqrt{\sin 3x}\cos 3x$

b. $\frac{\cos 3x}{2\sqrt{\sin 3x}}$

c. $\sqrt{\sin 3x}\cos 3x$

d. $\frac{3\cos x}{2\sqrt{\sin 3x}}$

e. $\frac{4\sqrt{\sin 3x}\cos 3x}{3}$

f. $-\frac{3\cos 3x}{2\sqrt{\sin 3x}}$

g. $\frac{3\cos 3x}{2\sqrt{\sin 3x}}$

h. none of these

22. Find $\frac{d}{dx}\left(e^{2x}\right)$ when x = 2

a. $4e^2$

b. e^4

c. e^3

d. $2e^4$

e. $2e^3$

f. $\frac{1}{e^2}$

g. $\frac{2}{e^4}$

h. none of these

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$\frac{3}{2}x^{-\frac{1}{2}} + 4x^{-3} - \frac{1}{8}x^{-\frac{3}{2}}$

23. Find $\frac{dy}{dx}$ when $y = 3\sqrt{x} - \frac{2}{x^2} + \frac{1}{4\sqrt{x}}$

a. $\frac{3}{2}x^{-\frac{1}{2}} - 4x^{-3} - \frac{1}{8}x^{-\frac{3}{2}}$

b. $\frac{3}{2}x^{-\frac{1}{2}} + 4x^{-3} - \frac{1}{8}x^{-\frac{3}{2}}$ 6

c. $-\frac{3}{2}x^{-\frac{1}{2}} - 4x^{-3} - \frac{1}{8}x^{-\frac{3}{2}}$

d. $3x^{\frac{1}{2}} + 2x^{-2} + 4x^{-\frac{1}{2}}$

e. $3x^{\frac{1}{2}} - 2x^{-2} + 4x^{-\frac{1}{2}}$

f. $\frac{3}{2}x^{\frac{3}{2}} + 4x^{-1} - 2x^{\frac{1}{2}}$

g. $\frac{3}{2}x^{\frac{1}{2}} - 4x^{-3} - \frac{1}{8}x^{-\frac{3}{2}}$

h. none of these

B ✓

24. Find $\frac{dy}{dx}$ when $y = x^2 \cos x$

a. $2\cos x$

b. $-x^2 \sin x + 2x\cos x$

c. ans

d. ans

e. ans

f. ans

g. 2 cos x sin x

h. none of these

wat.

$x^2 \cdot -\sin x + 2x\cos x$

B ✓

25. Find $\frac{dy}{dx}$ when $y = 1 + \sin^2 x$ when $x = \frac{5\pi}{4}$

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

b. 0

c. -1

d. $\sqrt{2}$

e. $-\sqrt{2}$

f. $\frac{1}{2}$

g. 1

h. none of these

G ✓

$2\sin\cos x$

$2 \cdot -\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{2}$ 1

$\sin(2x)$

$\sin\left(\frac{10\pi}{4}\right)$

$\sin\left(\frac{5\pi}{2}\right)$

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Student Grade Report

Legend: Incorrect: ☐

Student: Vestil, Keanu

	Grade	Total Score	Score (%)
Overall	A	25.00 / 25.00	100.00

Responses

Question	Response	Correct Answer
Question1	B	
Question2	D	
Question3	G	
Question4	E	
Question5	C	
Question6	B	
Question7	G	
Question8	A	
Question9	D	

Question	Response	Correct Answer
Question10	C	
Question11	B	
Question12	A	
Question13	F	
Question14	A	
Question15	G	
Question16	F	
Question17	C	
Question18	G	

Question	Response	Correct Answer
Question19	E	
Question20	G	
Question21	G	
Question22	D	
Question23	B	
Question24	B	
Question25	G	