AP Calculus BC

Chapter 2 Part 2 Review

Name _____ Date _____

1. What is $\lim_{h\to 0} \dfrac{(x+h)^3 - x^3}{h}$?

a) $3x^2h + 3x$ b) $3x^2$ c) $6xh$
d) h^2 e) 0

2. What is $\lim_{h\to 0} \dfrac{\sin(x+h) - \sin x}{h}$?

a) $\sin(x+h)$ b) $\dfrac{\cos x}{x}$ c) $-\sin x$
d) $\dfrac{\cos x}{x}$ e) $\cos x$

3. $\lim_{h\to 0} \dfrac{\sin 3(x+h) - \sin 3x}{h}$ is

a) $3\cos 3x$ b) $3\sin 3x$ c) 3
d) 0 e) undefined

4. What is $\lim_{h\to 0} \dfrac{\sin\left(\frac{\pi}{6}+h\right) - \sin\left(\frac{\pi}{6}\right)}{h}$?

a) 0 b) $-\dfrac{1}{2}$ c) $\dfrac{1}{2}$
d) $\dfrac{\sqrt{3}}{2}$ e) $-\dfrac{\sqrt{3}}{2}$

5. The functions f and g are differentiable and have the values shown in the table.

If $A = f + g$ then $A'(2) =$

a) -2 b) 3
c) 4 d) -4
e) 5

x	f	f'	g	g'
0	5	1	−7	$\frac{1}{4}$
2	8	3	−5	1
4	14	9	−3	4
6	26	27	−1	16

6. The functions f and g are differentiable and have the values shown in the table.

If $A = 3f + 2g$ then $A'(4) =$

a) 44 b) 5
c) 0 d) 36
e) 35

x	f	f'	g	g'
0	5	1	−7	$\frac{1}{4}$
2	8	3	−5	1
4	14	9	−3	4
6	26	27	−1	16

7. The functions f and g are differentiable and have the values shown in the table.

If $A = f \cdot g$ then $A'(4) =$

a) 0 b) 114
c) 36 d) 83
e) 29

x	f	f'	g	g'
0	5	1	−7	$\frac{1}{4}$
2	8	3	−5	1
4	14	9	−3	4
6	26	27	−1	16

8. The functions f and g are differentiable and have the values shown in the table.

If $A = \left(\dfrac{1}{g}\right)$ then $A'(4) =$

a) 0 b) $\dfrac{4}{9}$
c) $-\dfrac{4}{9}$ d) $\dfrac{1}{4}$
e) $-\dfrac{1}{4}$

x	f	f'	g	g'
0	5	1	−7	$\frac{1}{4}$
2	8	3	−5	1
4	14	9	−3	4
6	26	27	−1	16

9. The functions f and g are differentiable and have the values shown in the table.

If $A = \left(\dfrac{f}{g}\right)$ then $A'(2) =$

a) $\dfrac{23}{25}$ b) $-\dfrac{23}{4}$
c) $\dfrac{23}{4}$ d) -7
e) $-\dfrac{23}{25}$

x	f	f'	g	g'
0	5	1	−7	$\frac{1}{4}$
2	8	3	−5	1
4	14	9	−3	4
6	26	27	−1	16

10. The functions f and g are differentiable and have the values shown in the table.

If $A = f(g(x))$ then $A'(-8) =$

a) -72 b) 18
c) 54 d) 9
e) -9

x	f	f'	g	g'
−8	4	3	−2	6
−6	10	12	0	9
−2	20	9	6	18
2	30	15	12	24

11. The functions f and g are differentiable and have the values shown in the table.

If $A = \sqrt{f(x)}$ then $A'(-2) =$

a) $\frac{9}{8}$

b) impossible

c) $\frac{9}{4}$

d) $\frac{8}{9}$

e) 3

x	f	f'	g	g'
-8	4	3	-2	6
-6	10	12	0	9
-2	16	9	6	18
2	30	11	12	24

12. The functions f and g are differentiable and have the values shown in the table.

If $A = f(3x)$ then $A'(-2) =$

a) 36 b) 12

c) -6 d) -27

e) 18

x	f	f'	g	g'
-8	4	3	-2	6
-6	10	12	0	9
-2	16	9	6	18
2	30	15	12	24

13. The functions f and g are differentiable and have the values shown in the table.

If $A = f(x^3)$ then $A'(-2) =$

a) -18

b) 9

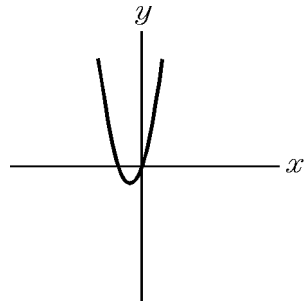
c) -120

d) 36

e) 3

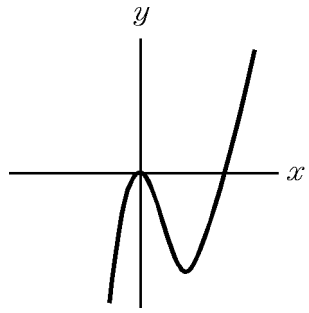
x	f	f'	g	g'
-8	4	3	-2	6
-6	10	12	0	9
-2	16	9	6	18
2	30	15	12	24

14.

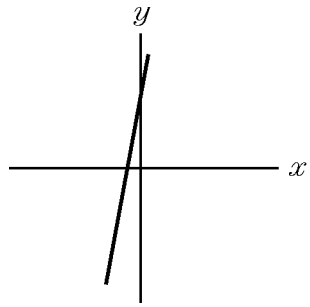


Given the graph of f shown above, which of the following is the graph of the derivative, f'?

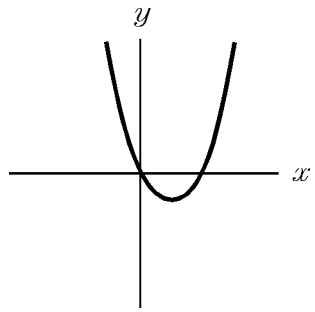
a)



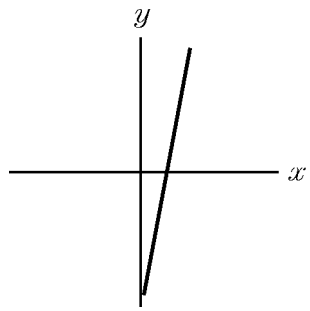
b)



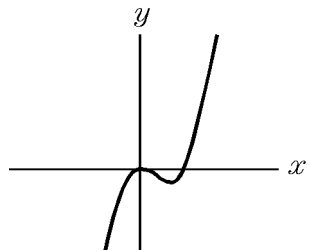
c)



d)



e)



15. If $f(x) = \tan x$, then $f'(\frac{\pi}{6}) =$

a) $\frac{1}{4}$ b) $-\frac{1}{\sqrt{3}}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{4}{3}$ e) $\frac{3}{4}$

16. If $f(x) = \sqrt{3} + \cos x - (3\pi x)$, then $f'\left(\frac{\pi}{3}\right) =$

a) $\frac{\sqrt{3}}{2} - 3\pi$ b) $-\frac{\sqrt{3}}{2} - 3\pi$ c) 3π
d) $\sqrt{3} - \pi$ e) $3 - \pi$

17. Find the derivative, $\dfrac{dy}{dx}$, of $y = \dfrac{2x}{1-3x^2}$.

a) $-\dfrac{1}{3x}$ b) $-\dfrac{12x}{(1-3x^2)^2}$
c) $\dfrac{6x^2+2}{(1-3x^2)^2}$ d) $\dfrac{9x^2-2}{(1-3x)^2}$
e) $\dfrac{2x}{3(1-3x^2)^2}$

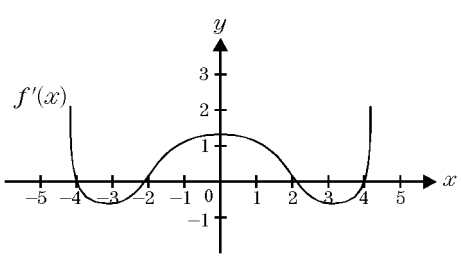
18. If $f(x) = \dfrac{x^3+3x^2+2}{x}$, then $f'(1) =$

a) 7 b) 6 c) 5 d) 3 e) 4

19. Find the derivative of $x^2 f(x)$.

a) $x\,[xf'(x) + 2f(x)]$ b) $2xf'(x)$
c) $x\,[xf(x) + 2f'(x)]$ d) $x^2 f'(x)$
e) $\frac{1}{3}x^3 + [f'(x)]^2$

20. The graph $f(x)$ has horizontal tangents when $x =$



a) −3, 0, 3 b) −4, 2
c) −4, −2, 2, 4 d) −4, −2, 4
e) 2, 4

21. Find an equation of the tangent line to the graph of $f(x) = \frac{(x-3)}{(x+3)}$ when $x = -2$.

a) $y - 5 = 6(x+2)$ b) $y + 5 = 6(x+2)$
c) $y - 5 = -6(x-2)$ d) $y + 5 = -6(x-2)$
e) $y - 5 = 3(x+2)$

22. Find the equation of the tangent line to the graph of $x^2 + 2y^2 = 3$ at the point $(1,1)$.

a) $y - 1 = \dfrac{1}{2}(x-1)$ b) $y + 1 = -\dfrac{1}{2}(x+1)$
c) $y + 1 = \dfrac{1}{2}(x+1)$ d) $y - 1 = -\dfrac{1}{2}(x-1)$
e) $y = -\dfrac{1}{2}(x-1)$

23. Given $2x + 5y = 12$ is the equation of the line *normal* to the graph of f at the point $(1,5)$, find $f'(1)$.

a) $\frac{1}{2}$ b) 2 c) $\frac{2}{5}$ d) $\frac{5}{2}$ e) 5

24. Given $f(x) = \begin{cases} x^2 + 3x - 5 & \text{for } x \le 1, \\ 5x - 6 & \text{for } x > 1 \end{cases}$

Does the curve have a tangent at $x = 1$?

25. Given $f(x) = \begin{cases} x^2 + 5x - 3 & \text{for } x \le 0, \\ 2x - 3 & \text{for } x > 0 \end{cases}$

Does the curve have a tangent at $x = 0$?

26. At what point is the slope of $f(x) = 2x^2 - 7x - 3$ equal to 5?

27. $\dfrac{d^6(x^6)}{dx^6} =$

a) $6x^5$ b) $120x$
c) $720(x^{120})$ d) 720
e) $360x^3 + 120x^2 + x$

28. Find $\dfrac{d^2y}{dx^2}$ for $y = \dfrac{1-x}{x-3}$.

a) 0 b) $\dfrac{-8}{(x-3)^3}$ c) $\dfrac{-4}{(x-2)^3}$
d) $\dfrac{-4}{(x-3)^3}$ e) $\dfrac{2}{(x-3)^2}$

29. Find the derivative of $y = (x^2 + 2x + 5)^6$.

a) $6(2x+2)(x^2+2x+5)^5$

b) $(12x+1)(x^2+2x+5)^5$

c) $6(x^2+2x+5)^5$

d) $\dfrac{2x+2}{(x^2+2x+5)^6}$

e) $\dfrac{6(2x+2)}{x^2+2x+5}$

30. Find the derivative of $f(x) = -8(1-x)^2 + 7(1-x) + 2$.

a) $-16x + 16$ b) $16(1-x) - 7$

c) $9(1-x)$ d) $-16(1-x) - 7$

e) $-(1-x)$

31. Find the derivative of $y = \sqrt[3]{x^2 + x}$.

a) $\dfrac{1}{3}(x^2+x)^{-2/3}(2x+1)$

b) $\dfrac{2}{3}(x^2+x)^{-2/3}(2x-1)$

c) $\dfrac{3}{2}(x^2+x)^{2/3}(2x+1)$

d) $\dfrac{x}{3}(x+1)^{-2/3}(2x+1)$

e) $\dfrac{1}{3}(x^2+x)^{2/3}(2x+1)$

32. Find the derivative: $s(t) = \sec\sqrt{t}$

a) $\tan^2\sqrt{t}$ b) $\dfrac{\sec\sqrt{t}\cdot\tan\sqrt{t}}{2\sqrt{t}}$

c) $\sec\dfrac{1}{2\sqrt{t}}\cdot\tan\dfrac{1}{2\sqrt{t}}$ d) $\sec\sqrt{t}\cdot\tan\sqrt{t}$

e) $\dfrac{\csc\sqrt{t}}{\sqrt{t}}$

33. Find the derivative of $y = \sin x^2$.

a) $2x\cos x^2$ b) $\cos x^2$

c) $\sin 2x$ d) $2\sin x\cos^2 x$

e) $x\cos x^2$

34. Differentiate: $y = \csc^2\theta + \cot^2\theta$

a) $\cot\theta + \csc^4\theta$

b) 0

c) $-4\csc^2\theta\cot\theta$

d) $-\csc^2\theta(\csc^2\theta + \cot^2\theta)$

e) 1

35. Find $f'(x)$ given $f(x) = \sin^3(4x)$.

a) $4\cos^3(4x)$ b) $3\sin^2 4x\cos(4x)$

c) $\cos^3 4x$ d) $12\sin^2 4x\cos(4x)$

e) $12\cos^2(4x)$

36. Given $2x = xy + y^2$, then $\dfrac{dy}{dx} =$

a) $\dfrac{-2+y}{x+2y}$ b) $\dfrac{-(2+y)}{x+2y}$ c) $\dfrac{(2-y)}{x+2y}$

d) $\dfrac{-2(y+1)}{x+2y}$ e) $\dfrac{-(-2+y)}{x+2xy}$

37. Find $\dfrac{dy}{dx}$ given $x = \sin(x+y)$.

a) 0 b) $\dfrac{1-\cos(x+y)}{\cos(x+y)}$

c) $\cos(x+y)$ d) 1

e) $\dfrac{1}{\cos(x+y)}$

38. What is the slope of the tangent line to $x^2y + xy^2 = 12$ at the point $(1,3)$?

a) $-\frac{15}{7}$ b) 3 c) $\frac{2}{3}$ d) $\frac{1}{3}$ e) $-\frac{1}{3}$

AP Calculus BC Chapter 2 Part 2 Review Gilliland 9/18/2014

Answer List

1.	b	2.	e	3.	a
4.	d	5.	c	6.	e
7.	e	8.	c	9.	e
10.	c	11.	a	12.	a
13.	d	14.	b	15.	d
16.	b	17.	c	18.	d
19.	a	20.	c	21.	b
22.	d	23.	d	24.	yes, $m = 5$
25.	no, slopes are different	26.	$(3, -6)$	27.	d
28.	d	29.	a	30.	b
31.	a	32.	b	33.	a
34.	c	35.	d	36.	c
37.	b	38.	a		

Catalog List

1.	APC DA 2	2.	APC DA 10	3.	APC DA 12
4.	APC DA 24	5.	APC DB 1	6.	APC DB 5
7.	APC DB 9	8.	APC DB 13	9.	APC DB 19
10.	APC DB 21	11.	APC DB 23	12.	APC DB 25
13.	APC DB 29	14.	APC DD 10	15.	APC EB 8
16.	APC EB 14	17.	APC EB 23	18.	APC EB 31
19.	APC EB 59	20.	APC EC 1	21.	APC EC 12
22.	APC EC 59	23.	APC EC 63	24.	APC EC 65
25.	APC EC 67	26.	APC EC 69	27.	APC ED 1
28.	APC ED 7	29.	APC EF 1	30.	APC EF 5
31.	APC EF 7	32.	APC EF 21	33.	APC EF 23
34.	APC EF 32	35.	APC EF 33	36.	APC EG 3
37.	APC EG 18	38.	APC EG 19		