

AP Calculus Multiple Choice Questions - Chapter 3

1 Evaluate:

$$\lim_{h \rightarrow 0} \frac{e^{(2+h)} - e^2}{h}$$

- a 0
c 2e
e $2e^2$
- b 1
d e^2

	3.1a
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2 Find the derivative of the given function at the given value of a:

$$f(x) = 1/x \quad a = 2$$

- a $-1/4$
c $1/4$
- b 4
d -4

	3.1a
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3 Find the derivative of the given function at the given value of a:

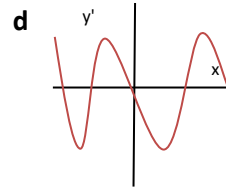
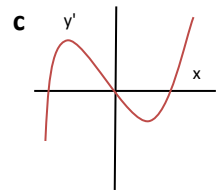
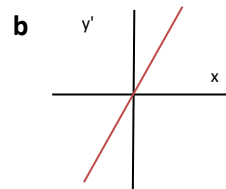
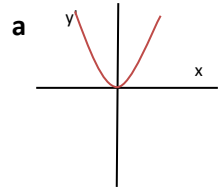
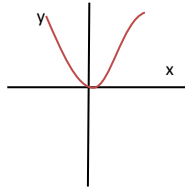
$$f(x) = 3 - x^2 \quad a = 1$$

- a -2
c 2
- b $1/2$
d $-1/2$

	3.1a
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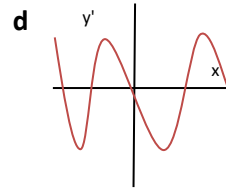
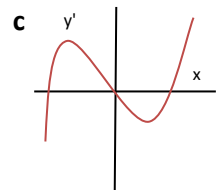
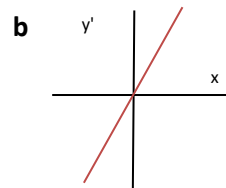
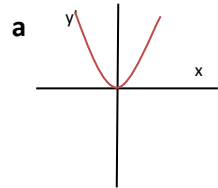
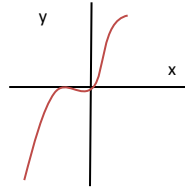
AP Calculus Multiple Choice Questions - Chapter 3

1 Match the graph of the function with the graph of its derivative



	3.1b
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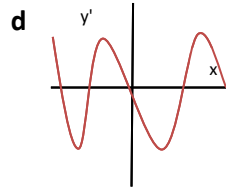
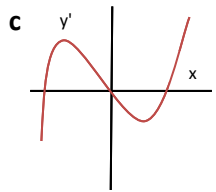
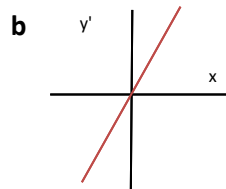
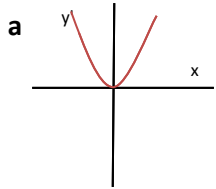
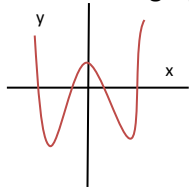
2 Match the graph of the function with the graph of its derivative



	3.1b
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AP Calculus Multiple Choice Questions - Chapter 3

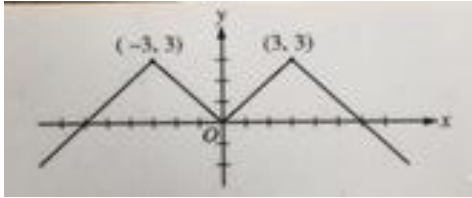
3 Match the graph of the function with the graph of its derivative



	3.1b
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AP Calculus Multiple Choice Questions - Chapter 3

1



The graph of the even function $y = f(x)$ consists of 4 line segments, as shown above. Which of the following statements about f is false?

a $\lim_{x \rightarrow 0} (f(x) - f(0)) = 0$

b $\lim_{x \rightarrow 0} \frac{f(x) - f(0)}{x} = 0$

c $\lim_{x \rightarrow 0} \frac{f(x) - f(-x)}{2x} = 0$

d $\lim_{x \rightarrow 2} \frac{f(x) - f(2)}{x - 2} = 1$

e $\lim_{x \rightarrow 3} \frac{f(x) - f(3)}{x - 3}$ does not exist

	3.2a
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2 Find all values of x for which the function is differentiable

$$f(x) = \sin|x| - 1$$

a $(-\infty, -1) \cup (-1, \infty)$

b $(-\infty, 0] \cup [0, \infty)$

c $(-\infty, \infty)$

d $(-\infty, 0) \cup (0, \infty)$

3 Find all values of x for which the function is differentiable

$$f(x) = (x^3 - 8) / (x^2 - 4x - 5)$$

a $(-\infty, -1) \cup (-1, 5) \cup (5, \infty)$

b $(-\infty, 0) \cup (0, \infty)$

c $(-\infty, -1) \cup (-1, \infty)$

d $(-\infty, \infty)$

	3.2a
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	3.2a
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AP Calculus Multiple Choice Questions - Chapter 3

1 Which of the following is true about the graph of $f(x)$ at $x^{4/5}$ at the point $x = 0$?

- a It has a corner
- b It has a cusp
- c It has a vertical tangent
- d It has a discontinuity
- e $f(0)$ does not exist

	3.2b
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2 Which of the following is true about the graph of $f(x) = x + \sqrt{x^2} + 2$ at the point $x = 0$?

- a It has a corner
- b It has a cusp
- c It has a vertical tangent
- d It has a discontinuity
- e $f(0)$ does not exist

	3.2b
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3 Which of the following is true about the graph of $f(x) = 3 - x^{1/3}$ at the point $x = 0$?

- a It has a corner
- b It has a cusp
- c It has a vertical tangent
- d It has a discontinuity
- e $f(0)$ does not exist

	3.2b
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AP Calculus Multiple Choice Questions - Chapter 3

- 1 Find the numerical derivative of the given function at the indicated point. Use $h = 0.001$.

$$f(x) = 4x - x^2 \quad x = 0$$

- a** -2 **b** 2
c 1 **d** 4

	3.2c
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- 2 Find the numerical derivative of the given function at the indicated point. Use $h = 0.001$.

$$f(x) = x^3 - 4x \quad x = 2$$

- a** 8 **b** 4
c 2 **d** 16

	3.2c
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- 3 Find the numerical derivative of the given function at the indicated point. Use $h = 0.001$.

$$f(x) = x^{2/3} \quad x = 0$$

- a** 1 **b** 0
c -1 **d** $1/2$

	3.2c
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AP Calculus Multiple Choice Questions - Chapter 3

- 1 Find the derivative of the following function

$$f(x) = (x^2 + 1)(x^3 + 1)$$

- a $3x^2 + 2x$ b $5x^4 + 3x^2 + 2x$
c $3x^2 + 2x + 1$ d $x^5 + x^3 + x^2 + 1$

	3.3a
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- 2 Find the derivative of the following function

$$f(x) = (2x + 5) / (3x - 2)$$

- a $19 / (3x - 2)^2$ b $-19 / (3x - 2)^2$
c $19 / (3x - 2)$ d $-19 / (3x - 2)$

	3.3a
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- 3 Find the derivative of the following function

$$f(x) = x^2 / (1 - x^3)$$

- a $(x^4 + 2x) / (1 - x^3)$ b $(x^4 + 2x) / (1 - x^3)^2$
c $-(x^4 + 2x) / (1 - x^3)$ d $-(x^4 + 2x) / (1 - x^3)^2$

	3.3a
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AP Calculus Multiple Choice Questions - Chapter 3

1 Find values of x for which the curve has horizontal tangents

$$f(x) = x^3 - 2x^2 + x + 1$$

a $x = 1/3, x = 1$

b $x = -1/3, x = -1$

c $x = -1/3, x = 1$

d $x = 1/3, x = -1$

	3.3b
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2 Find values of x for which the curve has horizontal tangents

$$f(x) = x^4 - 4x^2 + 1$$

a $x = 0, x = 1, x = -1$

b $x = 0$

c $x = 0, x = 1.414, x = -1.414$

d $x = 1, x = -1$

	3.3b
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3 Find values of x for which the curve has horizontal tangents

$$f(x) = 4x^3 - 6x^2 - 1$$

a $x = 0, x = -1$

b $x = 1, x = -1$

c $x = 0, x = 1$

d $x = 0$

	3.3b
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AP Calculus Multiple Choice Questions - Chapter 3

1 Find the fourth derivative of the following function

$$f(x) = x^4 + x^3 - 2x^2 + x - 5$$

- a $12x^2$
- b 12
- c $12x$
- d 24

	3.3c
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2 Find the fourth derivative of the following function

$$f(x) = x^2 + x + 3$$

- a $2x^2$
- b $2x$
- c 2
- d 0

	3.3c
--	-------------

3 Find the fourth derivative of the following function

$$f(x) = (x + 1) / x$$

- a $12 / x^3$
- b $12 / x^4$
- c $24 / x^5$
- d $24 / x^4$

	3.3c
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AP Calculus Multiple Choice Questions - Chapter 3

1 Evaluate the rate of change of volume V of a cube with side lengths of 5 units as a function of side length

- a 75 b 25
c 50 d 100

	3.4
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2 Evaluate the rate of change of the area A of a circle with circumference 18.8 units as a function of circumference

- a 2 b 3
c 4 d 3.5

	3.4
--	------------

3 Evaluate the rate of change of the area A of an equilateral triangle of side length 10 units as a function of side length

- a 8.66 b 9.23
c 8..02 d 9.87

	3.4
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AP Calculus Multiple Choice Questions - Chapter 3

1 What is

$$\lim_{h \rightarrow 0} \frac{\cos\left(\frac{3\pi}{2} + h\right) - \cos\left(\frac{3\pi}{2}\right)}{h}$$

- a 1
- c 0
- e Limit does not exist

b

$$\frac{\sqrt{2}}{2}$$

d -1

	3.5a
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2 Find the derivative of the following function

$$f(x) = 1 + x - \cos(x)$$

- a $1 - \sin(x)$
- c $1 - \sin^2(x)$

- b $1 + \sin(x)$
- d $1 + \sin^2(x)$

	3.5a
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3 Find the derivative of the following function

$$f(x) = x \sec x$$

- a $x \tan x + \sec x$
- c $x \sec x + \sec x$

- b $\sec x$
- d $x \sec x \tan x + \sec x$

	3.5a
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AP Calculus Multiple Choice Questions - Chapter 3

1 Find the jerk of the position function at time $t = 5$ sec
 $s(t) = 2 \cos(t)$

- a** 0.99 **b** -1.92
c 2.01 **d** -1.03

	3.5b
--	-------------

2 Find the acceleration of the position function at time $t = 2$ sec
 $s(t) = \sin(t) - \cos(t)$

- a** -0.49 **b** 0.53
c 1.85 **d** -1.22

	3.5b
--	-------------

3 Find the jerk of the position function at time $t = 10$ sec
 $s(t) = 1 + 2 \cos(t)$

- a** -1.09 **b** 1.32
c -0.41 **d** 2.82

	3.5b
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