

AP Calculus Multiple Choice Questions - Chapter 7

1 Find the general solution to the exact differential equation $dy/dx = 3t^2 \cos(t^3)$

- a $y = \cos(6t) + C$ b $y = \sin(6t) + C$
c $y = \cos(t^3) + C$ d $y = \sin(t^3) + C$

	7.1a
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2 Find the general solution to the exact differential equation $dy/dx = 5x^4 - \sec^2 x$

- a $y = x^5 - \tan x + C$ b $y = 20x^3 + \tan x + C$
c $y = x^5 + \tan x + C$ d $y = 20x^3 - \tan x + C$

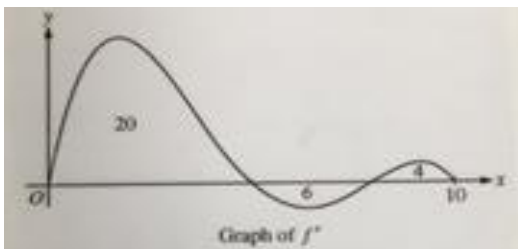
	7.1a
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3 Find the general solution to the exact differential equation $dy/dx = \sec x \tan x - e^x$

- a $y = \sec x + e^x + C$ b $y = \sec x - e^x + C$
c $y = \sin x + e^x + C$ d $y = \sin x - e^x + C$

	7.1a
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3



The graph of f' , the derivative of the function f , is shown above for $0 \leq x \leq 10$. The areas of the regions between the graph of f' and the x -axis are 20, 6, and 4, respectively. If $f(0) = 2$, what is the maximum value of f on the closed interval $0 \leq x \leq 10$?

- a 16 b 20
c 22 d 30
e 32

	7.1a
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AP Calculus Multiple Choice Questions - Chapter 7

- 1 Which of the following is the solution to the differential equation where $y(2) = -2$?

$$\frac{dy}{dx} = \frac{4x}{y}$$

a $y = 2x$ for $x > 0$

c $y = -\sqrt{4x^2 - 12}$ for $x > 3^{(1/2)}$

e $y = -\sqrt{4x^2 - 6}$ for $x > 1.5^{(1/2)}$

b $y = 2x - 6$ for x is not equal to 3

d $y = \sqrt{4x^2 - 12}$ for $x > 3^{(1/2)}$

	7.1b
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- 2 If $dy/dx = 2xy$ and $y = 1$ when $x = 0$, then $y =$

a y^{e^x}

c x^2y

e $(x^2y^2 / 2) + 1$

b $e^{x \cdot z}$

d $x^2y + 1$

	7.1b
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- 3 $dy/dx = 3 \sin(x)$ and $y = 2$ when $x = 0$

a $y = 3 \cos(x) + 5$

c $y = \cos(x) + 3$

b $y = \cos(x) - 3$

d $y = -3 \cos(x) + 5$

	7.1b
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- 2 If $f'(x) = 2/x$ and $f(e^{1/2}) = 5$, then $f(e) =$

a 2

c $5 + (2/e) - (2/e^2)$

e 25

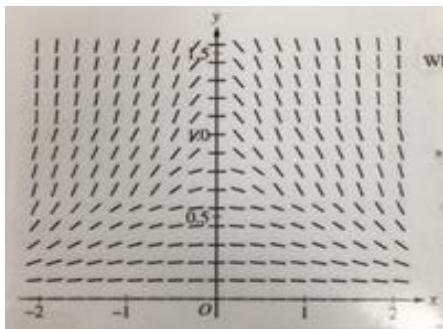
b $\ln 25$

d 6

	7.1b
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AP Calculus Multiple Choice Questions - Chapter 7

1



The slope field for a certain differential equation is shown above. Which of the following could be a solution to the differential equation with the initial condition $y(0) = 1$?

- a $y = \cos(x)$
- c $y = e^x$
- e $y = 1/(1 + x^2)$

- b $1 - x^2$
- d $y = \sqrt{1 - x^2}$

	7.1c
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2 A slope field for the differential equation $dy/dx = 42 - y$ will show

- a A line with slope -1 and y-intercept 42
- b A vertical asymptote at $x = 42$
- c A horizontal asymptote at $y = 42$
- d A family of parabolas opening downward
- e A family of parabolas opening to the left

	7.1c
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3 For which of the following differential equations will a slope field show nothing but negative slopes in the fourth quadrant?

- a $dy/dx = -x / y$
- c $dy/dx = xy^2 - 2$
- e $dy/dx = y / x^2 - 3$
- b $dy/dx = xy + 5$
- d $dy/dx = x^3 / x^2$

	7.1c
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AP Calculus Multiple Choice Questions - Chapter 7

1 If $f'(x) = \sin\left(\frac{\pi e^x}{2}\right)$ and $f(0) = 1$, then $f(2) =$

- a -1.819 b -0.843
c -0.819 d 0.157
e 1.157

	7.1d
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2 Use Euler's Method with increments of $\Delta x = 0.1$ to approximate the value of y when $x = 1.3$
 $dy/dx = x - 1$ $y = 2$ when $x = 1$

- a 2.03 b 4.22
c 1.01 d -1.98

	7.1d
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3 Use Euler's Method with increments of $\Delta x = 0.1$ to approximate the value of y when $x = 1.3$
 $dy/dx = y - 1$ $y = 3$ when $x = 1$

- a 5.55 b 3.66
c 1.21 d 4.89

	7.1d
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AP Calculus Multiple Choice Questions - Chapter 7

1 Evaluate:

$$\int \tan x dx$$

- a $(\tan^2 x / 2) + C$ b $\ln|\cot(x)| + C$
c $\ln|\cos(x)| + C$ d $-\ln|\cos(x)| + C$
e $-\ln|\cot(x)| + C$

	7.2a
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2 Evaluate:

$$\int (\cos(x) - 3x^2) dx$$

- a $\sin(x) - x^3 + C$ b $\sin(x) - 3x^2 + C$
c $\cos(x) - 3x^2 + C$ d $\cos(x) - x^3 + C$

	7.2a
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3 Evaluate:

$$\int \cos(3x + 4) dx$$

- a $\sin(3x + 4) + C$ b $3 \sin(3x + 4) + C$
c $0.33 \sin(3x + 4) + C$ d $0.33 \sin(3) + C$

	7.2a
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AP Calculus Multiple Choice Questions - Chapter 7

1 Use differentiation to verify the antiderivative formula

$$\int \csc^2 u \, du = -\cot u + C$$

- a True b False
 c Can't Determine

	7.2b
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2 Use differentiation to verify the antiderivative formula

$$\int e^{2x} \, dx = 0.5e^{2x} + C$$

- a True b False
 c Can't Determine

	7.2b
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3 Use differentiation to verify the antiderivative formula

$$\int 5^x \, dx = \ln(5)5^x + C$$

- a True b False
 c Can't Determine

	7.2b
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1 Evaluate:

$$\int \cos(3x) \, dx$$

- a $-3 \sin(3x) + C$ b $-(1/3) \sin(3x) + C$
 c $(1/3) \sin(3x) + C$ d $\sin(3x) + C$
 e $3 \sin(3x) + C$

	7.2b
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2 Evaluate:

$$\int \frac{dx}{(1-x)^2}$$

- a $1/(1-x) + C$ b $1/(1+x) + C$
 c $1/x + C$ d $-1/(1-x) + C$

	7.2b
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3 Evaluate:

$$\int \frac{\ln^6 x}{x} \, dx$$

- a $(1/7)(\ln x)^6 + C$ b $(1/7)(\ln x)^7 + C$
 c $(1/6)(\ln x)^6 + C$ d $(1/6)(\ln x)^7 + C$

	7.2b
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AP Calculus Multiple Choice Questions - Chapter 7

1 Evaluate:

$$\int (x^3 + 1)^2 dx$$

a $\frac{1}{7}x^7 + x + C$

c $6x^2(x^3 + 1) + C$

e $\frac{(x^3 + 1)^3}{9x^2} + C$

b $\frac{1}{7}x^7 + \frac{1}{2}x^4 + x + C$

d $\frac{1}{3}(x^3 + 1)^3 + C$

2 Evaluate:

$$\int (x-1)\sqrt{x} dx$$

a $\frac{3}{2}\sqrt{x} - \frac{1}{\sqrt{x}} + C$

c $\frac{1}{2}x^2 - x + C$

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

b $\frac{2}{3}x^{3/2} + \frac{1}{2}x^{1/2} + C$

d $\frac{2}{5}x^{5/2} - \frac{2}{3}x^{3/2} + C$

3 If $\int x^2 \cos x dx = h(x) - \int 2x \sin x dx$

then $h(x) =$

a $2\sin(x) + 2x \cos(x) + C$

c $2x \cos(x) - x^2 \sin(x) + C$

e $(2 - x^2) \cos(x) - 4 \sin(x) + C$

b $x^2 \sin(x) + C$

d $4 \cos(x) - 2x \sin(x) + C$

	7.3a
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	7.3a
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	7.3a
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AP Calculus Multiple Choice Questions - Chapter 7

1 Evaluate:

$$\int x^4 e^{-x} dx$$

- a $(-x^4 - 4x^3 - 12x^2 - 24x - 24)e^{-x} + C$
 c $(-x^4 - 4x^3 - 12x^2 - 24x - 24)e^x + C$

- b $(-x^4 - 4x^3 - 12x^2 - 24x - 24)e^{-x} + C$
 d $(-x^4 - 4x^3 - 12x^2 - 24x - 24)e^x + C$

	7.3b
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2 Evaluate:

$$\int (x^2 - 5x)e^x dx$$

- a $(x^2 - 7x + 7)e^x + C$
 c $(x^2 - 7x + 7)e^{-x} + C$

- b $(x^2 - 7x + 7)e^x + C$
 d $(x^2 - 7x + 7)e^{-x} + C$

	7.3b
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3 Evaluate:

$$\int x^3 \cos(2x) dx$$

- a $(x^3/2) \sin(2x) - (3x^2/4)\cos(2x) - (3x/4) \sin(2x) - (3/8) \cos(2x) + C$
 c $(x^3/2) \sin(2x) - (3x^2/4)\cos(2x) + (3x/4) \sin(2x) - (3/8) \cos(2x) + C$

- b $(x^3/2) \sin(2x) - (3x^2/4)\cos(2x) + (3x/4) \sin(2x) + (3/8) \cos(2x) + C$
 d $(x^3/2) \sin(2x) + (3x^2/4)\cos(2x) - (3x/4) \sin(2x) - (3/8) \cos(2x) + C$

	7.3b
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AP Calculus Multiple Choice Questions - Chapter 7

1 Oil is leaking from a tanker at a rate of $R(t) = 2000 e^{-0.2t}$ gallons per hour, where t is measured in hours. How much oil leaks out of the tanker from time $t = 0$ to $t = 10$?

- a 54 gallons
b 271 gallons
c 865 gallons
d 8647 gallons
e 14778 gallons

	7.4a
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2 An apple pie comes out of the oven at 425°F and is placed on a counter in a 68°F room to cool. In 30 minutes it has cooled to 195°F . According to Newton's Law of Cooling, how many additional minutes must pass before it cools to 100°F ?

- a 12.4
b 15.4
c 25.0
d 35.0
e 40.0

	7.4a
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3 A sample of Ce-143 (an isotope of cerium) loses 99% of its radioactive matter in 199 hours. What is the half-life of Ce-143?

- a 4 hours
b 6 hours
c 30 hours
d 100.5 hours
e 143 hours

	7.4a
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AP Calculus Multiple Choice Questions - Chapter 7

1 A bank account earning continuously compounded interest doubles in value in 7.0 years. At the same interest rate, how long would it take the value of the account to triple?

- a 4.4 years b 9.8 years
c 10.5 years d 11.1 years
e 21.0 years

	7.4b
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2 Suppose you deposit \$800 in an account that pays 6.3% annual interest. How much will you have 8 years later if the interest is compound continuously?

- a \$998.23 b \$1158.45
c \$1324.26 d \$1418.92
e \$1521.20

	7.4b
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3 Find the amount of time required for a \$2000 investment to double if the annual interest rate r is compounded continuously if the rate is 8.25%

- a 8.40 years b 7.21 years
c 9.99 years d 6.58 years

	7.4b
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