AP Calculus Multiple Choice Questions - Chapter 8

1 A particle moves along the x-axis so that at any time $t > 0$, its velocity is given by $v(t) = 4 - 6t^2$. If the particle is at position $x = 7$ at time $t = 1$, what is the position of the particle at time $t = 2$?

	8.1a

a -10
b -5
c -3
d 3
e 17

2 The position of a particle moving along a line is given by $s(t) = 2t^3 - 24t^2 + 90t + 7$ for $t \geq 0$. For what values of t is the speed of the particle increasing?

	8.1a

a $3 < t < 4$ only
b $t > 4$ only
c $t > 5$ only
d $0 < t < 3$ and $t > 5$
e $3 < t < 5$ and $t > 5$

3 A particle travels along a straight line with a velocity of $v(t) = 3e^{(-t/2)}\sin(2t)$ meters per second. What is the total distance, in meters, traveled by the particle during the time interval $0 \leq t \leq 2$ seconds?

	8.1a

a 0.835
b 1.850
c 2.055
d 2.261
e 7.025

4 Two particles start at the origin and move along the x-axis. For $0 < t < 10$, their respective position functions are given by $x_1 = \sin(t)$ and $x_2 = e^{-t} - 1$. For how many values of t do the particles have the same velocity?

	8.1a

a None
b One
c Two
d Three
e Four

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1 The data for the acceleration a(t) of a car from 0 to 15 seconds are given in the table below. If the velocity at t = 0 is 5 ft/sec, which of the following rules gives the approximate velocity at t = 15 using the Trapezoidal rule?

t (sec)	0	3	6	9	12	15
a(t) ft/sec^2	4	8	6	9	10	10

a 47 ft/sec
b 52 ft/sec
c 120 ft/sec
d 125 ft/sec
e 141 ft/sec

8.1b

2 The rate at which customers arrive at a counter to be served is modeled by the function F defined by $F(t) = 12 + 6\cos(t/\pi)$ for $0 < t < 60$, where F(t) is measured in customers per minute and t is measured in minutes. To the nearest whole number, how many customers arrive at the counter over the 60 minute period?

a 720
b 725
c 732
d 744
e 756

8.1b

3 Pollution is being removed from a lake at a rate modeled by the function $y = 20e^{-0.5t}$ tons/yr, where t is the number of years since 2005. Estimate the amount of pollution removed from the lake between 2005 and 2015. Round your answer to the nearest ton.

a 40
b 47
c 56
d 61
e 71

8.1b

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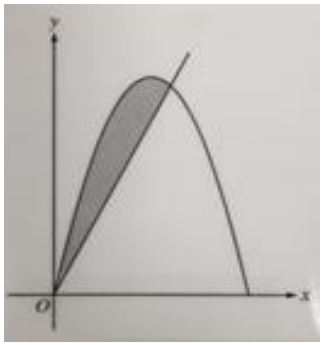
1 What is the area of the region enclosed by the graphs of $f(x) = x - 2x^2$ and $g(x) = -5x$?

	8.2

a 7/3 **b** 16/3
c 20/3 **d** 9
e 36

2

	8.2



The figure above shows the graph of $y = 5x - x^2$ and the graph of the line $y = 2x$. What is the area of the shaded region?

a 25/6 **b** 9/2
c 9 **d** 27/2
e 45/2

3 Which of the following gives the area of the region between the graphs of $y = x^2$ and $y = -x$ from $x = 0$ to $x = 3$?

	8.2

a 2 **b** 9 / 2
c 13 / 2 **d** 13
e 27 / 2

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1 Let S be the region enclosed by the graphs of y = 2x and y = $2x^2$ for $0 \le x \le 1$. What is the volume of the solid generated when S is revolved around the line y = 3?

	8.3

a $\pi\int_0^1((3-2x^2)^2-(3-2x)^2)dx$

b $\pi\int_0^1((3-2x)^2-(3-2x^2)^2)dx$

c $\pi\int_0^1(4x^2-4x^4)dx$

d $\pi\int_0^2((3-\frac{y}{2})^2-(3-\sqrt{\frac{y}{2}})^2)dy$

e $\pi\int_0^2((3-\sqrt{\frac{y}{2}})^2-(3-\frac{y}{2})^2)dy$

2 The base of a solid S is the region enclosed by the graph of y = ln(x), the line x = e, and the x-axis. If the cross sections of S perpendicular to the x-axis are squares, which of the following gives the best approximation of the volume of S?

	8.3

a 0.718
b 1.718
c 2.718
d 3.171
e 7.388

3 Let R be the region in the first quadrant bonded by the graph of y = 8 - $x^{3/2}$, the x-axis, and the y-axis. Which of the following gives the best approximation of the volume of the solid generated when R is revolved about the x-axis?

	8.3

a 60.3
b 115.2
c 225.4
d 319.7
e 361.9