



Nazareth Academy High School
Advance Placement Calculus BC
Summer Assignment

Ms. Souyack

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Name _____

Advanced Placement Calculus BC is an advanced-level mathematics course which utilizes certain aspects of previous math courses that you have taken. In order to ensure your success in the course, there is a mandatory summer assignment packet.

Most topics should be a review. You should not only be familiar with the topics but should know them well enough to be tested on them.

Study your unit circle! You need to know this well for AP Calculus BC.

On the first day of class, you should have your completed summer assignment with you. The assignment will be graded as your first test grade for the year. No work, no credit. Please circle or box your final answers. If the assignment is late, you will lose 20% of your grade each day until it is handed in.


If you have any questions during the summer, please email me.

This is a very challenging course. You should be prepared to work to the best of your ability. Success in the course will be a result of your desire to work hard, both in class and independently.

Have a great summer!

Ms. Souyack

Directions: Beginning In cell #1, do and show all the work necessary to answer the question. Search for your answer and call that cell #2. Continue In this manner until you complete the circuit (answer all the questions). You will find a calculator icon if one is needed.

<p>Answer: 9</p> <p>#_1_ $\frac{d}{dx}(\cos(x^2))$</p>	<p>Answer: 1.75</p> <p>#___ Find the average rate of change for the function $f(x) = 4x - x^2$ on the interval [1, 3].</p> 
<p>Answer: 96π</p> <p>#___ The negative x-coordinate(s) of the point(s) of inflection of $f(x) = \frac{x}{x^2+1}$ is...</p>	<p>Answer: 3.2</p> <p>#___ $y = x^2 \ln x^3$. Find $y'(1)$.</p>
<p>Answer: 9.827</p> <p>#___ Find $\frac{dy}{dx}$ for the circle $(x - 3)^2 + (y - 2)^2 = 25$.</p>	<p>Answer: $\ln(e^x + c)$</p> <p>#___ The relative minimum of the function $f(x) = 2x^3 - \frac{5}{2}x^2 - 4x + 2$ on the interval [-1, 2] is at $x = \underline{\hspace{1cm}}$?</p>

Answer: 12

____ A pebble is thrown into a pond forming ripples whose radius increases at a rate of 4 in./s. How fast is the area of the ripple changing when the radius is one foot?



Answer: $-2x \sin(x^2)$

____ $\int e^{3x} dx$

Answer: $-\frac{25}{64}$

____ If $F(x) = \int e^{-2x} dx$, find $F''(x) =$ ____?

Answer: 11.1

____ The lower sum of $f(x) = -(x - 1)^2 + 1$ on the interval $[0, 2]$ with four equal subintervals is...

Answer: $\frac{1}{3}e^{3x} + C$

____ $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sec^2 \theta d\theta$

Answer: $-\frac{2}{3}$

____ Find the area enclosed by the graphs of $f(x) = 2 - x$ and $g(x) = x^2$. Round to the nearest tenth.

Answer: $\frac{1-6xy}{3x^2-2}$

____ The position function of a particle moving horizontally along the x-axis is given by $x(t) = \sin(3t - 2\pi) + t$. Find the initial velocity of the particle.

Answer: $\frac{3-x}{y-2}$

____ $f(x) = \frac{1}{\ln x}$ is continuous and differentiable on which interval(s)? To move on in the circuit, use the x-value that is equal to 0.



Answer: 0.445

____ A ball is thrown upward from the top of a building 100 feet high at initial velocity of 20 ft/s. How long will it take until the ball hits the ground? Round to the nearest hundredth.



Answer: 2

____ Write the equation of the line tangent to $y = x^3 - 2x + 3$ at $x = -1$.

Answer: $-\frac{51}{25}$

____ $\lim_{x \rightarrow -\infty} \frac{\sqrt{25x^2+x}}{64x-3}$. Leave as a simplified fraction.

Answer: 4.5

____ Find the equation of the line perpendicular to the line tangent to $f(x) = \ln(3 - 2x)$ at $x = 1$.

Answer: $\frac{4}{3}$

____ Consider a particle whose motion is represented by the position equation $s(t) = t^2 - t, t \geq 0$, where s is feet and t is seconds. Find the distance traveled by the particle in the first two seconds.



Answer: 4

____ Evaluate $\frac{d^2y}{dx^2}$ for the conic section $x^2 - y^2 = 25$ at the point $(-\sqrt{41}, 4)$. Leave as a simplified fraction.

Answer: $y = x + 5$

____ Find $\frac{dy}{dx}$ for the relation $3yx^2 - 2y = x$.

Answer: $\frac{14}{9}$

____ The area enclosed by the graphs of $y = \sqrt{16 - x^2}$ and the line $y = 2$. Round to 3 decimals.



Answer: $\sqrt[3]{\frac{x-1}{2}}$

____ Find the general solution of the differential equation $\frac{dy}{dx} = e^{x-y}$.

Answer: $\frac{3}{4}$

____ $\lim_{x \rightarrow 0} \frac{(2+x)^3 - 8}{x}$

Answer: $-\frac{5}{64}$

____ Find the average value of $y = \sqrt{x}$ on the interval $[1, 4]$. Leave as a simplified fraction.

Answer: 3

____ A bank account that is earning continuously compounded interest doubles in value in 7.0 years. At the same rate, how long would it take the value of the account to triple? Round to the nearest tenth.



Answer: 0

____ Find the slope of the line with equation $2x + 3y = 5$. Leave as a simplified fraction.

Answer: $\frac{1}{2}(x - 1)$

____ What is the minimum distance from $y = (x - 2)^3$ to the point $(1, 0)$? Round to 3 decimal places. To move on in the circuit, use the y-value.



Answer: $-\sqrt{3}$

____ Find the inverse of the equation $y = 2x^3 + 1$.

Answer: $-2e^{-2x}$

____ Find $f'(-3)$ for the function $f(x) = \frac{3x-2}{x^2-4}$. Leave as a simplified fraction.