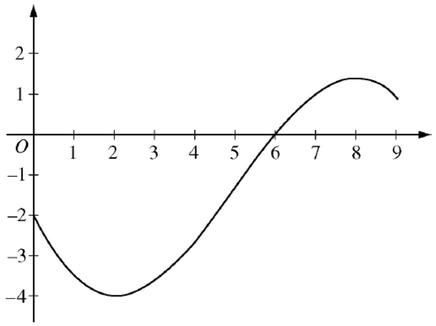
AP Calculus
QR Code Review

Name: ______________________________
Date: ____________________ Per: ____

Create two true statements from the problems below:

Problem	QR code	Word
Let f be the function given by $f(x) = 300x - x^3$. On which of the following intervals is the function f increasing? (A) $(-\infty, -10]$ and $[10, \infty)$ (B) $[-10, 10]$ (C) $[0, 10]$ only (D) $[0, 10\sqrt{3}]$ only (E) $[0, \infty)$		
If $f(x) = 7x - 3 + \ln x$, then $f'(1) =$ (A) 4 (B) 5 (C) 6 (D) 7 (E) 8		
$f(x) = \begin{cases} \dfrac{(2x+1)(x-2)}{x-2} & \text{for } x \neq 2 \\ k & \text{for } x = 2 \end{cases}$ Let f be the function defined above. For what value of k is f continuous at $x = 2$? (A) 0 (B) 1 (C) 2 (D) 3 (E) 5		
If $y = x \sin x$, then $\frac{dy}{dx} =$ (A) $\sin x + \cos x$ (B) $\sin x + x\cos x$ (C) $\sin x - x\cos x$ (D) $x(\sin x + \cos x)$ (E) $x(\sin x - \cos x)$		



Graph of f

The graph of a differentiable function f is shown above. If $h(x) = \int_0^x f(t)\,dt$, which of the following is true?

(A) $h(6) < h'(6) < h''(6)$

(B) $h(6) < h''(6) < h'(6)$

(C) $h'(6) < h(6) < h''(6)$

(D) $h''(6) < h(6) < h'(6)$

(E) $h''(6) < h'(6) < h(6)$

What is the area of the region in the first quadrant bounded by the graph of $y = e^{x/2}$ and the line $x = 2$?

(A) $2e - 2$ (B) $2e$ (C) $\frac{e}{2} - 1$ (D) $\frac{e-1}{2}$ (E) $e - 1$

$\lim_{h \to 0} \frac{\ln(4+h) - \ln(4)}{h}$ is

(A) 0 (B) $\frac{1}{4}$ (C) 1 (D) e (E) nonexistent

t (hours)	4	7	12	15
$R(t)$ (liters/hour)	6.5	6.2	5.9	5.6

A tank contains 50 liters of oil at time $t = 4$ hours. Oil is being pumped into the tank at a rate $R(t)$, where $R(t)$ is measured in liters per hour, and t is measured in hours. Selected values of $R(t)$ are given in the table above. Using a right Riemann sum with three subintervals and data from the table, what is the approximation of the number of liters of oil that are in the tank at time $t = 15$ hours?

(A) 64.9 (B) 68.2 (C) 114.9 (D) 116.6 (E) 118.2

New Sentence

If $y = \left(x^3 - \cos x\right)^5$, then $y' =$

(A) $5\left(x^3 - \cos x\right)^4$

(B) $5\left(3x^2 + \sin x\right)^4$

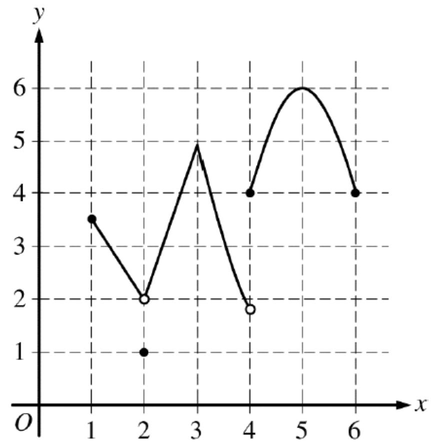
(C) $5\left(3x^2 + \sin x\right)$

(D) $5\left(3x^2 + \sin x\right)^4 \cdot (6x + \cos x)$

(E) $5\left(x^3 - \cos x\right)^4 \cdot \left(3x^2 + \sin x\right)$

The function f is defined by $f(x) = \begin{cases} 2 & \text{for } x < 3 \\ x - 1 & \text{for } x \geq 3. \end{cases}$ What is the value of $\int_1^5 f(x)\,dx$?

(A) 2 (B) 6 (C) 8 (D) 10 (E) 12



Graph of f

The graph of the function f is shown above. Which of the following statements is false?

(A) $\lim_{x \to 2} f(x)$ exists.

(B) $\lim_{x \to 3} f(x)$ exists.

(C) $\lim_{x \to 4} f(x)$ exists.

(D) $\lim_{x \to 5} f(x)$ exists.

(E) The function f is continuous at $x = 3$.

. The line $y = 5$ is a horizontal asymptote to the graph of which of the following functions?

(A) $y = \dfrac{\sin(5x)}{x}$ (B) $y = 5x$ (C) $y = \dfrac{1}{x-5}$ (D) $y = \dfrac{5x}{1-x}$ (E) $y = \dfrac{20x^2 - x}{1 + 4x^2}$

$\int \sec x \tan x \, dx =$

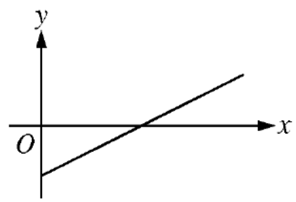
(A) $\sec x + C$

(B) $\tan x + C$

(C) $\dfrac{\sec^2 x}{2} + C$

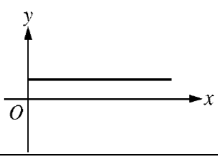
(D) $\dfrac{\tan^2 x}{2} + C$

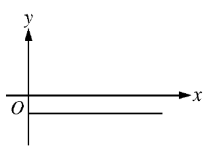
(E) $\dfrac{\sec^2 x \tan^2 x}{2} + C$

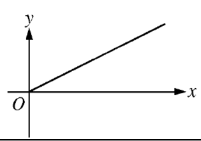


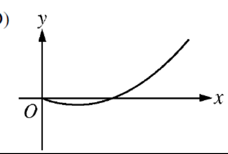
Graph of f

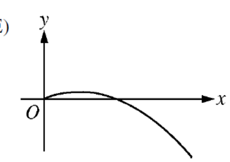
The figure above shows the graph of f. If $f(x) = \int_2^x g(t)\, dt$, which of the following could be the graph of $y = g(x)$?

(A)


(B)


(C)


(D)


(E)


If $f(x) = \sqrt{x^2 - 4}$ and $g(x) = 3x - 2$, then the derivative of $f(g(x))$ at $x = 3$ is

(A) $\dfrac{7}{\sqrt{5}}$ (B) $\dfrac{14}{\sqrt{5}}$ (C) $\dfrac{18}{\sqrt{5}}$ (D) $\dfrac{15}{\sqrt{21}}$ (E) $\dfrac{30}{\sqrt{21}}$

Let g be a function with first derivative given by $g'(x) = \int_0^x e^{-t^2}\, dt$. Which of the following must be true on the interval $0 < x < 2$?

(A) g is increasing, and the graph of g is concave up.

(B) g is increasing, and the graph of g is concave down.

(C) g is decreasing, and the graph of g is concave up.

(D) g is decreasing, and the graph of g is concave down.

(E) g is decreasing, and the graph of g has a point of inflection on $0 < x < 2$.