Name:
Teacher:
Period:
Due Date:

Be Good
Why>How>What

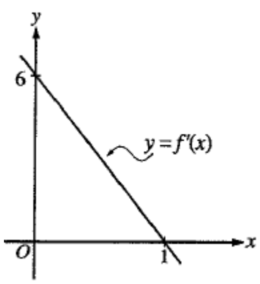
HW 4.2B

1.) Integrate

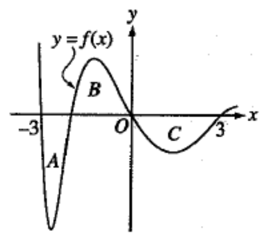
$$\int_0^{\frac{\pi}{4}} \sin x \, dx$$

2.) Differentiate

$$\frac{d}{dx}\left(\int_0^{x^2} \sin(t^3)\, dt\right)$$



3.) The graph of f', the derivative of f, is the line shown in the figure above. If $f(0) = 5$, then $f(1) =$?

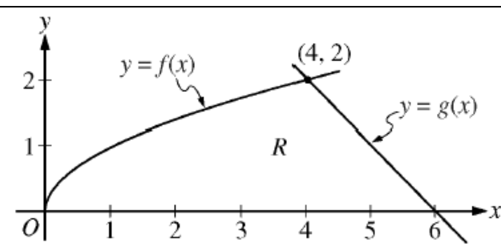


4.) The regions A, B and C in the figure above are bounded by the graph of the function f and x-axis. If the area of each region is 2, what is the value of $\int_{-3}^{3}(f(x)+1)dx$?

5.) A particle moves along the x-axsuch that at any time $t > 0$, its acceleration is given by $a(t) = t^3$. If the velocity of the particle is 2 at time $t = 1$, then the velocity of the particle at time $t = 2$ is…

6.) Let g be the function given by $g(x) = \int_0^x \sin(t^2)\, dt$ for $-1 \le x \le 3$. On which of the following intervals is g decreasing?

7.) (2011 B) Consider a differentiable function f with derivative $f'(x) = (4 - x)x^{-3}$. Given that $f(1) = 2$, determine the function f.



8.) The function f and g are given by $f(x) = \sqrt{x}$ and $g(x) = 6 - x$. Let R b the region bounded by the x-axis and the graphs of f and g as shown by the figure above. Find the area of R.

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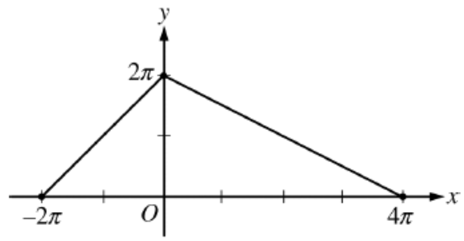
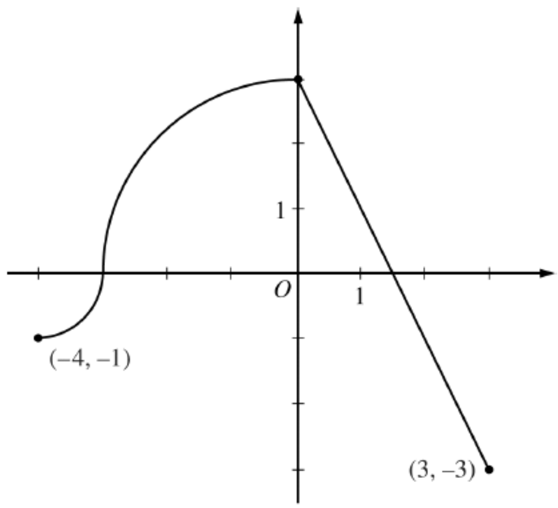


Graph of g

9.) Let g be the piecewise-linear function defined on $[-2\pi, 4\pi]$ whose graph is given above, and let $f(x) = g(x) - \cos\left(\frac{x}{2}\right)$.

a. Find $\int_{-2\pi}^{4\pi} f(x)dx$

b. Let $h(x) = \int_0^{3x} g(t)dt$. Find $h'\left(-\frac{\pi}{3}\right)$



Graph of f

10.) The continuous function f is defined on the interval $-4 \leq x \leq 3$. The graph of f consists of two quarter circles and one line segment as shown in the figure above. Let $g(x) = 2x + \int_0^x f(t)dt$.

a. Find $g(-3)$. Find $g'(x)$ and evaluate $g'(-3)$.

b. Determine the x-coordinate of the point at which g has an absolute maximum on the interval $-4 \leq x \leq 3$. Justify your answer.