Calculus AB Name______________________________

6.3 Opener

Suppose f *and* g **are continuous functions and that**

$$\int_{-3}^{2} g(x)\,dx = -4 \qquad \int_{0}^{2} g(x)\,dx = 1 \qquad \int_{-3}^{2} f(x)\,dx = 4$$

Find each integral.

a. $\int_{-3}^{0} g(x)\,dx = \int_{-3}^{2} g(x)\,dx - \int_{0}^{2} g(x)\,dx$

$= -4 - 1$

$= \boxed{-5}$

b. $\int_{-3}^{2}\left[0.5f(x) - \frac{g(x)}{5}\right]dx =$

$.5(4) - \left(\frac{-4}{5}\right)$

$2 + \frac{4}{5} = \boxed{2\frac{4}{5}}$

Find the average value of the function on the interval. (For a) use the antiderivative; for b) use geometry to evaluate the integral.)

a. $f(x) = 3x^2 + 1 \;\; [-1, 2]$

$av(f) = \frac{1}{2-(-1)} \int_{-1}^{2} (3x^2 + 1)\,dx$

$= \frac{1}{3}\left(x^3 + x\right)\Big|_{-1}^{2}$

$= \frac{1}{3}\left((8+2) - (-1 + -1)\right)$

$= \frac{1}{3}(10 + 2)$

$\boxed{av(f) = 4}$

where does $f(x) = av(f)$?

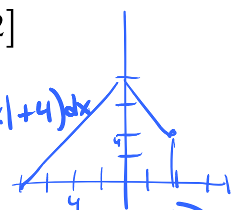
$3x^2 + 1 = 4$

$3x^2 = 3$

$x^2 = 1$

$\boxed{x = \pm 1}$ (both are in interval)

b. $g(x) = -|x| + 4 \;\; [-4, 2]$



$av(g) = \frac{1}{2-(-4)} \int_{-4}^{2} (-|x| + 4)\,dx$

$= \frac{1}{6}\left(\frac{1}{2}(4)(4) + \frac{1}{2}(4+2)(2)\right)$

$= \frac{1}{6}(8 + 6)$

$= \frac{14}{6}$

$\boxed{\frac{7}{3}}$

where does $g(x) = av(g)$?

$-|x| + 4 = \frac{7}{3}$

$-|x| = \frac{-5}{3}$

$|x| = \frac{5}{3}$

$\boxed{x = \frac{5}{3}, -\frac{5}{3}}$ both in interval