23 total pts

AB Calculus Quiz 12 vA
FTC & Properties of Integrals
Dr. Wisniewski Spring 2020

Name Solution Deathsü **Period**_____

Instructions: Work each of the following problems showing as much work as possible. A calculator **is not permitted** on this quiz.

1. (6 Pts) Given $\int_{-3}^{2} f(x)dx = 7$, $\int_{-3}^{2} g(x)dx = -4$ and $\int_{-3}^{5} f(x)\,dx = 15$, find

a. $\int_{-3}^{2} 2\,g(x)\,dx$
$= 2\int_{-3}^{2} g(x)dx = (2)(-4) = -8$

b. $\int_{-3}^{2}[f(x) - g(x)]\,dx$
$\int_{-3}^{2} f(x)\,dx - \int_{-3}^{2} g(x)dx =$
$7 - (-4) = 11$

c. $\int_{2}^{-3} g(x)\,dx = -\int_{-3}^{2} g(x)dx$
$= -(-4)$
$= 4$

d. $\int_{-3}^{2}[f(x) + 5]\,dx = \int_{-3}^{2} f(x)dx + 5\int_{-3}^{2} dx$
$7 + 5 \cdot 5$
32

e. $\int_{2}^{5} f(x)\,dx = \int_{-3}^{5} f(x)dx - \int_{-3}^{2} f(x)dx$
$15 - 7 = 8$

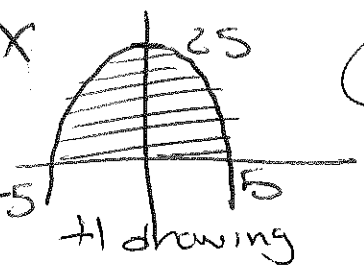
f. $\int_{1}^{1} f(x)\,dx = 0$

2. (3 Pts) Find the area of the region enclosed by the graph of $y = 25 - x^2$ and the x −axis. Construct a sketch of the region and shade the enclosed area.

$A = \int_{-5}^{5}(25 - x^2)dx = 2\int_{0}^{5}(25 - x^2)dx$
+1 for integral

$= 2\left[25x - \frac{x^3}{3}\right]_0^5$ +1 for execution/answer

$= 2\left[25 \cdot 5 - \frac{125}{3}\right] = 2\left[125 - \frac{125}{3}\right] = 2\left[\frac{375 - 125}{3}\right] = \frac{2}{3}(250) = \frac{500}{3}$



+1 drawing

.5/3 if they think 1/3 a circle.

Typo

3. (12 Pts) Evaluate each of the following integrals.

$3x+2=0$
$3x=-2$
$x=-2/3$

a. $\int_{-2}^{2} 4x^3\,dx$ $= 4\int_{-2}^{2} x^3\,dx$

$4\cdot\frac{x^4}{4}\Big|_{-2}^{2} = 0$ odd

b. $\int \frac{x^2-2x+3}{x}\,dx$

$\int\left(x-2+\frac{3}{x}\right)dx$; 5 for no const.

$= \frac{x^2}{2} - 2x + 3\ln|x| + C$

c. $\int_{-\pi/2}^{\pi/2} \cos x\,dx$

$= 2\int_0^{\pi/2} \cos x\,dx = 2\left[\sin x\right]_0^{\pi/2}$

$= 2(\sin\pi/2 - \sin 0)$

$2\cdot 1 = 2$

d. $\int_{-2}^{1} |3x+2|\,dx$ $=$

$\int_{-2}^{-2/3} -(3x+2)\,dx + \int_{-2/3}^{1} (3x+2)\,dx$

$\int_{-2/3}^{2} (3x+2)\,dx + \int_{-2/3}^{1} (3x+2)\,dx$

$\frac{3x^2}{2}+2x\Big|_{-2/3}^{-2} + \frac{3x^2}{2}+2x\Big|_{-2/3}^{1}$

discontinuous @ $x=0$

6.8333 $41/6$

$6\frac{5}{6}$

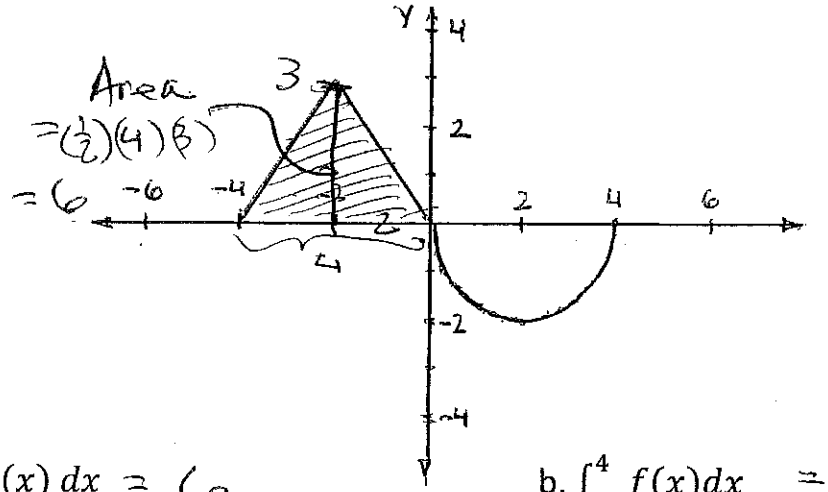
e. $\int_{-3}^{3} x^{-2}\,dx$

FTC DNA

f. $\int \sec\theta\tan\theta\,d\theta$

$= \sec\theta + C$

4. (2 Pts) The graph of the function $y = f(x)$ is given below. The graph is made up of a triangle and a semi-circle. Evaluate the two integrals.



a. $\int_{-4}^{0} f(x)\,dx = 6$

b. $\int_{-2}^{4} f(x)\,dx = 3 - \frac{\pi\cdot 2^2}{2}$

$3-2\pi$

94%