• FTC needs 2 apply
• INT • f a const ≠ 0
• $\frac{x^2+3x-5}{x} = x+3-5/x$

• No dx — lose pts moving forward

23 total pts

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

Name Solution Dai'hatsu **Period** 00I i 3

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

1. (12 Pts) Evaluate each of the following integrals.

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

DNA. f(x) has discontinuity at x=0.

d. $\int_{-2}^{1} |4x+3|\,dx$ $4x+3=0 \to 4x=-3$, $x=-3/4$

$= -\int_{-2}^{-3/4}(4x+3)\,dx + \int_{-3/4}^{1}(4x+3)\,dx$

$= 9.250 = 9\,1/4 = \boxed{37/4}$

b. $\int \frac{x^2+3x-5}{x}\,dx = \int\left(x+3-\frac{5}{x}\right)dx$

$= \boxed{\frac{x^2}{2}+3x-5\ln|x|+C}$

e. $\int_{-2}^{2} 4x^3\,dx$ odd funct

$\boxed{=0}$

+ − cancel = 0

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

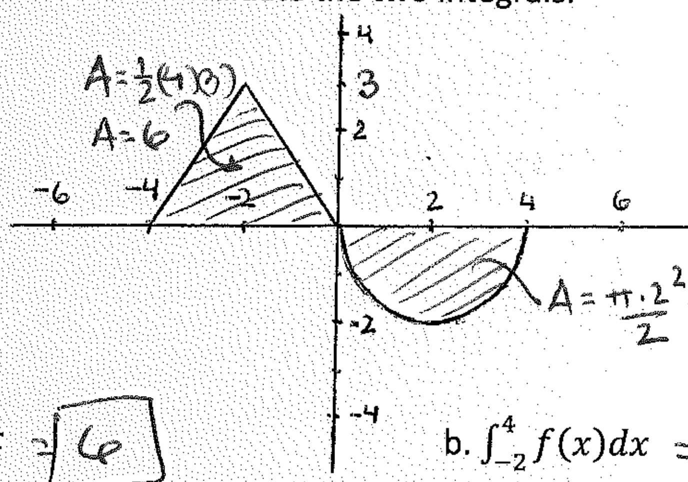
$= 2\int_0^{\pi/2}\cos x\,dx = 2\left[\sin x\right]_0^{\pi/2}$

$= 2(\sin \pi/2 - \sin 0) = \boxed{2}$

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

$\boxed{\sec\theta + C}$

2. (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.



$A = \frac{\pi \cdot 2^2}{2} = 2\pi$ (but neg since below x-axis)

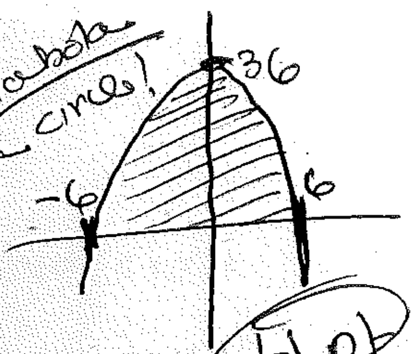
a. $\int_{-4}^{0} f(x)\,dx = \boxed{6}$

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

(14 pts)

3. (3 Pts) Find the area of the region enclosed by the graph of $y = 36 - x^2$ and the x –axis. Construct a sketch of the region and shade the enclosed area.

parabola not a circle!



+1 pt for drawing

$$A = \int_{-6}^{6}(36-x^2)\,dx \overset{\text{even fnc}}{=} 2\int_{0}^{6}(36-x^2)\,dx$$

+1 for setting up correctly

$$= 2\left[36x - \frac{x^3}{3}\right]_0^6 = 2\left(36\cdot 6 - \frac{6^3}{3}\right)$$

$$A = 2\left(216 - \frac{216}{3}\right) = 2\,\frac{(648-216)}{3}$$

$$A = 2\left(\frac{432}{3}\right) = \boxed{288}$$

+1 execution/answer

$648 - 216 = 432$

$432 \div 3 = 144$

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

$-\boxed{4}$

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

$7 - (-4) = \boxed{11}$

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

$= 2(-4) = \boxed{-8}$

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

$7 + 3[x]_{-3}^{2}$

$7 + 3(2 - (-3))$

$7 + 15 = 22$

e. $\int_{4}^{4} f(x)\,dx$

0

11–13 are same!

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

$15 - 7 = 8$

(9pts)