MATH-UA 122 Section 002   Worksheet 1   Summer 2020 6W2

Printed Last Name:	
Printed First Name:	
Univ ID:	
Net ID:	

Show your work and justify all your answers.

(1) (3 points each) Evaluate each definite integral **exactly**.

(a) $\displaystyle\int_1^4 \frac{\left(\sqrt{t}-1\right)^{3/2}}{\sqrt{t}}\,dt$

(b) $\displaystyle\int_0^9 \sqrt{4-\sqrt{x}}\,dx$

(2) (3 points each) Evaluate each indefinite integral.

(a) $\displaystyle\int (y-1)\sqrt{3y+1}\,dy$

(b) $\displaystyle\int \frac{t+2}{3t+5}\,dt$

(3) (3 points each) Suppose $f(x)$ and $g(x)$ are continuous functions.

$$\int_{-2}^{1} f(x)\,dx = 3 \qquad \int_{-2}^{1} g(x)\,dx = -3 \qquad \int_{-2}^{4} f(x)\,dx = 5 \qquad \int_{-2}^{4} g(x)\,dx = 2$$

Use the given information above to evaluate the definite integrals below.

(a) $\int_{-2}^{4} 2f(t) - 3g(t)\,dt$

(b) $\int_{4}^{1} g(x) - 5f(x)\,dx$

(c) $\int_{2}^{8} f(6 - y)\,dy$

(d) $\int_{-1}^{2} g(2\theta)\,d\theta$

(4) (a) (3 points) Find the **exact** average value of $f(x) = \sin(x)$ on the interval $[0, \frac{\pi}{4}]$.

(b) (3 points) Find the **exact** average value of
$$f(x) = \frac{x+1}{x^2 + 2x + 6}$$
on the interval $[-1, 1]$.

(5) (3 points each) Evaluate each of the following indefinite integrals.

(a) $\displaystyle\int \sin(\sqrt{\theta})\, d\theta$

(b) $\displaystyle\int \ln(5x+3)\, dx$

(6) (3 points) Let f be a smooth function with the values given in the table below.

x	$f(x)$	$f'(x)$
1	3	7
2	5	11

Evaluate the definite integral

$$\int_1^2 (x+1)f''(x)\,dx$$

(7) (3 points each) Evaluate each of the following definite integrals **exactly**.

(a) $\displaystyle\int_1^2 \left(x - 2x^3\right)\ln(x)\,dx$

(b) $\displaystyle\int_1^3 (\ln(t))^3 \, dt$