

Name: _____

Section: _____

Instructions: This sample exam has ten problems. Your in-class exam will have seven problems. Make sure to show all your work and make your final answer clear. Include labels and units when appropriate. No notes, books, or calculators will be permitted during the exam.

1. Fill in the blanks.

(a) $\int x^a dx =$ _____

(b) $\int kx^n dx =$ _____

(c) $\sum_{i=1}^5 i^2 =$ _____ + _____ + _____ + _____ + _____

(d) Set up a definite integral that yields the area of the region bounded by the curve $y = x^2$, the x -axis, and the vertical lines from $x = 1$ to $x = 3$. (Do not evaluate the integral.)

(e) True or false: If $F(x)$ and $G(x)$ are both antiderivatives for $f(x)$, then $F(x) = G(x)$. _____

2. Evaluate the following indefinite integrals.

(a) $\int x^5 + 1 dx$

(b) $\int \sqrt[3]{x^2} dx$

(c) $\int \frac{x^3 + 4x}{x^3} dx$

(d) $\int x^2(x^3 + 5)^4 dx$

3. Evaluate the following indefinite integrals.

(a) $\int y \sqrt[3]{y^2} dy$

(b) $\int \frac{2}{x^5} dx$

(c) $\int (7 - 3x^2)^2 x dx$

(d) $\int x^2(x^3 - 1)^4 dx$

4. Evaluate the following definite integrals

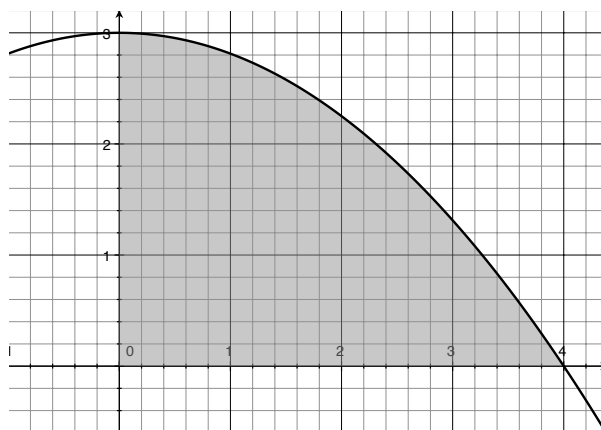
(a) $\int_0^2 6x dx$

(b) $\int_0^1 \frac{x - \sqrt{x}}{3} dx$

(c) $\int_{-2}^4 x^2(x^3 + 8)^2 dx$

5. For a particle moving along a straight line, the velocity, in feet per second, is given by $v(t) = 5t - 7$. Given that the initial position of the particle is $s(0) = 2$, find the position after t seconds.

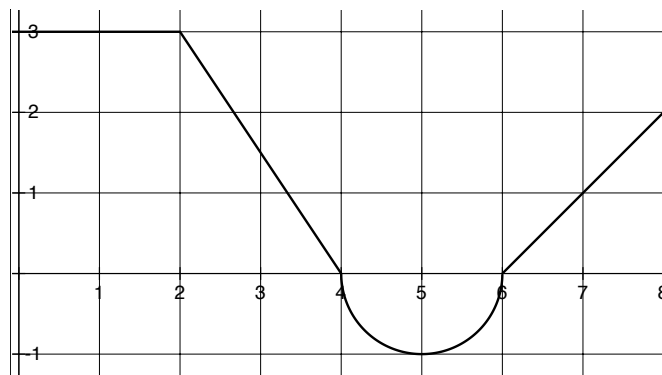
6. Bound the area of the shaded region by estimating the upper and lower sums. Use ($n = 4$) rectangles of width 1.



7. Given $\int_0^3 f(x)dx = 4$, $\int_3^6 f(x)dx = -1$, and $\int_3^6 g(x)dx = 2$, evaluate:

- (a) $\int_0^6 f(x)dx$
- (b) $\int_6^3 f(x)dx$
- (c) $\int_3^3 f(x)dx$
- (d) $\int_3^6 -5f(x)dx$
- (e) $\int_3^6 7f(x) - g(x)dx$

8. Let $g(x) = \int_0^x f(t)dt$, where f is the function whose graph is shown in the figure.



- (a) Fill in the table below with estimates for the specified values of g .

x	0	2	4	6	8
$g(x)$					

- (b) Find the largest open interval on which g is increasing. Find the largest open interval on which g is decreasing.
 - (c) Identify any extrema of g .
 - (d) Sketch a rough graph of g .
9. Solve the differential equation: $f''(x) = 2$, $f'(2) = 5$, $f(2) = 10$
10. Calculate $\int_0^{10} 2x - 6 dx$ by sketching the graph and evaluating using areas.