

MAC2312 Section U03
Suggested problems for Test 1
(Test 1 is Friday February 10th, in class)

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1. Write out the terms of the sum, and evaluate.

$$\sum_{k=1}^3 k^3$$

2. Write out the terms of the sum, and evaluate.

$$\sum_{j=2}^6 (3j - 1)$$

3. Evaluate the integral. You can use geometry if it helps you.

$$\int_0^5 2 \, dx$$

4. Evaluate the integral. You can use geometry if it helps you.

$$\int_0^\pi \cos x \, dx$$

5. Evaluate the integral. You can use geometry if it helps you.

$$\int_0^3 |x - 2| \, dx$$

6. Evaluate the integral.

$$\int_1^4 \frac{4}{x^2} dx$$

7. Evaluate the integral.

$$\int_1^2 \frac{1}{x^6} dx$$

8. Evaluate the integral.

$$\int_4^9 2x\sqrt{x} dx$$

9. Evaluate the integral.

$$\int_0^{\pi/4} \sec^2 \theta d\theta$$

10. Evaluate the integral.

$$\int_{\ln 2}^3 5e^x dx$$

11. Evaluate the integral.

$$\int_{1/2}^1 \frac{1}{2x} dx$$

12. Evaluate the integral.

$$\int_1^4 \frac{|2-x|}{x} dx$$

13. Find the position function of a particle, given the following.

$$a(t) = t^2 - 3t + 1 \quad (\text{acceleration function})$$

$$v(0) = 0 \quad (\text{velocity at time 0})$$

$$s(0) = 0 \quad (\text{position at time 0})$$

14. A particle moves with a velocity $v(t) = \cos t$ (in meters per second) and starts at position 0. Find the position function of the particle, and draw a graph of the position function over the time interval $\pi/2 \leq t \leq 2\pi$.

15. Find the average value of the function $f(x) = 3x$ over the interval $[1, 3]$.

16. Find the average value of the function $f(x) = \sin x$ over the interval $[0, \pi]$.

17. Find the average value of the function $f(x) = \frac{1}{x}$ over the interval $[1, e]$.

18. Evaluate the integral.

$$\int_0^1 (2x + 1)^3 dx$$

19. Evaluate the integral.

$$\int_0^8 x\sqrt{1+x} dx$$

20. Evaluate the integral.

$$\int_0^{\pi/6} \cos 3x dx$$

21. Evaluate the integral.

$$\int_1^2 \sqrt{5x-1} \, dx$$

22. Evaluate the integral.

$$\int_0^{\pi/4} \sin x \cos x \, dx$$

23. Find the area bounded by the curves $y = x^2$ and $y = 2x$.

24. Find the area bounded by the curves $y = x^2$ and $y = x + 2$.

25. The function f is defined as follows.

$$f(x) = \int_1^{x^3} \frac{1}{t} dt$$

Find $f'(x)$.

26. The function f is defined as follows.

$$f(x) = \int_1^{\ln x} e^t dt$$

Find $f'(x)$.