

## HOMWORK #14 (Exam 2 Review Packet)

Due Wednesday March 27th in Gradescope by 11:59 pm ET

### Limit Definition of the Definite Integral

1. Compute  $\int_{-1}^3 2 - 3x^2 dx$  using two different methods:

- (a) Fundamental Theorem of Calculus and
- (b) Limit Definition.

### Differentiation

2. Compute  $g''(x)$  where  $g(x) = \int_x^7 \sqrt{1 - \cos(2t)} dt$

**Integration** Evaluate each of the following integrals. Simplify if possible.

3.  $\int x^7 (30 - x^8)^6 dx$

4.  $\int_{\pi}^{3\pi} \cos\left(\frac{x}{6}\right) dx$

5.  $\int 7 \cos(5x) - 5 \sin(7x) dx$

6.  $\int_0^{\frac{\pi}{2}} \frac{\sin x}{(7 + \cos x)^2} dx$

7.  $\int_4^9 \frac{\sqrt{x} - x^2}{x} dx$

8.  $\int_2^3 \frac{1}{x^2} \sin\left(\frac{\pi}{x}\right) dx$

9.  $\int \frac{\sqrt{7}}{\sqrt{x}(\sqrt{x} + 4)^2} dx$

10.  $\int_0^{\frac{\pi}{3}} \tan^3 x \cdot \sec^2 x dx$

11.  $\int x \left( \sqrt{x^2 + 1} + \frac{1}{\sqrt{x^2 + 1}} \right) dx$

12.  $\int x(x + 1)^{14} dx$

### Displacement–Total Distance

13. Suppose that the velocity of a moving particle is  $v(t) = t^2 - 11t + 24$  feet per second.

- Sketch both  $v(t)$  and  $|v(t)|$  and the bounded area(s)
- Write the cases definition for  $|v(t)|$ .
- Set-up, **but do NOT compute**, the Definite Integrals that compute both the **Displacement** and **Total Distance** it travels between time  $t = 0$  and  $t = 8$  seconds.

# REGULAR OFFICE HOURS

**Monday: 12:00–3:00 pm**

**Tuesday: 1:00–4:00 pm**

7:30–9:00 pm TA Alexa, SMUDD **208A**

**Wednesday: 1:00-3:00 pm**

**Thursday: none for Professor**

6:00–7:30 pm TA Alexa, SMUDD **208A**

**Friday: 12:00–2:00 pm**

- Check the pacing, and aim to improve the response to the integration technique.