

These are suggested review problems similar to what might be on Midterm 2. Included with each problem is a link to a video where you can see how the problem is solved. I didn't make the videos, they are all available online.

1. Use Euler's method with $\Delta x = \frac{1}{2}$ to approximate $y(1)$ for the differential equation $\frac{dy}{dx} = x + y^2$ with initial condition $y(0) = -2$.

<https://www.nagwa.com/en/videos/409194546192/>

2. Use integration by parts to compute $\int_1^2 \frac{\ln x}{x^2} dx$.

<https://youtu.be/zGGI4PkHzhI>

3. Evaluate $\int x^2 \sin(3x) dx$.

https://youtu.be/2I-_SV8csw

4. Evaluate $\int \frac{1}{(1+x^2)^{5/2}} dx$ using a trig substitution.

<https://youtu.be/7nWDBemtZTk>

5. Find $\int \frac{x^2 - 3x - 5}{x - 2} dx$.

<https://youtu.be/02wswP8RED8>

6. Evaluate $\int \frac{3x - 8}{x^2 - 4x - 5} dx$.

<https://youtu.be/HZTv4zCgEnA>

7. Find $\int \sec^3 x \tan^3 x dx$.

https://youtu.be/Yv6AYLm_aSc

8. Compute $\int \sin^5 x dx$.

https://youtu.be/w__RvsA01BQ

9. Find $\int \sin(5x) \cos(4x) dx$.

<https://youtu.be/6WoEfTrG3CE>

10. Compute $\lim_{x \rightarrow 1} \left(\frac{x}{x-1} - \frac{1}{x} \right)$.

<https://youtu.be/VbHKHlTHJcY>

11. Evaluate $\lim_{x \rightarrow 0^+} (e^x + 5x)^{1/x}$.

<https://youtu.be/NYDj946krG0>

12. Compute $\int_{-\infty}^{-8} \frac{14}{x^2 - 49} dx$.

<https://youtu.be/jtbiTzELc4Y>