

Math 1272: Calculus II
Final exam review

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<http://www-users.math.umn.edu/~jwcalder/1272S19>

Final Exam Information

- May 9, 12pm–3pm
- 18 questions
 - 8 multiple choice (a)–(e)
 - 10 written questions
- Exam covers all sections listed on the schedule
<http://www-users.math.umn.edu/~jwcalder/1272S19/schedule.html>
except for **8.3, 9.4, 9.6, 10.5, orthogonal trajectories**.
- Midterm exams with solutions are available on the course website (linked above). This can be helpful for review.

Chapter 7

Topics: Integration (by parts, substitution, partial fractions, trig substitution, trig integrals, approximate integration)

Example: Determine the value of

$$\int_0^1 x^2 \cos x \, dx.$$

Chapter 8

Topics: Arclength, surface of revolution,

Exampe: Find the area of the surface obtained by rotating the curve

$$y = x^3, \quad 0 \leq x \leq 2$$

about the x -axis.

Chapter 9

Topics: Differential equations (Euler's method, separable and linear equations)

Example: Find the solution of the differential equation

$$\frac{dy}{dx} = \frac{x \sin x}{y},$$

satisfying $y(0) = -1$.

Chapter 10

Topics: Parametric equations, polar coordinates, area and arclength in polar coordinates.

Example: Set up (but do not evaluate) the integral computing the arclength of one loop of the four-leaved rose

$$r = \cos(2\theta).$$

Chapter 11

Topics: Sequences and series, tests for convergence, power series, Taylor and Maclaurin series

Example: Determine whether the series

$$2 - \frac{2}{\sqrt{2}} + \frac{2}{\sqrt{3}} - \frac{2}{\sqrt{4}} + \dots$$

converges absolutely, converges conditionally, or diverges.

Chapter 12

Topics: Dot and cross products, lines and planes.

Example: Find a vector orthogonal (perpendicular) to both $\mathbf{a} = \langle 1, 2, 3 \rangle$ and $\mathbf{b} = \langle 1, 0, 1 \rangle$.

Example: Find an equation for the plane containing the lines

$$x = 1 + t, \quad y = 1 - t, \quad z = 1$$

and

$$x = 1 + 2t, \quad y = 1 + 3t, \quad z = 1 + t.$$

