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MATH10560 Quiz 4 Study Guide

Chapter 9

9.3. Applications to Physics and Engineering

-Know how to find the center of mass for a system of n particles.
-Recall, that moment of mass around x-axis is distance from x-**axis** multiplied by mass. Moment of mass around y-axis is distance from y-**axis** multiplied by mass.
-When working on differential element, find width, length (thus area), find mass (area times length), and find the center of mass of the strip (usually midpoint of the strip: remember midpoint equals **sum** of endpoints divided by 2).
-Lastly, center of mass = sum of moments of mass/sum of masses (of little strips)
- Derive the formula for the centroid of the area between two curves (pg 604).

Chapter 10

10.2. Direction Fields and the Euler's Method

-Know that the direction field (or slope field) consists of short line segments with slope $y\prime$ that indicate the direction in which a solution curve is heading.
-Be able to draw a qualitatively accurate curve on a slope field for a given initial condition.
-Know that Euler's method is based on using tangent line approximations to a curve. As $h \to 0$, the approximations get more and more accurate. Be able to use Euler's method to solve differential equations.

10.3. Separable Equations

-To solve a separable equation, start from $\frac{dy}{dx} = \frac{g(x)}{h(x)}$ and then solve $\int h(y)\ dy = \int g(x)\ dx$.
-Examples 1,2 and 4.
-Mixing problems such as example 6.

10.4. Exponential Growth and Decay

-Be comfortable with all of the examples.

10.6. Linear equations

-To solve a linear equation $\frac{dy}{dx} + P(x)y = Q(x)$ multiply both sides of the equation by the integrating factor $I(x) = e^{\int P(x)\ dx}$ and integrate both sides.
-Be comfortable with all of the examples.