

2. Chapter 11 Review, p. 876, TF Quiz 1-9,12-18, Exercises 1, 3, 11, 13, 19, 24, 25, 27, 28, 32, 40, 41, 42, 45, 47, 49, 54, 55, 57ac.

3. Your exam will contain THREE Basic Skills No Partial Credit problems (BSA questions). One each will come from 13.2, 13.4 and 11.12.

4. There MAY BE up to 6 True-False Questions or Multiple Choice Questions on your exam. True-False will come from the end-of-chapter reviews. I may change the wording on the questions and thereby also change them from True to False or vice versa - so be sure to read these carefully on your exam. Multiple Choice questions will either be conceptual or simple calculations.

5. There will be 4 - 5 partial credit problems on the exam.

6. For 13.2: Be comfortable taking derivatives of vector functions. You should know the derivative rules on p. 859 and be able to the unit Tangent vector for a vector function. You should be able to take both definite and indefinite integrals of vector functions. You should be able to solve for constants of integration for indefinite integrals if initial conditions are given to you.

7. For 13.3: Be able to apply the formula for arc length given in vector form. Be able to find the unit Tangent vector, the principal unit Normal vector and the Binomial vector for a vector function as well as determine the curvature for a vector function.

8. For 13.4: Know how to apply differentiation and integration to vector functions in the context of the position, velocity, acceleration and speed. Also, be comfortable finding the tangential and normal components of acceleration.

9. For 11.1: Be able to list out several terms of a sequence if the nth term definition is given. Be able to determine the nth term definition if a list of terms is given. Be able to determine if a sequence is convergent or divergent - if it is convergent find its limit. (problems 4, 9, 13, 16, 19, 23, 40)

10. For 11.2: Be comfortable applying partial sums, geometric series test and divergence test to determine the convergence or divergence of a series. If you are asked to find the sum of a series - be prepared to use either partial sums or geometric series test to do so. Also be able to express a repeating decimal as a ratio of integers by writing it as a geometric series and determining the sum. (problems 11, 15, 21, 23, 27, 35, 37)

11. For 11.3: Be comfortable applying the p-test (p. 725) to determine if a series is convergent or divergent (problems 3, 4, 9, 10).

12. For 11.5: Be able to apply the alternating series test to determine the convergence of a series that can be written in the form $\sum_{n=1}^{\infty} (-1)^n b_n$ (problems 5, 7, 11, 13).

13. For 11.6: Be able to determine if a given series is absolutely convergent, conditionally convergent or divergent. Also be comfortable applying the ratio test and the root test, both of which test absolute convergence of a series (problems 3, 5, 7, 9, 13, 15, 21, 23).
14. For 11.8: Be able to determine the radius and interval of convergence for a given series. For the interval of convergence - be sure to read the wording carefully on the problem to see if you need to check the endpoints of the interval for convergence (problems 3, 7, 10, 11, 13, 18, 20, 25).

15. For 11.9: Be able to express functions that are of the form \( \frac{a}{1 - r} \) by using properties of geometric series (problems 3, 5, 6, 9). Also be comfortable integrating or differentiating power series (see examples 5, 6, 7 and 8a in text). Be able to state the radius of convergence for these problems.

16. For 11.10: Understand how to write out the Taylor or Maclaurin expansion of a function about \( x = a \). You should be able to determine the nth term definition of the coefficient for the resulting series expansion (problems 6, 7, 13, 14, 16). Given a Maclaurin series expansion for \( f(x) \), determine a Maclaurin series for a given function that is related to \( f(x) \) (see problems 24, 25, 28). Use a power series to evaluate an indefinite integral (problems 39, 40, 42).

17. For 11.11: Given the binomial series definition, determine a power series expansion of a given function along with its radius of convergence (problems 1, 3, 5, 7).

18. For 11.12: Find Taylor polynomials to approximate \( f(x) \) given \( a \), the center, and \( n \), the degree of the polynomial. You may also be asked to use Taylor’s Inequality to estimate the accuracy. (problems 3, 4, 5, 8, 9, 13, 16, 19).

Chapter 13 TF Answers: T, F, F, F, F, T, F

Formulas given on your test

Arc Length

\[
L = \int_a^b ||\vec{r}'(t)|| \, dt
\]

Curvature

\[
\kappa = \frac{||\vec{T}'(t)||}{||\vec{r}'(t)||}
\]

\[
\kappa = \frac{||\vec{r}'(t) \times \vec{r}''(t)||}{||\vec{r}'(t)||^3}
\]

Tangential and Normal Components of Acceleration

\[
a_T = \vec{a} \cdot \vec{T} = \frac{\vec{v} \cdot \vec{a}}{||\vec{v}||} = \frac{\vec{r}' \cdot \vec{r}''}{||\vec{r}'||}
\]

\[
a_N = \vec{a} \cdot \vec{N} = \frac{||\vec{v} \times \vec{a}||}{||\vec{v}||} = \frac{||\vec{r}' \times \vec{r}''||}{||\vec{r}'||} = \sqrt{||\vec{a}||^2 - a_T^2}
\]

Binomial Series

\[
(1 + x)^k = 1 + kx + \frac{k(k-1)}{2!} x^2 + \frac{k(k-1)(k-2)}{3!} x^3 + \cdots = \sum_{n=0}^{\infty} \binom{k}{n} x^n
\]
\[
\binom{k}{n} = \frac{k(k-1)(k-2)\cdots(k-n+1)}{n!}
\]

Taylor Remainder and Inequality on an interval

\[f(x) = P_n(x) + R_n(x)\]

\[|R_n(x)| \leq \frac{M}{(n+1)!}|x-a|^{n+1}\]

where \(M\) is the maximum value of \(|f^{(n+1)}(x)|\) on the interval and \(|x-a| \leq d\).