

LINKING SPRING 2008 SKILL SET TO FALL 2007 EXAMS

Index	Objective	Text Exercise	Exam Fall 07	Question
5.1.1	Use lower and upper sums to estimate the area under a graph over an interval.	1, 3	Exam1	FR5
5.1.2	Use the midpoint rule to estimate the area under a graph over an interval.	7	Exam1	MC15
5.1.3	Use a table of velocities, recorded at points along a time interval, to estimate distance traveled over the interval.	9, 11	Exam1	MC7
5.1.4	Use a finite sum to estimate the average value of a function over an interval.	15, 17	Exam1	MC5
5.1.5	Use a table of the rates of change of a quantity, recorded at points along a time interval, to estimate total change in the quantity over the interval.	19	Exam1	
5.2.1	Given a sum in sigma notation, rewrite without sigma notation then evaluate.	1, 5	Exam1	
5.2.2	Identify an appropriate sigma notation for a given sum.	7	Exam1	MC8
5.2.3	Express sums in sigma notation.	13, 15	Exam1	
5.2.4	Use formulas for the sum of the first n integers, squares of integers and cubes of integers to evaluate sums.	19, 25	Exam1	MC12
5.2.5	Calculate the area under the curve of $f(x)$ over $[a, b]$ by partitioning into subintervals of width $1/n$ and taking the limit as n approaches infinity.	37	Exam1	FR 2 FR 7
5.3.1	Express limits of Riemann sums as definite integrals.	1, 5	Exam1	MC4
5.3.2	Use properties of definite integrals to evaluate other integrals.	9, 13	Exam1	
5.3.3	Given a definite integral whose integrand's graph is a well known geometric shape, use the area of the shape to evaluate the integral.	17, 19	Exam1	MC2
5.3.4	Given a definite integral over $[a, b]$ whose integrand's graph is a well known geometric shape, use the area of the shape to find an expression for the integral in terms of a and b .	23, 25	Exam1	

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5.3.5	Use the limit of a Riemann sum to find the area between a curve and the x - axis.	51, 52	Exam1	
5.3.6	Use the limit of a Riemann sum to find the average value of a function over a interval.	55, 57	Exam1	
5.4.1	Evaluate definite integrals using FTC, Part 2.	1, 5, 9, 13, 16, 17, 18, 23, 25, 27, 29	Exam1	MC14
5.4.2	Find dy/dx when y is a definite integral whose upper limit is a function of x (using FTC, Part 1 and Chain Rule).	41, 45, 47	Exam1	MC6
5.4.3	Find the total area between the graph of a function and the x - axis.	51, 55, 57	Exam1	
5.4.4	Express solutions to initial value problems in terms of integrals.	61, 65	Exam1	
5.5.1	Use a specified substitution to reduce an indefinite integral to standard form (i.e., where antiderivative of integrand is known).	1, 7, 11	Exam1	MC1 MC10
5.5.2	Evaluate an indefinite integral using the Substitution Rule, if appropriate.	15, 19, 21, 23, 25, 29, 35, 39, 43, 49, 53	Exam1	FR1a FR1b MC3 MC11
5.5.3	Solve an initial value problem requiring substitution.	61, 65	Exam1	MC13
5.5.4	Evaluate the same indefinite integral using different substitutions and explain why all are correct.	67	Exam1	
5.6.1	Evaluate definite integrals using substitution and a corresponding change of limits of integration.	3, 7, 11, 17, 25, 29, 39, 43	Exam1	FR6a FR6b FR6c
5.6.2	Find the areas of shaded regions between curves, drawings provided.	47, 53, 55, 61	Exam1	FR3 FR4

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5.6.3	Find the areas of regions between curves, no drawings provided.	67, 73, 81, 83, 85, 93, 97, 99	Exam1	FR8
5.7.1	Evaluate integrals involving logarithmic and exponential functions.	1, 5, 13, 17, 21, 27, 33, 37, 41	Exam1	MC9
5.7.2	Solve initial value problems involving logarithmic and exponential functions.	49, 51	Exam1	
¹ 6.1.1	Find the volume of a solid by slicing.	1, 7, 9	Exam2	MC11 FR2
6.1.2	Find the volume of a solid of a solid of revolution about a horizontal axis using the disk method.	13, 17, 19, 21, 23	Exam2	
6.1.3	Find the volume of a solid of revolution about a vertical axis using the disk method.	29	Exam2	MC7
6.1.4	Find the volume of a solid of revolution about a horizontal axis using the washer method.	35, 39, 41	Exam2	MC9 FR5
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6.2.2	Use the shell method to find the volume generated by revolving a region about a horizontal axis.	3, 17, 21, 23, 27ad	Exam2	MC1 MC5
6.3.1	Find the length of a parametrically-defined curve.	1, 2, 7, 34	Exam2	MC12 FR9
6.3.2	Find the length of a curve $y = f(x)$.	9, 11, 17	Exam2	MC6 FR3
6.3.3	Find a curve with a given length integral and passing through a given point.	29	Exam2	
6.4.1	Use calculus to find the lateral surface area of a cone and frustum.	9, 11	Exam2	
6.4.2	Find the area of a surface formed by revolving a curve about a horizontal axis.	13, 15	Exam2	MC10 FR9
6.4.3	Find the area of surfaces by formed by revolving a curve about a vertical axis.	17, 21	Exam2	MC4

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6.4.4	Find the surface area of surface of revolution based on a parametrically-defined curve.	33, 35	Exam2	MC2
6.6.1	Use Hooke's Law for springs to solve problems involving work.	1, 3	Exam2	MC8
6.6.2	Solve problems involving work done by a variable force along a line.	19, 21	Exam2	FR6
7.1.1	Evaluate indefinite integrals using integration by parts.	1, 3, 7, 9, 11, 15, 23, 39, 41, 45	Exam3	MC4
7.1.2	Evaluate definite integrals using integration by parts.	5, 19, 33, 35	Exam3	FR3
7.1.3	Evaluate an integral by using substitution prior to integration by parts.	25, 29	Exam3	
7.2.1	Evaluate an integral involving products of powers of sin and/or cosine.	1, 9	Exam3	MC6 MC11
7.2.2	Use trigonometric identities to eliminate square roots.	15, 17, 19, 21	Exam2	MC2
7.2.3	Evaluate integrals involving products of powers of tan and/or secant.	23, 25, 27, 29, 31	Exam3	MC5
7.2.4	Use trigonometric integrals to find curve lengths or volumes.	41, 43	Exam3	FR5
7.3.1	Use trigonometric substitution to evaluate indefinite integrals	1, 5, 7, 9, 11, 13, 25, 37	Exam3	MC1 MC10 MC14 MC2 MC13
7.3.2	Use trigonometric substitution to evaluate definite integrals.	3, 29, 41	Exam3	
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7.4.1	Expand a rational function by partial fractions.	1, 3, 5, 7	Exam3	MC3 MC9
7.4.2	Expand an integrand by partial fractions and evaluate the integral.	9, 11, 15, 17, 19, 21, 23, 27	Exam3	FR1
7.4.3	Perform long division on an integrand, write the proper fraction as sum of partial fractions, then evaluate the integral.	29, 31, 33	Exam3	MC7
7.4.4	Use substitution to express an integrand as a rational function, then evaluate the integral using partial fraction expansion.	35, 37	Exam3	
7.4.5	Solve an initial value problem using integration by partial fractions.	41	Exam3	

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7.7.1	Evaluate integrals with infinite limits.	1, 9, 11, 13, 21	Exam3	MC8
7.7.2	Evaluate integrals whose integrands have vertical asymptotes.	3, 5, 7, 13, 15, 25, 27, 29	Exam3	FR2
I.1	Construct Taylor polynomials of given order.	1-7 odd; pp.558	Exam4	FR1a
I.2	Use a Taylor polynomial of a given order to approximate the value of a function.	Use a Taylor polynomials of order 3 from exercises 1-7 odd, p. 559, to approximate the following values: (a) $\ln(1/2)$, (b) e^{-1} , (c) $\sin(1)$, (d) $\sqrt{2}$.	Exam4	FR1b
II.1	Find the Maclaurin series for a function.	9-15 odd, 19; pp. 558	Exam4	
II.2	Find the Taylor series for a function.	21, 25-28; pp. 558	Exam4	
III.1	Find a new Taylor series using substitution into another Taylor series.	1, 3; pp. 567	Exam4	MC2
III.2	Find a new Taylor series by adding, subtracting, or multiplying another series with a polynomial.	(a) 7, 9, 11; pp. 567 (b) Group III.2 of Exercise Supplement	Exam4	MC10
III.3	Find a new Taylor series with term-by-term integration or differentiation of another Taylor series.	Group III.3 of Exercise Supplement	Exam4	MC5
III.4	Find a Taylor series representation for an integral using term-by-term integration of another Taylor series.	Group III.4 of Exercise Supplement	Exam4	
III.5	Use a Taylor polynomial with a given number of nonzero terms to approximate the value of a definite integral.	Group III.5 of Exercise Supplement	Exam4	

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IV.1	Determine if a sequence diverges or converges, and if it converges, find its limit.	23, 25, 35, 41, 45, 55, 77, 65; pp. 511	Exam4	MC7 MC12
IV.2	Find a formula for the n th partial sum of a series and use it to find the sum of the series if it converges.	1, 3, 15; pp. 522	Exam4	FR3
V.1	Correctly identify a geometric series, determine if it diverges or converges, and if it converges find its sum.	7 -13 odd, 23, 29, 33, 39; pp. 522	Exam4	MC1 MC11
V.2	Correctly identify a p-series and determine if it diverges or converges.	5, 6, 8, 13; pp. 527	Exam4	MC6
V.3	Use the Ratio Test to determine if a series converges or diverges.	1 – 5 odd, 13, 19, 21 on pp. 536.	Exam4	MC13
V.4	Find the radius of convergence of a power series.	Find the radius of convergence of the series in exercises 1 – 13 odd on pp. 552.	Exam4	FR4
9.1.1	Plot a point given in polar coordinates and find all equivalent polar coordinates of the same point.	3	Exam4	MC4
9.1.2	Find the Cartesian coordinates of a point given in polar coordinates.	5	Exam4	MC8
9.1.3	Graph the sets of points whose polar coordinates satisfy a given (polar) equation or inequality.	7, 9, 11, 13, 15, 17, 19, 21	Exam4	
9.1.4	Replace polar equations with equivalent Cartesian equations and identify the graphs.	23, 27, 29, 31, 35, 37, 43	Exam4	MC3
9.1.5	Replace Cartesian equations with equivalent polar equations.	49, 51, 53, 55, 57	Exam4	
9.2.1	Identify the symmetries of a polar curve, then sketch the curve.	1, 3, 5, 9, 11, 13	Exam4	
9.2.2	Find the slope of a polar curve at a given point, then sketch the curve and its tangent at that point.	17, 19	Exam4	FR2c
9.2.3	Graph a limaçon.	21, 22, 23, 24	Exam4	FR2a
9.3.1	Find the area of regions defined by polar equations.	3, 5, 7, 11, 13, 19, 23	Exam4	FR2b
9.3.2	Find the area of regions shared by two circles defined with polar equations.	7	Exam4	
9.3.3	Find area of a region outside one circle and inside another.	13	Exam4	

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9.3.4	Find the arc length of a curve defined by a polar equations.	17, 19, 23	Exam4	FR2d
9.4.1	Match the graph of a conic section with its equation.	1, 3, 5, 7	Exam4	
9.4.2	Given the equation for a parabola find its focus and directrix and label them on a sketch of the graph.	9, 11, 15	Exam4	
9.4.3	Given the equation for an ellipse rewrite in standard form, find foci and label them on a sketch of the graph.	17, 21	Exam4	
9.4.4	Given the foci and vertices of an ellipse centered on the origin find the ellipse's standard form equation.	25, 26	Exam4	
9.4.5	Given an equation for a hyperbola rewrite in standard form, find its asymptotes, and label its foci and asymptote on a sketch of the graph.	27, 31	Exam4	
9.4.6	Given asymptotes and vertices or foci of a hyperbola centered at the origin find the hyperbola's standard form equation.	35, 37	Exam4	
9.4.7	Given an equation for a parabola and information about it being shifted up, down, left, or right, find the shifted parabola's vertex, focus, and directrix and label them in a sketch of the graph.	39	Exam4	
9.4.8	Given an equation for an ellipse and information about it being shifted up, down, left, or right, find the shifted ellipse's foci, vertices, and center and label them in a sketch of the graph.	41	Exam4	
9.4.9	Given an equation for a hyperbola and information about it being shifted up, down, left, or right, find the shifted hyperbola's foci, vertices, center, and asymptotes and label them in a sketch of the graph.	43	Exam4	
9.4.10	Given an equation for a parabola and information about it being shifted up, down, left, or right, find an equation for the new parabola and identify its vertex, focus, and directrix.	45	Exam4	
9.4.11	Given an equation for an ellipse and information about it being shifted up, down, left, or right, find the find an equation for the shifted ellipse and identify its foci, vertices, and center.	49, 51	Exam4	
9.4.12	Given an equation for a hyperbola and information about it being shifted up, down, left, or right, find an equation for the new hyperbola and identify its foci, vertices, center and asymptotes.	53	Exam4	
9.4.13	Find the center, foci, vertices, asymptotes, and radius, as appropriate, for a given conic section.	57, 61, 63, 67	Exam4	