Unit 1 Skill Set

Important: Students should expect test questions that require a synthesis of these skills. Additionally, some test questions may require a synthesis of material learned in the current unit and previous units.

Note: Technology is not allowed on any exams. Limits of integration for definite integrals should be written as exact values. The values for definite integrals should also be written as exact values.

Review
Section 5.5: Substitution Rule, pp. 388 – 395
MyLab Math: 1, 6, 17, 22, 36, 43, 44, 46, 51, 65, 68, 79, 87, 91, 97

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving the Substitution Rule.	1, 6	3, 4, 5, 95, 100
Evaluate indefinite integrals using substitution.	17, 22, 36, 43, 44, 79	17 – 44, 78 – 85, 116 – 118
Evaluate definite integrals using substitution.	46, 51, 65, 68	45 – 74, 86, 119
Evaluate integrals with $\sin^2 x$ and $\cos^2 x$	87, 91	87 – 94
Find the area of a region using integration that requires substitution.	97	96 – 98

Section 6.1: Velocity and Net Change, pp. 403 – 410
MyLab Math: 1, 3, 6, 7, 15, 21, 27, 35, 40, 48, 57

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving velocity and net change.	1, 3, 6	2, 4, 5, 59, 62
Determine displacement, distance, and position from velocity.	7, 15, 21, 27	8 – 22
Determine position and velocity from acceleration.	35	29 – 39
Solve additional applications involving velocity.		23, 66
Solve applications (other than velocity) involving net change.	40, 48, 57	41, 45, 51, 53, 55 – 58

Section 6.2: Regions Between Curves, pp. 416 – 420
MyLab Math: 1, 3, 4, 5, 10, 15, 19, 32, 39, 43

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions about finding areas between curves.	1, 3, 4	65
Find the area of a region using geometry.	5	6
Find the area of a region (either by integrating with respect to x or by integrating with respect to y) when the figure of the region is provided.	10, 15, 19	9 – 30, 63
Set up the area of a region in two ways: (1) in terms of one or more integrals with respect to x and (2) in terms of one or more integrals with respect to y.	32	31
Sketch a given region and find its area.	39, 43	37 – 51, 54, 55, 57 – 62

Section 6.3: Volume by Slicing, pp. 425 – 434
MyLab Math: 1, 13, 19, 23, 33, 37, 42, 49, 51, 55

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving the general slicing, disk, and washer methods.	1	2, 4, 61
Use the general slicing method to find volumes of solids.	13	11 – 16
Use the disk and washer methods to find the volume of solids of revolution about the x-axis.	19, 23, 42	17 – 20, 23 – 26, 29 – 31, 34 – 36, 39, 41, 42
Use the disk and washer methods to find the volume of solids of revolution about the y-axis.	33, 37	21, 22, 27, 28, 32, 33, 37, 38, 40, 43
Use the disk and washer methods to find the volume of solids of revolution about horizontal lines ($y = a$) other than the x-axis and vertical lines ($x = b$) other than the y-axis.	49, 51, 55	49 – 59
Describe the solid whose volume is given by an integral.		65
Solve applications involving the general slicing, disk, and washer methods.		70, 71

Section 6.4: Volume by Shells, pp. 439 – 447
MyLab Math: 1, 2, 3, 13, 18, 21, 37, 39, 43, 48, 57, 63

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving the Shell Method.	1, 2, 3, 63	4
Use the shell method to find the volume of the solid of revolution about the y-axis.	18	9 – 12, 17 – 20, 24, 33
Use the shell method to find the volume of the solid of revolution about the x-axis.	13, 21	13 – 16, 21 – 23, 26
Use the shell method to find the volume of the solid of revolution about other horizontal and vertical lines (other than the x-axis and y-axis).	39, 43	39 – 44
Use both the shell method and washer method to find the volume of the solid of revolution about an indicated axis or line.	37, 48	35 – 38, 45 – 48
Find the volume of a solid of revolution using any method.	57	53 – 62
Solve applications involving the shell method.		51, 67

Section 6.5: Length of Curves, pp. 451 – 455
MyLab Math: 1, 4, 7, 13, 15, 17, 36, 39

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving lengths of curves.	1	2, 33
Set up arc length integrals.	4	3 – 6, 38
Find the arc length of a curve on a given interval, integrating with respect to x or with respect to y as appropriate.	7, 13, 15, 17	9 – 20
Find functions with given arc lengths.	36	35
Find lengths of related curves given the length of a curve f.	39	

Section 6.6: Surface Area, pp. 457 – 462
MyLab Math: 2, 3, 9, 11, 17, 19, 33

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving surface area.	3	23
Find surface areas of curves revolved about the x-axis.	2, 9, 17, 33	7 – 10, 13, 16, 17, 18, 31 – 33
Find surface areas of curves revolved about the y-axis.	11, 19	11, 12, 14, 15, 20, 34, 35

Section 6.7: Physical Applications, pp. 465 – 473
MyLab Math: 3, 7, 11, 17, 22, 25, 27, 31, 35, 47, 55

Skill	MyLab Math	Suggested Practice Problems from the Text
Find the mass of a thin bar with a given density function.	17	13 – 20
Find the work done given constant force.	3	
Find the work done given a variable force function $f(x)$.	22	21
Solve work problems involving springs and Hooke's law.	25, 27	23, 24, 26, 28, 29, 30
Solve work problems involving lifting ropes/chains/cables.	31	32, 33, 34
Solve work problems involving pumping water.	11, 35	35 – 45
Solve applications involving pressure.	7	
Solve applications involving hydrostatic force.	47, 55	46 – 56

Section 8.1: Basic Approaches, pp. 520 – 523
MyLab Math: 1, 3, 13, 15, 27, 39, 53, 59, 61, 73, 74

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving basic approaches to integration.	1, 3	5, 65
Find indefinite integrals using basic methods.	13, 27, 39, 53, 59, 61	7, 8, 10, 11, 13, 19 – 23, 26 – 28, 31, 33, 36 – 43, 45 – 49, 55, 57, 62
Evaluate definite integrals using basic methods.	15	9, 12, 14 – 18, 24, 25, 39, 30, 32, 34, 35, 44, 50 – 52, 54, 56, 58, 60, 63, 64
Find the area of a region bounded by two curves using basic methods.	73	72
Find the volume of a solid of revolution using basic methods.	74	75

Section 8.2: Integration by Parts*, pp. 525 – 529
MyLab Math: 1, 6, 11, 13, 25, 26, 27, 34, 36, 44, 63

*Note: No reduction formulas allowed on exams.

Skill	MyLab Math	Suggested Practice Problems from the Text
Answer conceptual questions involving integration by parts.	1, 6	4, 5, 49
Find indefinite integrals using integration by parts.	11, 13, 25, 26, 27	9 – 31, 38, 40, 41
Evaluate definite integrals using integration by parts.	34, 36	32 – 37, 39
Find volumes of solids of revolution using integration by parts.	44	42 – 47
Combine integration methods to evaluate integrals.	63	64