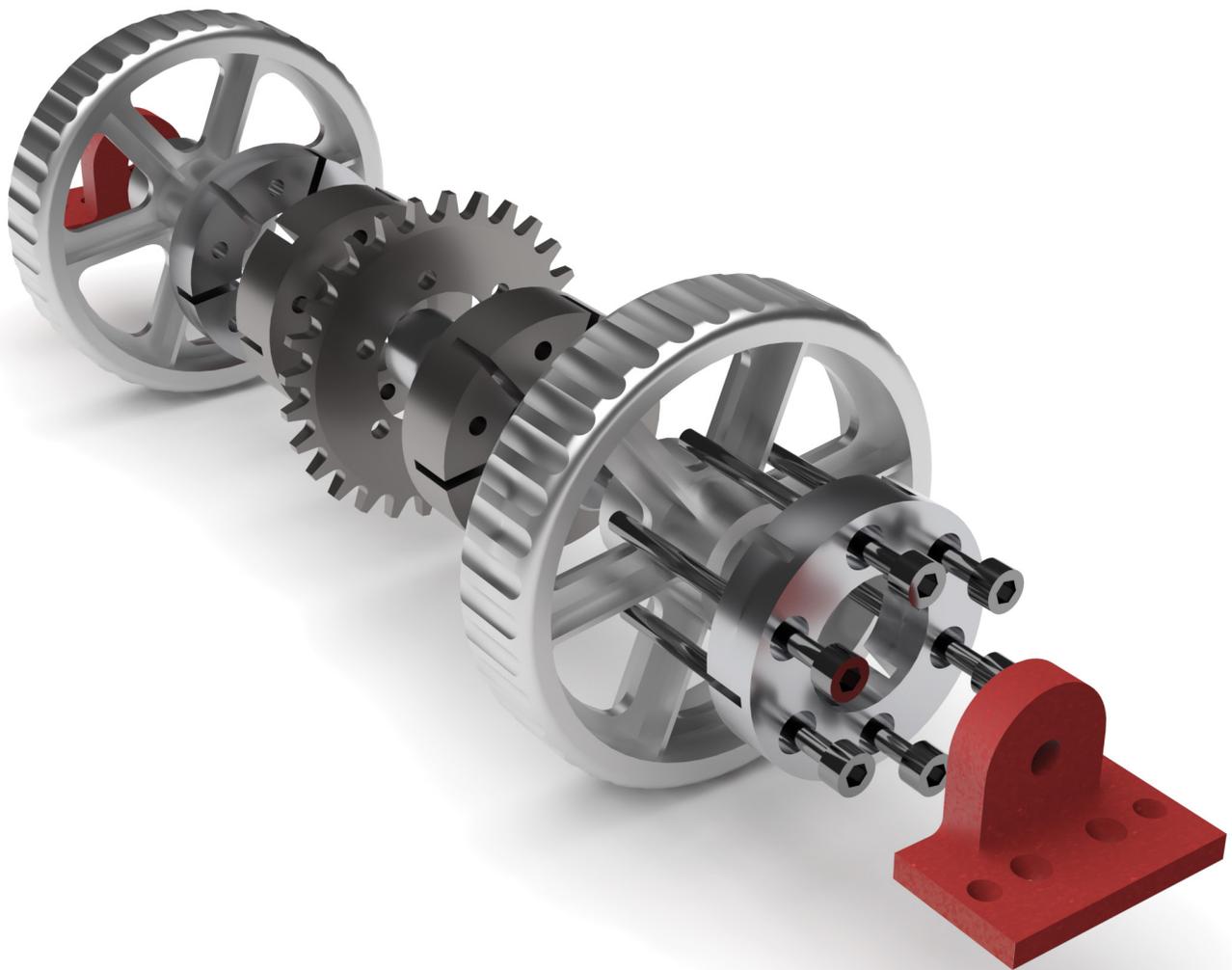


Autodesk® **Inventor® 2020** **Essentials Plus**

Daniel T. Banach & Travis Jones



Visit the following websites to learn more about this book:



[amazon.com](https://www.amazon.com)

[Google books](https://books.google.com)

[BARNES & NOBLE](https://www.barnesandnoble.com)

Table of Contents

Introduction	vii
Chapter 1 – Getting Started	1
Introduction	1
Objectives	1
Getting Started with Autodesk Inventor	2
User Interface.....	2
File Tab.....	4
Ribbon	6
Quick Access Toolbar.....	7
Open Files	7
New Files	10
File Information.....	11
Save File Options.....	12
Application Options.....	14
Exercise 1-1: User Interface	16
Command Entry.....	19
Help System.....	21
Projects in Autodesk Inventor.....	22
Autodesk Vault	27
Exercise 1-2: Projects	28
Changing your Viewpoint.....	30
Exercise 1-3: Viewing a Model	34
Checking Your Skills.....	38
Chapter 2 – Sketching, Constraining, and Dimensioning.....	39
Introduction	39
Objectives	39
Part and Sketch Application Options.....	40
Units	43
Templates.....	44
Creating a Part File	45
Step 1 — Sketch the 2D Outline of the Part	48
Exercise 2-1: Creating a Sketch with Lines	55
Exercise 2-2: Creating a Sketch with Tangencies.....	57
Step 2 — Constraining the Sketch	58
Exercise 2-3: Adding and Displaying Constraints.....	64
Step 3 — Adding Dimensions Manually	68
Exercise 2-4: Constraining and Dimensioning a Sketch.....	75

Measure Command	79
Region Properties.....	82
Inserting an AutoCAD File	83
Open Other File Types	86
Exercise 2-5: Inserting AutoCAD Data	87
Applying Your Skills	90
Checking Your Skills	92
Chapter 3 – Creating and Editing Sketched Features	93
Introduction.....	93
Objectives	93
Features	94
Understanding the Browser.....	95
Switching Environments.....	96
Direct Manipulation	97
Property(ies) Panels	98
Extrude a Sketch	99
Exercise 3-1: Extruding a Sketch.....	103
Linear Diameter Dimensions	105
Revolve a Sketch.....	106
Exercise 3-2: Revolving a Sketch	109
Primitive Shapes/Features.....	112
Secondary 2D Sketched Features.....	113
Select Other-Face Cycling	115
Slice Graphics	116
Exercise 3-3: Sketch Features	116
Editing a Feature and Sketch.....	118
Exercise 3-4: Editing Features and Sketches	121
Projecting Geometry	123
Exercise 3-5: Projecting Geometry	125
Part Material, Properties and Appearance.....	127
Applying Your Skills	132
Checking Your Skills.....	135
Chapter 4 – Creating Placed Features	137
Introduction.....	137
Objectives	137
Filletts	138
Chamfers.....	144
Exercise 4-1: Creating Filletts and Chamfers.....	148
Holes	152

Table of Contents

Exercise 4-2: Creating Holes	156
Shelling.....	162
Exercise 4-3: Shelling a Part.....	164
Work Features.....	166
Exercise 4-4: Creating Work Axes	168
Exercise 4-5: Creating Work Planes and a UCS.....	177
Patterns	184
Exercise 4-6: Creating a Rectangular Pattern	187
Exercise 4-7: Creating Circular Pattern	192
Exercise 4-8: Creating a Pattern Along a Nonlinear Path.....	194
3D Printing – Additive Manufacturing	197
Applying Your Skills.....	199
Checking Your Skills.....	201
Chapter 5 – Creating and Editing Drawing Views	203
Introduction	203
Objectives	203
Drawing Options.....	204
Creating a Drawing.....	205
Drawing Sheet Preparation	207
Creating Drawing Views	210
Exercise 5-1: Creating a Multiview Drawing	214
Exercise 5-2: Creating Auxiliary, Section, and Detail Views.....	225
Exercise 5-3: Creating Break View	230
Editing Drawing Views	231
Exercise 5-4: Editing Drawing Views	234
Annotations.....	237
Exercise 5-5: Adding Centerlines	243
Adding Dimensions to a Drawing View.....	246
Exercise 5-6: Adding Dimensions	253
Exercise 5-7: Creating Baseline Dimensions and Chain Dimensions.....	263
Adding Text and Additional Symbols	268
Exercise 5-8: Adding Annotations.....	272
Exercise 5-9: Creating Hole Tables	277
Shortcut for Opening Referenced Files.....	281
Create a 3D PDF.....	282
3D Annotations / Model-Based Definition (MBD)	284
Applying Your Skills.....	288
Checking Your Skills.....	290
Chapter 6 – Creating and Documenting Assemblies.....	291

Introduction.....	291
Objectives	291
Assembly Options.....	292
Creating Assemblies	292
Adding Assembly Constraints.....	303
Moving and Rotating Components	313
Editing Assembly Constraints.....	314
Exercise 6-1: Assembling Parts	315
Assembly Joints	321
Exercise 6-2: Assembly Joints	325
Additional Assembly Commands	327
Adaptivity	331
Exercise 6-3: Designing a Part in the Context of an Assembly.....	332
Patterning Components.....	336
Exercise 6-4: Patterning Components	340
Analysis Commands	341
Exercise 6-5: Analyzing an Assembly	344
Driving a Constraint.....	346
Exercise 6-6: Driving a Constraint.....	347
Creating a Presentation File	351
Exercise 6-7: Creating a Presentation Storyboard.....	362
Creating Drawing Views from Assemblies and Presentation Files.....	367
Bill of Material (BOM).....	368
Exercise 6-8: Editing a Bill of Material (BOM).....	372
Creating Balloons.....	375
Parts List	381
Exercise 6-9: Creating a Drawing from an Assembly.....	384
Applying Your Skills	394
Checking Your Skills.....	398
Chapter 7 – Advanced Modeling Techniques.....	399
Introduction.....	399
Objectives	399
Dimension Display, Relationships, and Equations	400
Parameters.....	402
Exercise 7-1: Relationships and Parameters	407
iParts	412
Exercise 7-2: Creating and Placing an iPart.....	420
iAssemblies	427
Exercise 7-3: Creating and Placing an iAssembly	433

Table of Contents

Sectioning a Part or Components in an Assembly	437
Design View Representations in a Part or an Assembly File.....	438
Emboss Text and Closed Profiles	439
Exercise 7-4: Creating Text and Emboss Features	442
Sweep Features	446
Exercise 7-5: Creating Sweep Features	451
3D Sketching	453
3D Lines	456
Create a 3D Sweep.....	458
Import Points	458
Exercise 7-6: 3D Sketch & Sweep Features	459
Coil Features.....	465
Loft Features.....	468
Exercise 7-7: Creating a Loft Feature	474
Freeform Modeling.....	478
Split a Part or Face.....	481
Exercise 7-8: Splitting a Part into Multiple Solid Bodies.....	482
Mirror Features	485
Suppressing Features	486
Reordering a Feature.....	487
Feature Rollback.....	488
Content Center	489
Introduction to Stress Analysis	490
Exercise 7-9: Run a Stress Analysis on a Part	500
Exercise 7-10: Run a Stress Analysis on an Assembly.....	503
The Frame Generator	507
Exercise 7-11: Creating a Frame.....	510
Applying Your Skills.....	518
Checking Your Skills.....	519
Chapter 8 – Introduction to Sheet Metal Design	521
Introduction	521
Objectives	521
Sheet Metal Design.....	522
Creating a Sheet Metal Part.....	522
Sheet Metal Environment	522
Sheet Metal Defaults, Rules and Styles	524
Exercise 8-1: Editing a Sheet Metal Style and Rule	530
Face.....	533
Contour Flange	535

Flange.....	538
Exercise 8-2: Creating Sheet Metal Parts.....	540
Hem.....	544
Bend.....	546
Cut.....	549
Fold.....	550
Corner Round.....	552
Exercise 8-3: Creating Bend, Cut, Hem and Fold Features.....	553
Flat Pattern.....	560
Detailing Sheet Metal Parts.....	562
Exercise 8-4: Creating Flat Pattern and Documenting a Sheet Metal Part.....	563
Applying Your Skills.....	568
Checking Your Skills.....	569
Index.....	570