

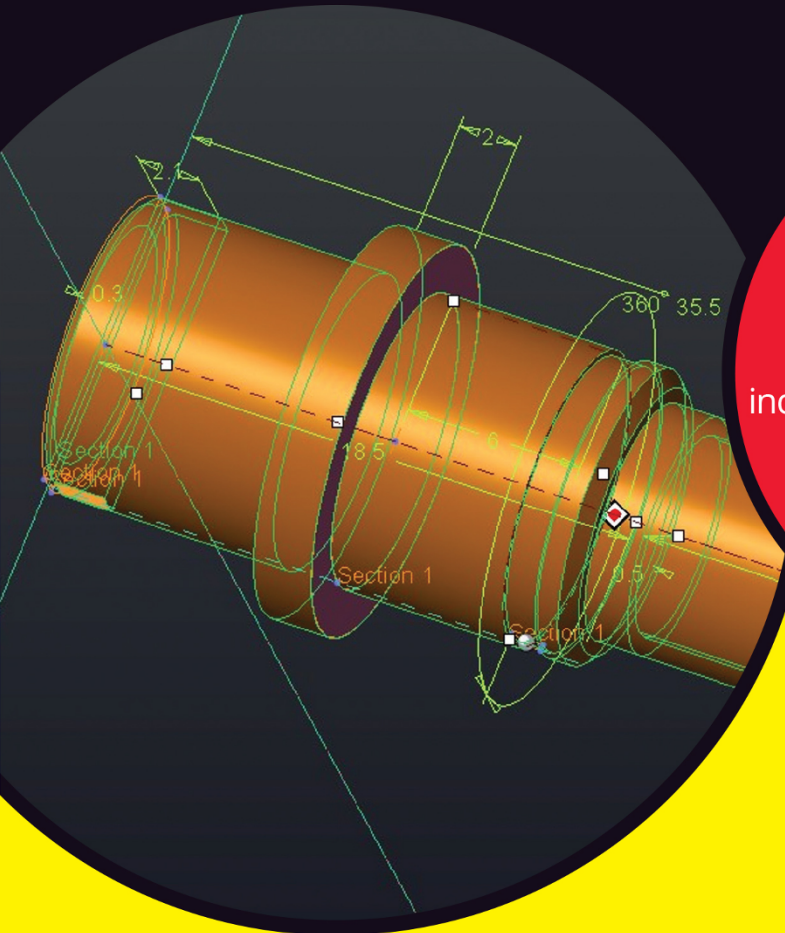
LEARNING MADE EASY



18th Edition

AutoCAD®

for
dummies®
A Wiley Brand



Build your AutoCAD project
from the ground up

Tackle basic drawing shapes
including straight lines and curves

Move into advanced drawing
and 3D modeling

Bill Fane

Autodesk Authorized Training
Center certified instructor



AutoCAD®

18th Edition

by Bill Fane

for
dummies®
A Wiley Brand

AutoCAD® For Dummies®, 18th Edition

Published by: **John Wiley & Sons, Inc.**, 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

Copyright © 2019 by John Wiley & Sons, Inc., Hoboken, New Jersey

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Trademarks: Wiley, For Dummies, the Dummies Man logo, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and may not be used without written permission. AutoCAD is a registered trademark of Autodesk, Inc. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002. For technical support, please visit <https://hub.wiley.com/community/support/dummies>.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2019940397

ISBN 978-1-119-58008-9 (pbk); ISBN 978-1-119-58010-2 (ebk); ISBN 978-1-119-58011-9 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

Contents at a Glance

Introduction	1
Part 1: Getting Started with AutoCAD	7
CHAPTER 1: Introducing AutoCAD and AutoCAD LT	9
CHAPTER 2: The Grand Tour of AutoCAD	17
CHAPTER 3: A Lap around the CAD Track	37
CHAPTER 4: Setup for Success	61
CHAPTER 5: A Zoom with a View	83
Part 2: Let There Be Lines	93
CHAPTER 6: Along the Straight and Narrow	95
CHAPTER 7: Dangerous Curves Ahead	109
CHAPTER 8: Preciseliness Is Next to CADliness	123
CHAPTER 9: Manage Your Properties	141
CHAPTER 10: Grabbing Onto Object Selection	163
CHAPTER 11: Edit for Credit	175
CHAPTER 12: Planning for Paper	207
Part 3: If Drawings Could Talk	219
CHAPTER 13: Text with Character	221
CHAPTER 14: Entering New Dimensions	253
CHAPTER 15: Down the Hatch!	281
CHAPTER 16: The Plot Thickens	295
Part 4: Advancing with AutoCAD	323
CHAPTER 17: The ABCs of Blocks	325
CHAPTER 18: Everything from Arrays to Xrefs	343
CHAPTER 19: Call the Parametrics!	377
CHAPTER 20: Drawing on the Internet	403
Part 5: On a 3D Spree	415
CHAPTER 21: It's a 3D World After All	417
CHAPTER 22: From Drawings to Models	439
CHAPTER 23: It's Showtime!	461
CHAPTER 24: AutoCAD Plays Well with Others	481

Part 6: The Part of Tens	493
CHAPTER 25: Ten AutoCAD Resources	495
CHAPTER 26: Ten System Variables to Make Your AutoCAD Life Easier	499
CHAPTER 27: Ten AutoCAD Secrets	505
Index	509

Table of Contents

INTRODUCTION	1
About This Book	2
Foolish Assumptions	3
Conventions Used in This Book	3
Using the command line	3
Using aliases	4
Icons Used in This Book	5
Beyond the Book	5
Where to Go from Here	6
PART 1: GETTING STARTED WITH AUTOCAD	7
CHAPTER 1: Introducing AutoCAD and AutoCAD LT	9
Launching AutoCAD	10
Drawing in AutoCAD	11
Understanding Pixels and Vectors	14
The Cartesian Coordinate System	15
CHAPTER 2: The Grand Tour of AutoCAD	17
Looking at AutoCAD's Drawing Screen	18
For your information	21
Making choices from the Application menu	22
Unraveling the Ribbon	24
Getting with the Program	27
Looking for Mr. Status Bar	28
Using Dynamic Input	28
Let your fingers do the talking: The command line	29
The key(board) to AutoCAD success	30
Keeping tabs on palettes	34
Down the main stretch: The drawing area	34
Fun with F1	35
CHAPTER 3: A Lap around the CAD Track	37
A Simple Setup	38
Drawing a (Base) Plate	43
Taking a Closer Look with Zoom and Pan	51
Modifying to Make It Merrier	52
Crossing your hatches	53
Now that's a stretch	54

Following the Plot	57
Plotting the drawing	57
Today's layer forecast: Freezing	60
CHAPTER 4: Setup for Success	61
A Setup Roadmap	62
Choosing your units	62
Weighing up your scales	65
Thinking about paper	68
Defending your border	68
A Template for Success	69
Making the Most of Model Space	71
Setting your units	72
Making the drawing area snap-py (and grid-dy)	73
Setting linetype, text, and dimension scales	75
Entering drawing properties	76
Making Templates Your Own	77
CHAPTER 5: A Zoom with a View	83
Zooming and Panning with Glass and Hand	84
The wheel deal	84
Navigating a drawing	85
Zoom, Zoom, Zoom	87
A View by Any Other Name	89
Degenerating and Regenerating	91
PART 2: LET THERE BE LINES	93
CHAPTER 6: Along the Straight and Narrow	95
Drawing for Success	96
Introducing the Straight-Line Drawing Commands	97
Drawing Lines and Polylines	98
Toeing the line	100
Connecting the lines with polyline	100
Squaring Off with Rectangles	105
Choosing Sides with POLygon	106
CHAPTER 7: Dangerous Curves Ahead	109
Throwing Curves	109
Going Full Circle	110
Arc-y-ology	112
Solar Ellipses	114

	Splines: Sketchy, Sinuous Curves	115
	Donuts: Circles with a Difference	117
	Revision Clouds on the Horizon	118
	Scoring Points	120
CHAPTER 8:	Preciseliness Is Next to CADliness	123
	Controlling Precision	124
	Understanding the AutoCAD Coordinate Systems	127
	Keyboard capers: Coordinate input	127
	Introducing user coordinate systems	128
	Drawing by numbers	129
	Grabbing an Object and Making It Snappy	131
	Grabbing points with object snap overrides	132
	Snap goes the cursor	134
	Running with object snaps	135
	Other Practical Precision Procedures	137
CHAPTER 9:	Manage Your Properties	141
	Using Properties with Objects	142
	Using the ByLayer approach	142
	Changing properties	144
	Working with Layers	146
	Accumulating properties	148
	Creating new layers	149
	Manipulating layers	156
	Scaling an object's linetype	158
	Using Named Objects	159
	Using AutoCAD DesignCenter	161
CHAPTER 10:	Grabbing Onto Object Selection	163
	Commanding and Selecting	164
	Command-first editing	164
	Selection-first editing	164
	Direct-object manipulation	164
	Choosing an editing style	165
	Selecting Objects	166
	One-by-one selection	167
	Selection boxes left and right	167
	Tying up object selection	169
	Perfecting Selecting	170
	AutoCAD Groupies	173
	Object Selection: Now You See It	173

CHAPTER 11: Edit for Credit	175
Assembling Your AutoCAD Toolkit	175
The Big Three: Move, COpy, and Stretch	178
Base points and displacements	178
Move	180
COpy	181
Copy between drawings	182
Stretch	182
More Manipulations	186
Mirror, mirror on the monitor	186
ROtate	188
SCale	189
-ARray	190
Offset	191
Slicing, Dicing, and Splicing	193
TRim and EXtend	193
BReak	195
Fillet, CHAmfer, and BLEND	196
Join	199
Other editing commands	201
Getting a Grip	202
When Editing Goes Bad	204
Dare to Compare	206
CHAPTER 12: Planning for Paper	207
Setting Up a Layout in Paper Space	210
The layout two-step	210
Put it on my tabs	212
Any Old Viewport in a Layout	213
Up and down the detail viewport scales	214
Keeping track of where you're at	216
Practice Makes Perfect	217
Clever Paper Space Tricks	217
PART 3: IF DRAWINGS COULD TALK	219
CHAPTER 13: Text with Character	221
Getting Ready to Write	222
Creating Simply Stylish Text	224
Font follies	225
Get in style	226
Taking Your Text to New Heights	228
Plotted text height	228
Calculating non-annotative AutoCAD text height	228

Entering Text	230
Using the Same Old Line	230
Saying More in Multiline Text	233
Making it with mText.	233
mText dons a mask.	237
Insert Field	237
Doing a number on your mText lists	238
Line up in columns — now!	240
Modifying mText	242
Turning On Annotative Objects	242
Gather Round the Tables	245
Tables have style, too	246
Creating and editing tables	247
Take Me to Your Leader	250
Electing a leader.	250
Multi options for multileaders	252
CHAPTER 14: Entering New Dimensions	253
Adding Dimensions to a Drawing	254
A Field Guide to Dimensions	257
Self-centered	259
Quick, dimension!	260
And now for the easy way	261
Where, oh where, do my dimensions go?	262
The Latest Styles in Dimensioning	263
Creating dimension styles	266
Adjusting style settings	268
Changing styles	272
Scaling Dimensions for Output	272
Editing Dimensions	275
Editing dimension geometry	275
Editing dimension text	277
Controlling and editing dimension associativity	278
And the Correct Layer Is	279
CHAPTER 15: Down the Hatch!	281
Creating a Hatch	281
Using the Hatches Tab	285
Scaling Hatches	288
Scaling the easy way	288
Annotative versus non-annotative	289
Pushing the Boundaries of Hatch	290
Adding style	290
Hatches from scratch	291
Editing Hatch Objects	293

CHAPTER 16:	The Plot Thickens	295
	You Say “Printing,” I Say “Plotting”	296
	The Plot Quickens	296
	Plotting success in 16 steps	296
	Getting with the system	301
	Configuring your printer	301
	Preview one, two	303
	Instead of fit, scale it	303
	Plotting the Layout of the Land	305
	Plotting Lineweights and Colors	307
	Plotting with style	307
	Plotting through thick and thin	312
	Plotting in color	316
	It’s a (Page) Setup!	317
	Continuing the Plot Dialog	318
	The Plot Sickens	321
	PART 4: ADVANCING WITH AUTOCAD	323
CHAPTER 17:	The ABCs of Blocks	325
	Rocking with Blocks	326
	Creating Block Definitions	328
	Inserting Blocks	332
	Attributes: Fill-in-the-Blank Blocks	336
	Creating attribute definitions	337
	Defining blocks that contain attribute definitions	339
	Inserting blocks that contain attribute definitions	339
	Editing attribute values	340
	Extracting data	340
	Exploding Blocks	341
	Purging Unused Block Definitions	341
CHAPTER 18:	Everything from Arrays to Xrefs	343
	Array Associatively	345
	Comparing the old and new ARray commands	346
	Hip, hip, array!	347
	Associatively editing	353
	Going External	354
	Becoming attached to your xrefs	356
	Layer-palooza	358
	Editing an external reference file	358
	Forging an xref path	359
	Managing xrefs	361

Blocks, Xrefs, and Drawing Organization	363
Mastering the Raster	364
Attaching a raster image	365
Maintaining your image	366
You Say PDF; I Say DWF	367
Theme and Variations: Dynamic Blocks	369
Now you see it	370
Lights! Parameters! Actions!	374
Manipulating dynamic blocks	375
CHAPTER 19: Call the Parametrics!	377
Maintaining Design Intent	378
Defining terms	380
Forget about drawing with precision!	381
Constrain yourself	381
Understanding Geometric Constraints	382
Applying a little more constraint	384
Using inferred constraints	389
You AutoConstrain yourself!	389
Understanding Dimensional Constraints	390
Practice a little constraint	392
Making your drawing even smarter	394
Using the Parameters Manager	396
Dimensions or constraints? Have it both ways!	399
Lunchtime!	401
CHAPTER 20: Drawing on the Internet	403
The Internet and AutoCAD: An Overview	404
You send me	404
Prepare it with eTransmit	404
Rapid eTransmit	405
FTP for you and me	407
Increasing cloudiness	407
Bad reception?	408
Help from Reference Manager	408
The Drawing Protection Racket	410
Outgoing!	411
Autodesk weather forecast: Increasing cloud	411
Your head planted firmly in the cloud	412
AutoCAD Web and Mobile	413

PART 5: ON A 3D SPREE	415
CHAPTER 21: It's a 3D World After All	417
The 3.5 Kinds of 3D Digital Models	418
Tools of the 3D Trade	419
Warp speed ahead	420
Entering the third dimension	421
Untying the Ribbon and opening some palettes	422
Modeling from Above	423
Using 3D coordinate input	424
Using point filters	425
Object snaps and object snap tracking	425
Changing Planes	426
Displaying the UCS icon	426
Adjusting the UCS	426
Navigating the 3D Waters	431
Orbit à go-go	432
Taking a spin around the cube	433
Grabbing the SteeringWheels	434
Visualizing 3D Objects	435
On a Render Bender	437
CHAPTER 22: From Drawings to Models	439
Is 3D for Me?	440
Getting Your 3D Bearings	441
Creating a better 3D template	441
Seeing the world from new viewpoints	446
From Drawing to Modeling in 3D	448
Drawing basic 3D objects	448
Gaining a solid foundation	449
Drawing solid primitives	450
Adding the Third Dimension to 2D Objects	451
Adding thickness to a 2D object	451
Extruding open and closed objects	451
Pressing and pulling closed boundaries	452
Lofting open and closed objects	452
Sweeping open and closed objects along a path	453
Revolving open or closed objects around an axis	454
Modifying 3D Objects	454
Selecting subobjects	454
Working with gizmos	455
More 3D variants of 2D commands	456
Editing solids	457

CHAPTER 23: It's Showtime!	461
Get the 2D Out of Here!	462
A different point of view	466
Additional 3D tricks	467
AutoCAD's top model	467
Visualizing the Digital World	469
Adding Lighting	470
Default lighting	470
User-defined lights	471
Sunlight	474
Creating and Applying Materials	474
Defining a Background	477
Rendering a 3D Model	479
CHAPTER 24: AutoCAD Plays Well with Others	481
Get Out of Here!	481
Things that go BMP in the night	482
Vectoring in on WMF	483
And now here are the lumpy bits	484
PDF	485
What the DWF?	485
3D Print	486
But wait! There's more!	486
Open Up and Let Me In!	486
Editing other drawing file formats	487
PDF editing	487
Translation, Please!	489
The Importance of Being DWG	490
PART 6: THE PART OF TENS	493
CHAPTER 25: Ten AutoCAD Resources	495
Autodesk Discussion Groups	495
Autodesk's Own Blogs	495
Autodesk University	496
Autodesk Channel on YouTube	496
World Wide (CAD) Web	496
Your Local Authorized Training Center	497
Your Local User Group	497
Autodesk User Groups International	497
Books	498
Autodesk Feedback Community	498

CHAPTER 26:	Ten System Variables to Make Your AutoCAD Life Easier	499
	APERTURE	.500
	DIMASSOC	.500
	MENUBAR	.501
	MIRRTEXT	.501
	OSNAPZ	.502
	PICKBOX	.502
	REMEMBERFOLDERS	.502
	ROLLOVERTIPS	.503
	TOOLTIPS	.503
	VISRETAIN	.504
	And the Bonus Round	.504
CHAPTER 27:	Ten AutoCAD Secrets	505
	Sheet Sets	.505
	Custom Tool Palettes	.506
	Ribbon Customization	.506
	Toolsets	.506
	Programming Languages	.506
	Vertical Versions	.507
	Language Packs	.507
	Multiple Projects or Clients	.508
	Data Extraction and Linking	.508
	Untying the Ribbon	.508
INDEX		509

Introduction

Welcome to the wonderful world of AutoCAD and to the fame and fortune that awaits you as an AutoCAD user. (Would I lie to you?)

Believe it or not, AutoCAD is almost 40 years old, having been born in December 1982, when most people thought that personal computers weren't capable of industrial-strength tasks like CAD. The acronym stands for Computer-Aided Drafting, Computer-Aided Design, or both, depending on who you talk to. What's equally scary is that many of today's hotshot AutoCAD users, and most of the readers of this book, weren't even born when the program first hit the street and when the grizzled old-timer writing these words began using it.

AutoCAD remains the king of the PC computer CAD hill by a tall margin, making it one of the longest-lived computer programs ever. It's conceivable that the long-term future of CAD may belong to special-purpose, 3D-based software such as the Autodesk Inventor and Revit programs, or to specialized market-specific variations built on top of AutoCAD. At any rate, AutoCAD's DWG file format is the de facto standard, and so AutoCAD will be where the CAD action is for the foreseeable future.

You may have heard that AutoCAD is complex, and therefore is difficult to learn and use. Yes, the user interface includes about 1,300 icons. But it has been my observation that the easier any software is to learn and use, the sooner you bump up against its limitations. A car with no accelerator, one forward gear, no steering, and no brakes would be easy to use until you reached a hill, a curve, or a stop sign or you needed to back out of a parking space.

Yes, AutoCAD is complex, but that's the secret to its success. Some claim that few people use more than 10 percent of AutoCAD's capabilities. Closer analysis reveals that most people use the same basic 5 percent and everyone else uses a different 5 percent after that. The trick is to find *your* 5 percent, the sweet spot that suits your particular industry. If you follow my advice, I think you will find that using AutoCAD is as simple and intuitive as driving a car.

It should be perfectly clear that if your career path has put you in a position where you need to know how to use AutoCAD, you're no dummy!

About This Book

Unlike many other *For Dummies* books, this one *often* tells you to consult the official software documentation. AutoCAD is just too big and powerful for a single book to attempt to describe it completely. The book that ultimately covers every AutoCAD topic would need a forklift to move it. Literally. They stopped shipping paper instruction manuals with the software somewhere around 1995, when the full documentation package grew to about a dozen volumes and more than 30 pounds.

In *AutoCAD For Dummies*, I occasionally mention differences from previous releases so that everyone gains some context and so that upgraders can more readily understand the differences; plus, you're bound to encounter a few of the billions and billions of drawings that were created using older methods. I also mention the important differences between AutoCAD and AutoCAD LT. In particular, AutoCAD LT has no programming language and has extremely limited support for parametrics (Chapter 19) and 3D (Chapter 21).

This book is not *Mechanical Drafting For Dummies*, or *Architectural Drafting For Dummies*, or even *Crash Testing For Dummies*. It doesn't cover drafting principles and procedures, but it does cover the AutoCAD commands necessary to create drawings. Remember, though, that knowing AutoCAD's drawing commands won't make you a great designer, just as knowing how to touch-type and run a word processor won't make you a great author. The job title *CAD operator* doesn't exist, but almost all drafters and designers use CAD.

In addition, the book does *not* cover the discipline-specific features in AutoCAD-based vertical market products, such as AutoCAD Electrical or AutoCAD Mechanical, although most of the information in this book applies to the general-purpose features of those programs as well.

This book covers AutoCAD 2015 through 2020. The obvious major differences between these versions and 2014 and earlier are the initial startup screen and the format of the Ribbon menu. The underlying principles remain the same. I will draw your attention to other differences where appropriate.

Late in 2010, Autodesk released the first non-Microsoft Windows version of AutoCAD in 20 years. Although AutoCAD for Mac is now available, *AutoCAD For Dummies* covers only the Windows version. The two versions are file-compatible, but they differ in many ways in how they look and what they can do. If you have AutoCAD for Mac, you should be able to grasp basic concepts but you might be better off with a Mac-specific book such as *Mastering AutoCAD For Mac*, by George Omura and Rick Graham (Sybex Publishing) or *What's Inside? AutoCAD for Macintosh*,

by Ralph Grabowski, available as an e-book at www.worldcadaccess.com/ebooksonline/2015/07/wia.html. Halfway down the page (“To Place Your Order”) is a drop-down list, from which you can choose the Mac version of the ebook.

Foolish Assumptions

AutoCAD has a large, loyal, dedicated group of longtime users. *AutoCAD For Dummies* is not for you if you’ve been using AutoCAD for a decade or more, if you plan your vacation time around Autodesk University, if you used AutoCAD to create your wedding invitations, if you tell police officers that you can walk a straight line if they will press F8 first, or if you read 1,200–page technical tomes about AutoCAD for pleasure. This book *is* for you if you want to get going quickly with AutoCAD, and you understand the importance of developing proper CAD techniques from the beginning.

However, you do need to have an idea of how to use your computer system before tackling AutoCAD and this book. You need to have a computer system with AutoCAD or AutoCAD LT (preferably the 2020 version but at least 2015 or later). A printer or plotter and a connection to the Internet are helpful, too.

You also need to know how to use your version of Windows to copy and delete files, create a folder, and find a file. You need to know how to use a mouse to select (highlight) or to choose (activate) commands, how to close a window, and how to minimize and maximize windows. You should be familiar with the basics of your operating system before you start using AutoCAD.

Conventions Used in This Book

Here are some conventions that you’ll run across in this book.

Using the command line

The command line is that gray area near the bottom of the screen that says *Type a command*. One way of using AutoCAD is to type command names in this area. In addition, this is where AutoCAD talks back when it needs information from you. Examples of AutoCAD prompts appear in a special typeface, as does any other text in the book that replicates a message, a word, or text that appears onscreen.

Sequences of prompts that appear in the AutoCAD command line have a shaded background, like this:

```
Specify lower left corner or [ON/OFF] <0.0000,0.0000>:
```

When there is a specific action that I want you to take at one of these prompts, look for the italic passage at the end of this line, such as when I want you to press Enter:

```
Specify ending width <5.0000>: Press Enter
```

Text that I want you to type into the program at the command line, in a dialog box, in a text box, or elsewhere appears in **boldface** type, like the 3 at the end of the following line.

```
Specify starting width <0.0000>: 3
```

Many figures in this book also show AutoCAD command-line sequences that demonstrate AutoCAD's prompts and sample responses.

Using aliases

Many AutoCAD commands have *aliases* — these shortcut versions have fewer letters than their full commands, in case you like to type commands at the AutoCAD command line. In this book, I show aliases in uppercase as part of the command names. To start a command, you have to type only its uppercase letters. For example, to draw a line, type either **LINE** (the official command), or just **L** (its alias) and then press Enter to execute the command. When I tell you to start a command, I spell it out in full (such as Line, Circle, or COpy), but you need to enter only the letters shown in uppercase (**L**, **C**, or **CO**, respectively). Note also that the uppercase letters aren't always the initial letters nor are they always adjacent. For example, the eXit command can be entered as the full word or as just the letter **X** and DimAngular can be entered simply as **DAN**.

Command entry at the keyboard became even easier starting with AutoCAD 2014. As you begin to type a command name, the program will try to guess what you want and display a list of suggestions. You can then click the one you want or keep typing until your choice rises to the top.

Icons Used in This Book

Throughout this book, I point out certain morsels of particularly important or useful information by placing handy little icons in the margin. Naturally, different icons indicate different types of information:



TIP

Herein lies a pointed insight that can save you time and trouble as you use AutoCAD. In many cases, Tip information acts as a funnel on AutoCAD's impressive but sometimes overwhelming flexibility: After telling you many of the ways that you *can* do something, I tell you the way that you *should* do it, in most cases.



TECHNICAL
STUFF

The Technical Stuff icon points out places where I delve a little more deeply into AutoCAD's inner workings or point out information that most people don't need to know most of the time. These paragraphs definitely are not required reading, so if you see one at a point when you've reached your techie-detail threshold, feel free to skip it.



WARNING

Warning tells you how to stay out of trouble when living close to the edge. Failure to heed its message may have unpleasant consequences for you or your drawing — or both.



REMEMBER

You have a lot to remember when you're using AutoCAD, so I've remembered to remind you not to forget about some of those things that you should remember.

Beyond the Book

I have written a lot of extra content that you won't find in this book. Go online to find

» **AutoCAD drawings:** Drawings that you can use with this book are at www.dummies.com/go/autocadfd18. The drawings, which are on the Downloads tab, are in Zip format; just download and unzip them and they're ready to open in AutoCAD. The Zip files, which are named according to chapter, contain one or more drawing files. For example, `afd03.zip` contains the versions of the drawing in Chapter 3. Note that not all chapters have associated drawing files.

» **Cheat sheet:** The cheat sheet for this book has a roadmap for setting up your drawings as well as a list of keyboard shortcuts. To get to the cheat sheet, go to www.dummies.com and type *AutoCAD For Dummies* in the Search box.

» **Updates:** If I have any updates to the book, you can find them at www.dummies.com/extras/autocad18.

Where to Go from Here

Because you're reading this Introduction, you're like me — you like to read. (The cut-to-the-chase people tend to flip to the index right away and look up what they need to know at that instant.) If you're a total AutoCAD newbie, you can read this book in order, from front to back; it follows a straightforward route from setting up the drawing environment to outputting your masterworks on hard copy to sharing your work with others.

If you're an experienced user, you'll probably be an index-flipper who looks for the missing information needed to complete a specific task. You can probably find the index on your own, but I encourage you to browse through this book anyway, with a highlighter or sticky notes in hand, so that you can find those particularly important places when you need them again.

Whichever route you choose, I hope that you enjoy your time with *AutoCAD For Dummies*. A-a-and, you're off!

1

Getting Started with AutoCAD

IN THIS PART . . .

Find your way around the AutoCAD screen, and discover the location of the tools you will use most often, such as the Ribbon, the graphic screen, and command line.

Discover the half-dozen commands that will account for much of your AutoCAD activities.

See the big picture: from how to start a drawing to printing it.

Correctly set up AutoCAD and create templates for drawing success.

Navigate through your drawing by panning and zooming.

- » Launching AutoCAD
- » Creating your first drawing in AutoCAD
- » Seeing the complete picture
- » Understanding the difference between pixels and vectors
- » Comprehending the Cartesian coordinate system

Chapter **1**

Introducing AutoCAD and AutoCAD LT

This chapter helps ease you into using AutoCAD to create engineering drawings and how to get started. Although it's not uncommon to feel overwhelmed the first time you see AutoCAD, rest assured that you don't need to learn all the controls that you see in the default environment to be an efficient user of the program.

After a brief introduction to the program, I take you through an exercise to show you just how easy it can be to use AutoCAD. The exercise is followed up with some key concepts that you should understand when using AutoCAD, including how it differs from most other computer applications.



REMEMBER

When you're starting out with AutoCAD, heed this quote from *The Hitchhiker's Guide to the Galaxy*:

Don't panic!

Launching AutoCAD

The first thing you need to do to start using AutoCAD is to launch the AutoCAD program (well, duh!) and, if necessary, maximize its screen display. AutoCAD has so many tools and palettes that you'll almost always want to use it in full-screen mode. Follow these steps:

1. Launch AutoCAD.

As indicated in the Introduction, I assume that you have a working knowledge of how to use your version of Windows, including how to launch applications. Depending on your version of Windows and how it is set up, you might have to double-click a desktop icon or find a suitable entry in the Start → [All] Programs menu or Start → All Apps menu on the start screen. The wording of the selections varies depending on the version of AutoCAD and Windows.



2. Start a new drawing.

Click the large Start Drawing icon towards the upper-left corner of the screen.

3. If something called the Design Feed palette is displayed, close it by clicking the X in its top-left corner.

I'm assuming that you aren't quite ready to post your drawing to the web so you can share it and collaborate live with other people.

4. If necessary, expand AutoCAD to full-screen mode.

Click the middle Windows button in the upper-right corner of the application window.

5. If necessary, expand the graphic area (the big, gray area in the middle) to full-screen size.

Click the middle button in the upper-right corner, near the compass rosette.

6. Place the cursor in the gray graphics area (midscreen), and then press the Esc key twice to make sure that no commands are active.

Now you're ready to start drawing in AutoCAD, as shown in Figure 1-1.



REMEMBER

Your screen may look a little different from Figure 1-1 depending on your version of AutoCAD and Windows and your screen resolution. Note too that although you will draw using white on dark gray (refer to Figure 1-1), I drew using black on white (see Figure 1-2), and my menu icons have a white background compared to your gray background.

FIGURE 1-1:
Your AutoCAD,
ready to draw!

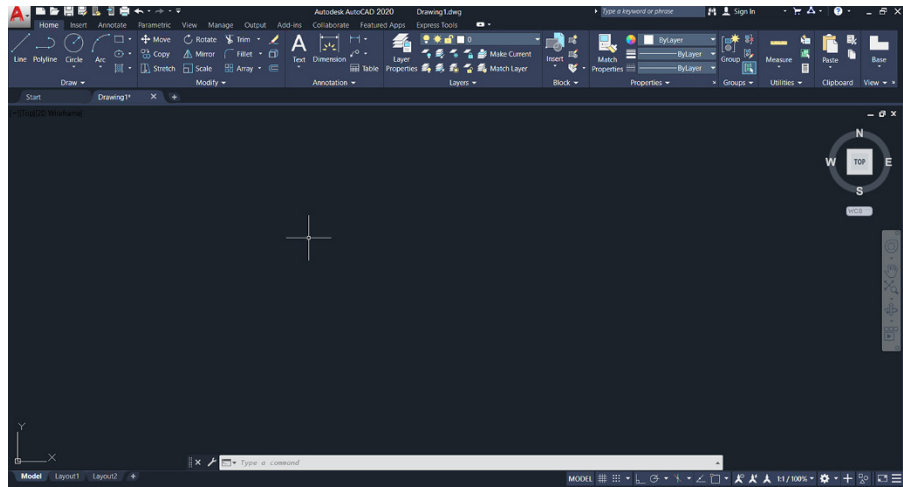
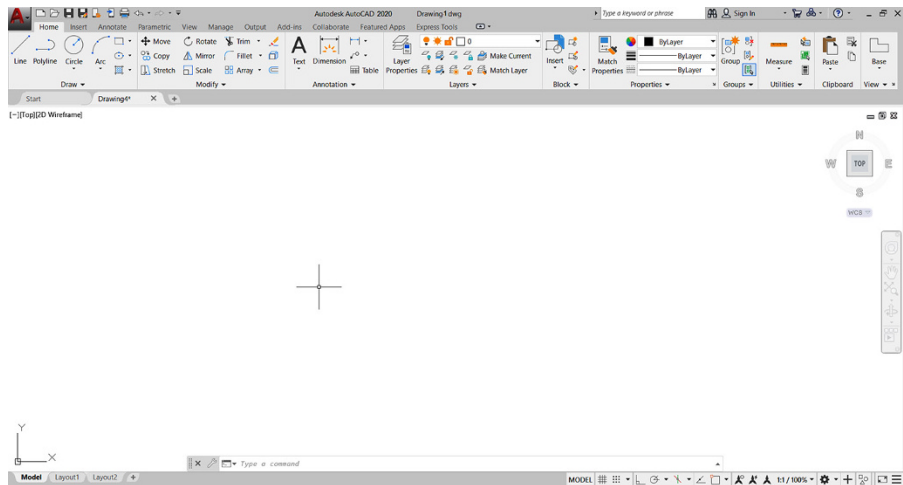


FIGURE 1-2:
My AutoCAD,
ready to draw!



Drawing in AutoCAD

AutoCAD offers a wide range of commands to create, modify, and annotate 2D designs. Don't feel as though you need to learn and master every one of the 1,300 or so commands and options that AutoCAD offers to be a proficient drafter; most veteran drafters probably use only 20 or so commands for most basic drafting tasks.

The following simple exercise introduces a few of the commonly used commands to establish the size of your drawing area as well as the commands for creating straight line segments and circles.

You can start a command by clicking its button in the Ribbon menu, across the top of the screen, or by entering the command's name in the *command line*, which is the light-gray text-entry area at the bottom of the screen that reads *Type a command*.

In this exercise and others in this book, AutoCAD's command line entries look like this, and you type the commands and responses shown in **bold**. Press Enter or the spacebar after each command or response that you type.



TIP

You don't even have to move the cursor to the command line. As you type, AutoCAD tries to guess which command you want and displays a list of possibilities at the command line, even if the cursor is in the Ribbon menu area. When you see the command you want, simply click it in the list.



WARNING

In the following exercise, don't add spaces on either side of a comma! In most situations, AutoCAD treats pressing the spacebar the same as pressing Enter, which makes keyboard entry fast and easy but messes things up if you do it at the wrong time. In addition, make sure you use a comma as the X,Y separator and the period (.) as the decimal delimiter, and don't use a thousands separator. Some parts of the world use the comma as the decimal separator and the space as the thousands delimiter, either of which confuses AutoCAD no end.

In this first exercise I ask you to do things without explaining why. Trust me; all will become clear in later chapters:

1. Set up an appropriate size for the drawing:

LIMITS

Reset Model space limits:

Specify lower left corner or [ON/OFF] <0.0000,0.0000>: **0,0**

Specify upper right corner <12.0000,9.0000>: **60,40**

Now type the letters **ZA** and press Enter. Note that there must be a space between the Z and the A.

2. Disable Dynamic Input mode to work with the command line:

DYNMODE

Enter new value for DYNMODE <3>: **-3**

3. Draw the frame:

```
Line
Specify first point: 26,12
Specify next point or [Undo]: 13,12
Specify next point or [Undo]: 22,24
Specify next point or [Undo]: 40.5,24
Specify next point or [Undo]: 41,22
Specify next point or [Undo]: 26,12
Specify next point or [Undo]: 20.6667,28
Specify next point or [Undo]: 25,28
Specify next point or [Undo]: Enter
```

4. Draw a bit more:

```
Line
Specify first point: 45,12
Specify next point or [Undo]: 42.87,14.53
Specify next point or [Undo]: 39.38,28.5
Specify next point or [Undo]: 35.3,30
Specify next point or [Undo]: Enter
```

5. Draw a round thing:

```
Circle
Specify center point for circle or [3P/2P/Ttr (tan tan
radius)]: 13,12
Specify radius of circle or [Diameter]: 8
```

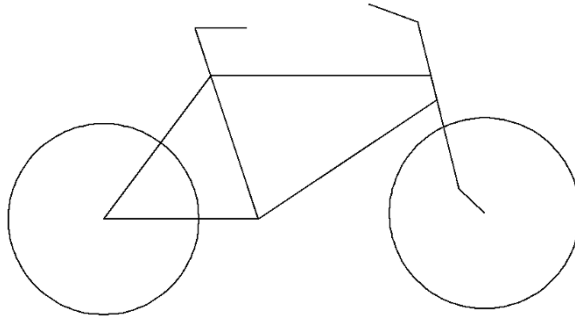
6. Draw another round thing:

```
Circle
Specify center point for circle or [3P/2P/Ttr (tan tan
radius)]: 45,12
Specify radius of circle or [Diameter]: 8
```

Figure 1-3 shows the bicycle you've drawn, and you didn't even need training wheels!

It has been claimed that Line and Circle are the second- and third-most-used commands after UNDO. You should now SAVE your drawing as an historic artifact. That was easy, wasn't it?

FIGURE 1-3:
Your first
AutoCAD
drawing.



Understanding Pixels and Vectors

To use AutoCAD effectively (or even at all) you need to understand how an image is displayed on your computer screen, and how the image is stored when it is not being displayed.

» **An image on a computer screen is made up of pixels.** If you look closely at the screen with a strong magnifying glass, you'll see that the image is formed from a large number of small dots of light, as shown in Figure 1-4, called *pixels*. This has nothing to do with Tinker Bell, except that an onscreen image of her would indeed be made up of pixels.

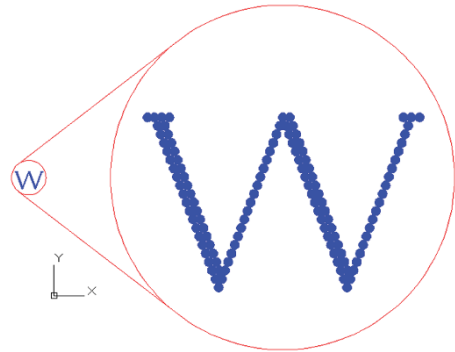


FIGURE 1-4:
Pixels.

- » **All programs that display a graphic image simply turn on or off suitable spots to build the picture.** This is a *raster* image. A straight line in a raster image is just a fortuitous alignment of appropriate dots, and after it's been created, it can't be edited as a single object.
- » **A major difference between CAD programs and computer graphics programs (such as Microsoft Paint) lies in how they save the image to disk.** When the image from a Paint-type program is saved to disk, it's stored as a bitmap that simply lists the color of each pixel. What gets saved to disk is simply a snapshot of what you see onscreen.
- » **All CAD programs work with and store on a vector file on disk.** A *vector file* is a big collection of numbers and words that list the type, size, and location of every entity in the drawing. When a CAD program displays your drawing



onscreen, it analyzes the vector data and calculates which pixels to turn on or off, depending on which portion of the drawing you're viewing. CAD programs understand that a circle is a closed curve with a center point and a constant radius. If you change its radius, the CAD program redraws the image onscreen to show the new size.

» **AutoCAD doesn't limit you to working only with what you can see onscreen.** You can include as much detail in a drawing as needed. You can zoom in to see more detail and zoom out to see the big picture. At any time, the screen shows only those entities and their detail that the screen is capable of showing.

Some screens can show more pixels than others can. The number ranges from the 320 per row by 200 rows (320 x 200) of the very old Color Graphics Adapter (CGA) to 3840 x 2160 and beyond for today's 4K monitors. However, the drawing file always contains the same information. If it were moved to a computer with a higher resolution graphics adapter and monitor, then greater detail would show without you having to zoom in as far. Conversely, a drawing file moved to a computer with a lower screen resolution does not lose any detail, but you will need to zoom in closer to see it.

How big is "the big picture"? AutoCAD can draw a circle with a radius of 10^{99} (a 1 followed by 99 zeros) units, but the universe is "only" about 9×10^{23} miles in diameter, depending on how you measure and whose numbers you use (subject to change without notice). Check out en.wikipedia.org/wiki/Observable_universe for the latest number.

Conversely, AutoCAD can draw a circle with a radius as small as 10^{-99} (which equals 0.00000[plus 90 more zeros plus]0001) units in diameter, as opposed to the classical radius of an electron, which is $2.8179403267 \times 10^{-13}$ cm.

» **It's possible for a drawing file to contain much more than you can see at any one time.** The computer screen is not really the drawing; it is just a viewer that lets you look at all or part of the drawing file.

The Cartesian Coordinate System

AutoCAD uses the Cartesian coordinate system to define all locations in the drawing. This includes things such as the starting and ending points of lines, the centers of circles, the locations of text notes, and so on. Cartesian coordinates are named for French philosopher René Descartes, who is famous for statement "I think, therefore I am," although today he might say, "I tweet, therefore I am" — although tweeting doesn't always involve thinking.

In his *Discourse on Method*, Descartes, wearing his mathematician's hat, came up with the idea of locating any point on a planar surface by measuring its distance from the intersection of a pair of axes. (That's *axes* as in more than one axis, not several tools for chopping wood.) By convention, the intersection of these axes (called, also by convention, the X-axis and the Y-axis) are perpendicular to one another, and their intersection point is identified as 0,0 — or the origin.

For example, if your address is 625 East 18th Street in a typical town, you live 6¼ blocks east of First Avenue and 18 blocks north of Main Street.

AutoCAD also uses the notation that the origin is at point 0,0. Positive values are to the right of and above this point, and negative values are to the left of and below it. You can identify any location on a drawing by its horizontal distance from the origin, followed by its vertical distance from the same starting point.

AutoCAD shows Cartesian coordinates as a pair of numbers separated by a comma. The number to the left of the comma is the X (horizontal) coordinate, and the value to the right is the Y (vertical) coordinate. You used this convention when creating your bicycle drawing. When working in three dimensions (see Chapter 21), AutoCAD adds a third coordinate: Z.



WARNING

It's worth repeating my earlier warning: Make sure you use a comma as the X,Y separator and the period (.) as the decimal delimiter, and don't use a thousands separator.

- » Touring the AutoCAD screens
- » Going bar-hopping: Title bars and the status bar
- » Unraveling the Ribbon
- » Practicing with palettes
- » Discovering the drawing area
- » Using online help

Chapter 2

The Grand Tour of AutoCAD

Over the years, AutoCAD's interface has undergone many changes, ranging from a simple text menu down the right side (still the second-fastest way of using AutoCAD) to drop-down menus, toolbars, the Dashboard (which only survived two releases — 2007 and 2008), tool palettes, and, for now, the Ribbon menu.

Like the rest of this book, this chapter is written for someone who has used other Windows programs but has little or no experience with AutoCAD. Here and throughout the rest of the book, I show you how to do things by using AutoCAD's implementation of Microsoft's flavor of the year of its Fluent User Interface (or FUI; pronounced “foo-ey”). AutoCAD has always been big on backward compatibility, and this includes the interface. You can always shift between earlier and newer versions of the user interface.

Looking at AutoCAD's Drawing Screen

When you first open AutoCAD, you encounter the Start screen. I can already hear your plaintive cry: “Where do I draw? The screen is full!” No problem. The Start screen (shown in Figure 2-1) is just a menu of available actions. It should be quite obvious as to what each item does. For now, just click the big Start Drawing icon.

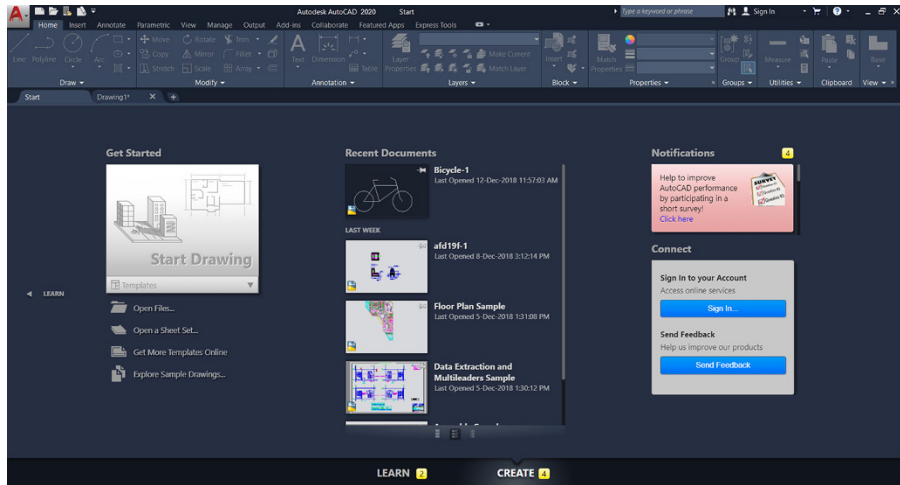


FIGURE 2-1:
AutoCAD's
Start screen.



TIP

You can always get the Start screen back by clicking its tab in the upper-left corner of the large gray drawing area.

If the screen is still partially obscured by the Design Feed palette, close it by clicking the X in its upper-left corner. AutoCAD remembers that you closed it, so the program doesn't open it next time. Don't worry: When you're ready to upload your drawings to the web so you can share and collaborate, getting the palette back on the screen is easy; click the button on the Palettes panel of the View tab on the Ribbon menu.

Figure 2-2 shows the screen you then see, AutoCAD's default drawing window.



REMEMBER

Your screen will have a dark gray background. I'm using a white background because it is clearer on the printed page.

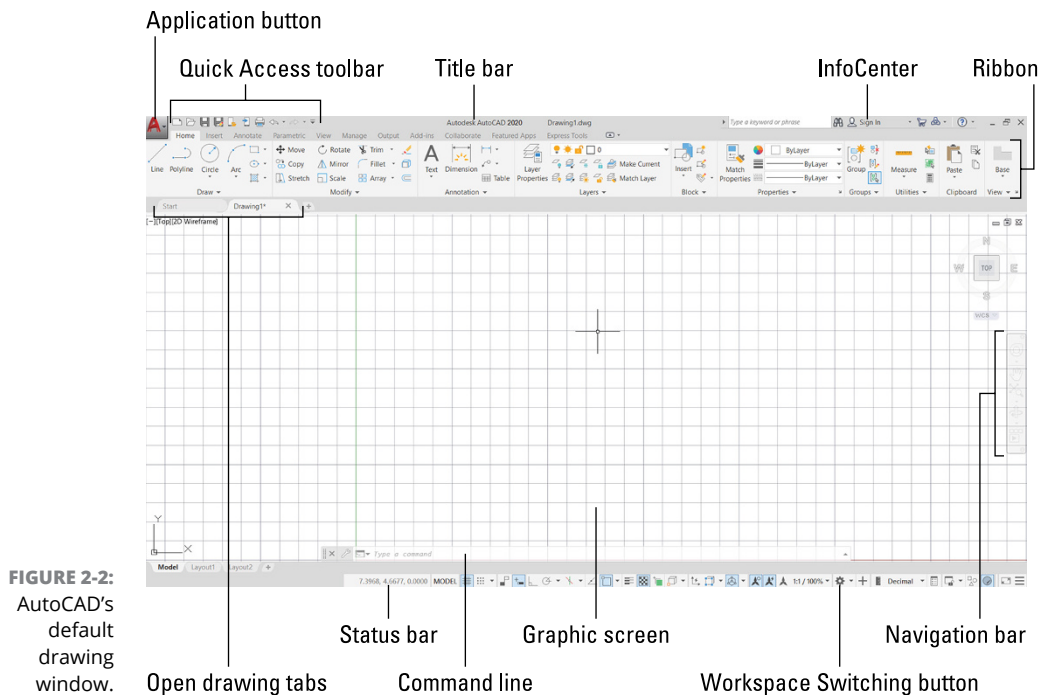


FIGURE 2-2: AutoCAD's default drawing window.

Now you're ready to get to work. Starting from the top down, AutoCAD's interface has eight main sections:

- » **The Application menu:** Click the Application button (known informally as "the big red A") at the top-left corner of the AutoCAD window to open the AutoCAD Application menu. It presents mostly file-related commands; from this menu you can create new drawings, open existing drawings, save files, or print masterpieces. It also gives access to the important Options command.
- » **The Quick Access toolbar:** This toolbar, in the top-left corner of the screen, includes buttons for some of the most commonly used functions, such as Save and Undo. You can add functions that you use all the time and delete unneeded buttons by clicking the down-facing triangle near the right-hand end of the toolbar.
- » **The Ribbon:** Whereas the Application menu focuses on file management, the Ribbon holds commands to create and modify drawing objects.
- » **File Tabs:** The series of tabs across the top of the graphic screen, one for each open drawing, makes it easy to jump from drawing to drawing, compared to earlier releases. New tabs appear as you open or start additional drawings.
- » **The graphic screen:** It's the "piece of paper" on which you draw.



REMEMBER

» **The command line:** This window, the chat room between you and AutoCAD, displays your input to AutoCAD and (equally important) tells you what it needs from you.

If you're having a problem and all else fails, read the command line.

» **The space tabs:** These tabs let you switch between model space and any paper spaced layouts. I discuss paper space layouts in Chapter 12.

» **The status bar:** The status bar tells you an awful lot about how many of AutoCAD's operating variables are set and in which way. The status bar does more than show you settings, however. You can set, reset, and change most settings from the status bar. I discuss many of these settings in later chapters.

Because of the way that AutoCAD has evolved, you usually have four or five ways to invoke a command, primarily the Ribbon, keyboard entry, toolbars, menu bar, and screen menus. Throughout this book, I focus on the Ribbon and direct keyboard entry because the other methods, from earlier releases, aren't turned on in recent releases of AutoCAD.

PROFILING YOUR DISPLAY

The illustrations and descriptions in this chapter and throughout the book show the *default* configuration of the AutoCAD 2020 Drafting & Annotation workspace. That is, I show the way the screen looks if you use the standard version of AutoCAD and not a flavored version, such as AutoCAD Architecture or AutoCAD Mechanical. The main change I make in this book from AutoCAD's default settings is to configure the drawing area background to be white because the figures show up better in print. The default background color in both AutoCAD and AutoCAD LT is dark gray, but many longtime users prefer a pure black background for less glare but this is much less of an issue with LCD flat-panel displays. You may want to set a black or a white background on your own system or stay with the default gray background. It's your choice, and there's no right or wrong way. Some AutoCAD object colors show up better on a light background, and some are better on a black one.

If you want to print in color, you may use a white screen so that WYSIWYG (What You See Is What You Get) on your monitor matches what you see on paper. This is discussed in Chapter 16.

You may also notice subtle differences in AutoCAD's appearance, depending on which version of Windows you're using and if you have used the Windows Control Panel to set it up for best performance instead of the default setting of best appearance.



TIP

As slick as they are, navigating Ribbon panels and browsing the Application menu aren't always the most efficient ways of doing things. When you want to do real work, you need to combine the Ribbon panels with other methods, especially entering commands and options at the keyboard or choosing them from right-click menus.

A *workspace* defines an operating environment including such things as which version of the Ribbon menu to use and whether or not toolbars are used. In addition to the default Drafting & Annotation workspace, a few additional preconfigured workspaces are available from the Workspace Switching button. You can also create customized workspaces. I stick with the out-of-the-box Drafting & Annotation workspace, except in Part 5, which describes 3D modeling.

For your information

Located at the right side of the program title bar, InfoCenter serves as Information Central in AutoCAD. You can

- » **Search for information.** Type a keyword and then click the binoculars for more information.
- » **Sign in to your Autodesk A360 account.** Click the Sign In link and log in with your username and password. Autodesk 360 is a free, web-based file storage and collaboration service in the cloud.
- » **Download free or inexpensive add-ons.** Click the button that looks like a shopping cart to open the Autodesk App Store website.
- » **Connect to Autodesk via social media.** Click the triangle button to see a list of links for product updates and to connect to Autodesk via social networks such as YouTube, Twitter, and Facebook.
- » **Find help.** Click the question mark button in the InfoCenter area to open the online Help site.



TIP

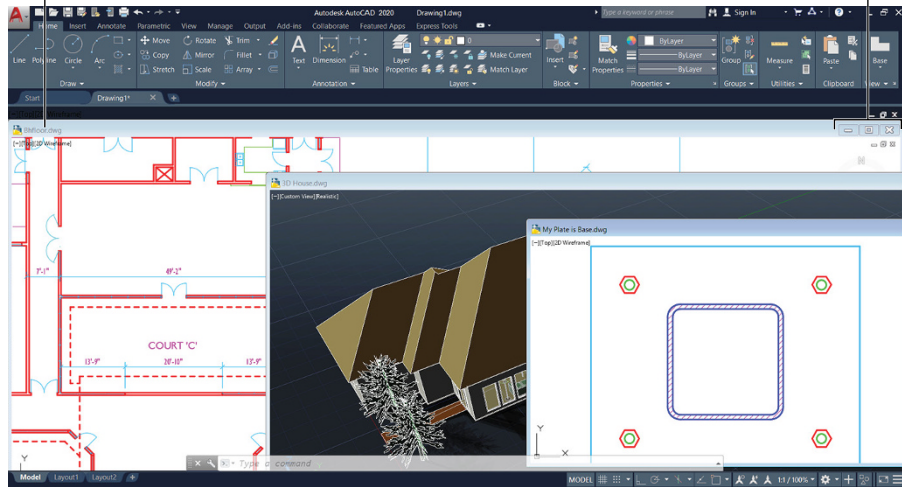
If you're floundering, looking for the weird icon for the command you want to use, click the down arrow at the right end of the Quick Access toolbar and select Show Menu Bar. A classic text-based menu appears above the Ribbon.

You may already be familiar with the Quick Access toolbar from Microsoft Office applications. Other features AutoCAD has in common with Office (and most Windows applications) are the capability to have more than one file open at a time, to cut or copy and paste between files, to tile or cascade multiple open files (see Figure 2-3), and to minimize, restore, and maximize individual drawings and the application itself.

Drawing window title bar

Drawing window control buttons

FIGURE 2-3:
The AutoCAD
screen with
several
windowed
drawings
in view.



Making choices from the Application menu

The Application menu is accessible from all workspaces. The AutoCAD Application menu follows the Microsoft FUI guidelines in placing file management commands there. The Application menu is divided into ten categories. You'll find the following commands on the Application menu:

- » **New:** Create a new drawing from a list of templates.
- » **Open:** Open an existing drawing.
- » **Save:** Save the current drawing in the current location; if the current drawing hasn't been saved, you're prompted for a filename and a location.
- » **Save As:** Save the current drawing to a new filename or location or both, and make the newly named or located file the current drawing.
- » **Import:** Open drawing files stored in formats other than DWG. I discuss this feature in Chapter 24.
- » **Export:** Save the current drawing to a large variety of file formats, including Design Web Format (DWF), PDF, and several other CAD file formats.
- » **Publish:** Send a 3D model to an outside 3D printing service, or create an archived sheet set. (AutoCAD LT doesn't support 3D.) Use eTransmit to create a package that includes all files referenced by the selected drawings, or email the current drawing by using your configured email client.

- » **Print:** Print a single drawing or batch-plot multiple drawings, create or modify named page setups, and manage plotters and plot styles. I cover most of these operations in Chapter 16.
- » **Drawing Utilities:** Set file properties or drawing units; purge unused blocks, layers, and styles from the current drawing; and audit or recover damaged drawings.
- » **Close:** Close the current drawing or close all drawings. If any drawings have changed, you're prompted to save them before AutoCAD closes the file.

The **CLOSEALLOTHER** command closes all open drawings except for the active one. You won't appreciate the significance of this feature until you have opened 20 or so drawings looking for a particular one and now want to close the rest. Unfortunately, the command doesn't appear in the Ribbon menu.

In addition to the Application menu's file menu items, a few other features are worth a mention:



TIP

- » **Recent Documents:** If you choose this option, the right pane displays a list of recently edited drawings that aren't open. You can show them in a simple list or as thumbnail images. You can also pin them to stop them from scrolling off the list. Naturally enough, clicking an icon opens the drawing.

The Recent Documents feature is hardly necessary, however. Instead, click the Start tab near the upper-left corner of the screen to bring back the Start screen, which displays a scrollable series of thumbnail views of the last few open drawings, as shown in Figure 2-1 earlier in the chapter.

- » **Open Documents:** Choose this option to see which documents are already open, and click an item to switch to it.

This feature, like Recent Documents, isn't necessary because a series of tabs appears across the top of the graphic screen, one for each open drawing. Hovering the cursor over a tab produces a quick preview of its drawing, which makes jumping from drawing to drawing much easier compared to earlier releases.



TIP

- » **Options:** Click this button to open the Options dialog box, where you can adjust hundreds of system settings. You can also open Options by typing **OP** (the alias for the OPTions command).
- » **Search:** If you're unsure of a command name or you want help on a topic, just start typing in the search bar, at the top of the Application menu. AutoCAD quickly displays a categorized list, complete with links to start commands or to access the online Help system. See Figure 2-4.

You can also search directly from the command line. Just start typing the name of a command. As you type, AutoCAD displays a list of what it thinks you are searching for. When you see the one you want, click the question mark beside its name to get help about the selected item.

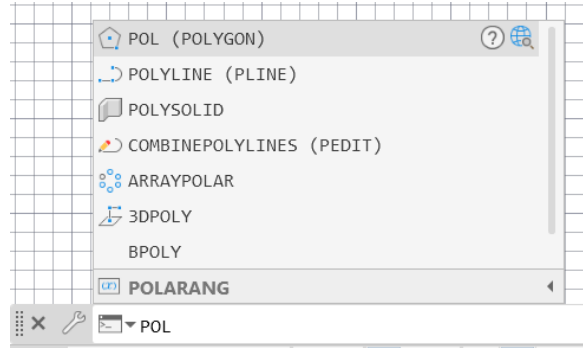


FIGURE 2-4: If you can't find it on the Ribbon or in the tool buttons, just start typing!



TIP

A quick way to close AutoCAD is to double-click the big red A. AutoCAD asks whether you want to save unsaved drawings before it shuts down.

Unraveling the Ribbon

The primary interface element in the Drafting & Annotation, 3D Basics, and 3D Modeling workspaces is the *Ribbon*, an adjustable area that contains a series of tabbed, task-oriented collections of panels. Those panels marked with a little down-facing triangle on the panel label have more tools concealed on a slideout (see Figure 2-5). Click the panel label to open the slideout. You can click the push-pin icon to pin open the slideout if you don't want it to slide home when you've finished using it.

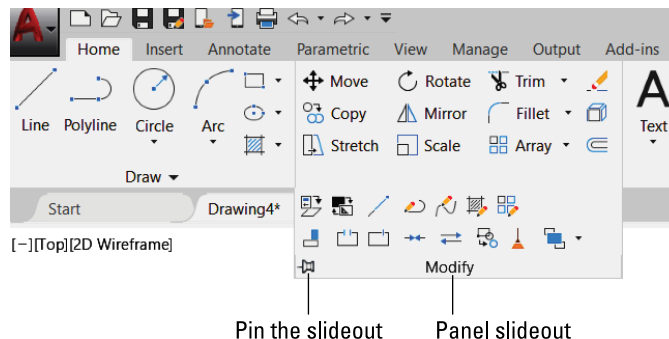


FIGURE 2-5: More tools than you can wave a Ribbon at.

If you use a particular Ribbon panel often, click and drag it into the drawing area. If, for example, you're doing a whack of dimensioning, you can drag the Dimensions panel into the drawing and it stays put, even as you switch to other panels or tabs.

NO EXPRESS SERVICE?

If the Ribbon in your version of AutoCAD doesn't include the Express Tools tab (at the far right end — refer to Figure 2-2), consider installing them. AutoCAD LT does not include or support the Express Tools.

When you first install AutoCAD, you choose between the Typical and Custom installations. If you choose Typical, the next screen asks whether you want to install the Express Tools. If you choose a Custom installation, on the next screen, make sure to select the Express Tools item in the list of components. If you don't install the Express Tools during initial setup, you have to rerun the setup routine. If you haven't installed AutoCAD yet, I strongly recommend that you choose the Typical installation option or at least make sure that the Express Tools check box is selected during a Custom installation. So what are the Express Tools? They are what programmers play with in their spare time. They can be extremely useful but aren't fully supported by Autodesk. If users show enough interest in particular tools then they often get rolled into future releases. Examples include a tool to arrange text around a circular arc, or to draw a jagged break symbol when the real line is longer than line in the drawing such as a long shaft.



REMEMBER

You can fully customize the Ribbon, but I don't get into customizing AutoCAD in this book. If you want to find out more, enter **Customization Guide** in the AutoCAD search window.

By default, the Ribbon is docked at the top of the screen, but you can dock it against any edge, anchored to the left or right side of the AutoCAD window, or floated. To gain some screen space, you can click the little white button to the right of the last tab on the Ribbon's tab bar to reduce the amount of space the Ribbon occupies, or use the drop-down menu next to the little white button to tailor the Ribbon's display, or drag individual tabs over to a second monitor.



REMEMBER

Depending on your screen's resolution the Ribbon may not show all the command buttons within a panel, all the available panels within a tab, or even all available tabs. If a panel looks empty, click the down arrow at its lower edge to see all the buttons. If entire tabs or panels seem missing then simply right-click anywhere within the Ribbon and then click Show Tabs to see a list of all the tabs, or on Show Panels to see all the available panels within the current tab.

The tabs on the Ribbon are organized by task:

- » **Home:** Contains Draw, Modify, Layers, Annotation, Block, Properties, Groups, Utilities, Clipboard, and View panels. Some panels may be displayed as collapsed, depending on the screen resolution. I cover most of the commands in these panels in other parts of the book.

- » **Insert:** Groups Block and Reference panels as well as Point Cloud tools, Import commands, and a series of commands for working with nongraphical information including attributes, fields, data links, and geographic data. I cover blocks (see Chapter 17) and external references (see Chapter 18), but a description of point clouds and data tools is beyond the scope of this book.
- » **Annotate:** Expands on the minimalist Annotation panel on the Home tab, with many more options for creating text, dimensions, leaders, and tables, as well as markup functions and a few annotation-scaling tools.
- » **Parametric:** Serves as home base of one of AutoCAD's most powerful features. You can apply geometric or dimensional parameters or constraints (rules of behavior) to drawing objects so that, say, two circles always have equal diameters or the length of a rectangle is always twice its width. I introduce parametric drawing in Chapter 19.

AutoCAD LT is limited when it comes to parametrics. You can modify or delete existing constraints, but you need the full version of AutoCAD to create them.

- » **View:** Contains tools and panels for controlling drawing display, working with viewports, loading various palettes, and organizing Windows functions, such as cascading open files or displaying different parts of the application window. I explain most of the features on this tab later in the book.
- » **Manage:** Contains panels that access the Action Recorder and CAD Standards, neither of which is in AutoCAD LT, and a set of drawing management and customization tools. I don't cover anything on the Manage tab in this book.
- » **Output:** Has panels that allow you to get those drawings off your hands by printing (also known as *plotting*) or publishing them, exporting them to PDF or DWF files, or simply sending them electronically to others. I cover some of these functions in Chapter 16.
- » **Add-Ins:** The number and names of panels varies between releases, but they all have a Content panel with a single Explore button that runs the Content Explorer tool. After you let Content Explorer index your file folders, it can winnow through all your drawings, looking for specific blocks, layers, layouts, and even text strings.
- » **Collaborate A360:** Most of the buttons fire up a login screen for the AutoCAD A360 service. Using an A360 account, which you can create for free, you can upload drawings to a secure website and then access them on your iPad (you *do* have an iPad, right?) or Android device or on any computer with a web browser. You can also invite non-AutoCAD users to view and mark up your drawings or to join you for a discussion, using a standard web browser.
- » **Express Tools:** Holds an invaluable set of custom commands that streamline your work procedures in pretty well every aspect of AutoCAD. The Express Tools are created when a programmer says, "Hey, how about if we try . . ." The tools often serve as the final beta-test version of new features that sometimes

are incorporated directly into later releases. They're officially unsupported, but they've been an install option in many recent releases, and, mostly, they work well. Express Tools are not available in AutoCAD LT.

» **Featured Apps:** Connects to the App Store, where you can buy or sometimes get for free third-party specialized add-ons.

» **Layout:** Has a series of panels used to create and modify paper space layouts, and to create 2D drawing views from 3D models. I mention paper space layouts in Chapters 4 and 5, and I introduce 3D in Part 5. This tab is highlighted in blue to emphasize that it appears only when you are working with layouts, which I cover in Chapter 23.



REMEMBER



REMEMBER

Some Ribbon buttons may be hidden under other, similar ones. For example, POLygon may be hidden under RECTangle or vice versa, depending on which you used last.

Other Ribbon tabs may exist if you purchased AutoCAD as part of a *collection* — a group of related Autodesk products that are sold in one package.

Getting with the Program



In most of this book I focus on 2D drafting, which is by far the easiest way to get your feet wet with AutoCAD. Just don't drip water on your computer. If you're not already in the Drafting & Annotation workspace (the default workspace), you can return to it by clicking the Workspace Switching button, towards the right end of the Status bar (and shown in the margin). I cover workspace switching in more detail in Chapter 21, where I discuss 3D modeling that has a different workspace. When you are in the Drafting & Annotation workspace, AutoCAD displays the interface shown earlier, in Figure 2-2.

Like all good Windows programs, AutoCAD has *tooltips*, those short descriptions that appear in little text boxes whenever you hover the mouse pointer over a button. In AutoCAD, tooltips display two levels of information. When you first hover the mouse pointer over a tool button, you see a short identification of the command. When you continue hovering, a longer description of the icon's function, often with a graphical image, appears in an extended tooltip. As helpful as they are when you're starting with AutoCAD, you'll probably want to remove these training wheels sooner or later because they cover up some of your drawing. You can do so in the Options dialog box. See the online Help system for more information.

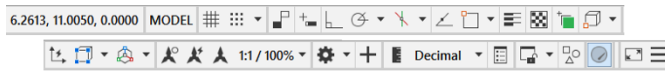
I'm intrigued by the computer industry's fascination with icons. Traditional Chinese uses about 450,000 icons, but in the 1950s Simplified Chinese came into being with only 4,500 icons. On the other hand, Korean is generally considered

to be the best written language in the world. It has 24 “letters,” no punctuation marks, does not distinguish between uppercase and lowercase, and is perfectly phonetic. On the other, other hand, AutoCAD uses about 1,300 icons.

Looking for Mr. Status Bar

The *application status bar* (see Figure 2-6), which appears at the bottom of the AutoCAD screen, displays — and allows you to change — several important drawing modes, aids, and settings that affect how you draw and edit in the current drawing.

FIGURE 2-6:
Status (bars)
check.



Earlier AutoCAD releases allowed you to set status bar buttons to display icons or traditional text labels. Now, unfortunately, we’re stuck with icons only. The good news is that the F keys (F3, F5, and so on) can also be used to turn on and off the most commonly used drawing modes.



REMEMBER

In Figure 2-6, I present the status bar in two rows so you can see the icons at a reasonable size. On the AutoCAD screen, the status bar is one long line of icons (unless your computer has a lower screen resolution, which forces the bar onto two lines).

I cover each status bar setting as appropriate when I discuss its relevant commands. See the online extras for a description of each of the status bar buttons.

Using Dynamic Input



The F12 key turns Dynamic Input on and off. When it is active, most command input and responses from the command line are repeated in the graphic area of the screen, close to the current cursor location. Dynamic Input is supposed to increase efficiency because you don’t have to shift your focus between the command line and the current cursor location. On the other hand, many users find it too distracting to have everything dancing and flashing around the cursor, and it’s probably not good for your eyes to always be focused on the same point.



WARNING

When Dynamic Input is on, coordinate values you enter from the keyboard are relative to the current location. When Dynamic Input is off, values are absolute relative to the drawing origin.



REMEMBER

Don’t get in the habit of relying on Dynamic Input. Sometimes there simply isn’t room in the Dynamic Input tooltip to show as much information as you get at the command line.

The Dynamic Input tooltip doesn't display options unless you press the down-arrow key, as shown in Figure 2-7. Pressing the up-arrow key displays previous input.

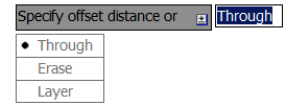
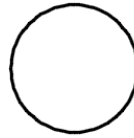


FIGURE 2-7:

Choosing command options from the Dynamic Input menu.



WARNING

I like Dynamic Input. Really, I do. But sometimes it fights with normal command input, and that can make things really confusing.

Let your fingers do the talking: The command line

The command line (or command window, or command prompt, or command area, or whatever you want to call it), as shown in Figure 2-8, is a throwback to the dark ages of AutoCAD. It puzzles newcomers and delights AutoCAD aficionados. Despite Dynamic Input, the command line is the most efficient way of performing many AutoCAD operations.

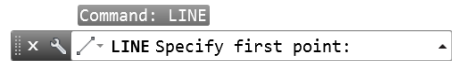


FIGURE 2-8:

Obey the command line; that is an order.

Cozy up to the command line because it's AutoCAD's primary communications conduit back to you. AutoCAD displays prompts, warnings, and error messages in the command line that Dynamic Input may not show. Even if Dynamic Input gives you the same info, glancing at the command line is more efficient.



REMEMBER

If you take away only one tip from this book, it should be this: "When all else fails, read the command line!"

The *command line* is a semitransparent toolbar that can float anywhere on the screen, allowing drawings to show through it. This recovers some of the vertical window area that was lost to the Ribbon. Hey, Microsoft, computer screens are getting wider, not taller! By default, the command line displays one command input line plus the last three input prompts, but you can change the number of input prompts that are displayed.

As a command is running, the command line often displays several options that can be invoked during the command. You invoke an option by entering the upper-case letter or letters shown in each option, such as End or Mid. It's usually but not always the first letter. Some commands have more than one option whose name begins with the same letter, such as Entity versus Exit, so you enter E for Entity

but X for eXit. For consistency, some options use a letter other than the first letter even if the current command doesn't have conflicts. The most common example is eXit, which always uses X even if no other options start with E. Entering command option choices is not case-dependent. X or x will both work. However, ON and OFF must be entered in full because they are shown in all uppercase.

You don't even need to type the option letter. You can invoke an option by using the mouse to select it in the command line.

The key(board) to AutoCAD success

Despite (or because of) AutoCAD's long heritage as the most successful CAD software for personal computers, newcomers are still astonished at the amount of typing they have to do. Modern programs have much less dependency on the keyboard than AutoCAD does, but as you get used to it, you'll find that no other input method gives you as much flexibility or speed as pounding the ivories — oops, wrong keyboard!

Typing at your computer's keyboard is an efficient way to run certain commands, and it's the *only* way to run a few others. Instead of hunting for a button or scrolling through a menu, you can start a command by typing the command name and pressing Enter. Even better, for most common commands, you can type the short form for a command name (an *alias*) and press Enter. For example, you can simply type L for the Line command, C for Circle, and CO for the COpy command. Hands up, everyone who'd rather type **APPLY** instead of **APPLYGLOBALCAPACITIES**!

Aliases are not case-sensitive, so entering, for example, C or c will start the Circle command.



TIP

Print a list of aliases and highlight the ones you use most often. To see a complete list of command aliases, look in the AutoCAD (or AutoCAD LT) Program Parameters (PGP) file by going to the Manage tab and clicking Edit Aliases on the Customization panel. When Windows Notepad opens with the `acad.pgp` (or `acadlt.pgp`) file loaded, scroll down to the Sample Aliases for AutoCAD Commands section.



REMEMBER

Get comfortable using the keyboard and command line. Several everyday commands are nowhere to be found on the Ribbon. If you want to run those commands, you have to type them!

AutoCAD's AutoComplete feature can help you become a keyboard jockey. Start typing a command name, and a list appears at the cursor showing all commands and options that start with the letters you've typed. You can continue until only the command you want appears, or you can scroll down the list and select a command.

The command line has more functionality beyond simply entering commands and options. It includes a spel chequer for command names so that close enough is good enough, the same as hand grenades and dancing. For example, it recognizes the misspelled LABLE as the correct LABEL. It also has a synonym list so that entering ROUND (an otherwise non-existent command) starts the FILLET command, and it's adaptive so that commands you use more frequently rise to the top of the suggestion list.

The following steps demonstrate how to use the keyboard to run commands and view and select options. If Dynamic Input is toggled on, press F12 to turn it off — temporarily, at least. Follow these steps to work with the command line:

1. Type L and then press Enter.

AutoCAD starts the Line command and displays the following prompt in the command line:

```
LINE Specify first point:
```

2. Click a point anywhere in the drawing area.

The command line prompt changes to

```
LINE Specify next point or [Undo]:
```

3. Click another point anywhere in the drawing area.

AutoCAD draws the first line segment.

4. Click a third point anywhere in the drawing area.

AutoCAD draws the second line segment and prompts you:

```
LINE Specify next point or [Close/Undo]:
```

5. To activate the Undo option, type U and press Enter.

You can type the option letter in lowercase or uppercase.

AutoCAD undoes the second line segment.

If you type an option that the command line doesn't recognize (for example, X isn't a valid option for the Line command), the command line displays an error message and prompts you again for another point — in this case, a point for the Line command:

```
Point or option keyword required.  
Specify next point or [Close/Undo]:
```

Option keyword is programmer jargon for letters, shown in uppercase, that activate a command option. This error message is AutoCAD's way of saying, "Huh? I don't understand what you mean by typing X. Either specify a point or type a letter that I do understand."

6. Type 3,2 (with no spaces) and press Enter.

AutoCAD draws a new line segment to the point whose X coordinate is 3 and Y coordinate is 2.

7. Click several more points anywhere in the drawing area.

AutoCAD draws additional line segments.

8. Type C and then press Enter.

The C instructs AutoCAD to draw a final line segment, which creates a closed figure and ends the Line command. A blank command line returns, indicating that AutoCAD is ready for the next command:

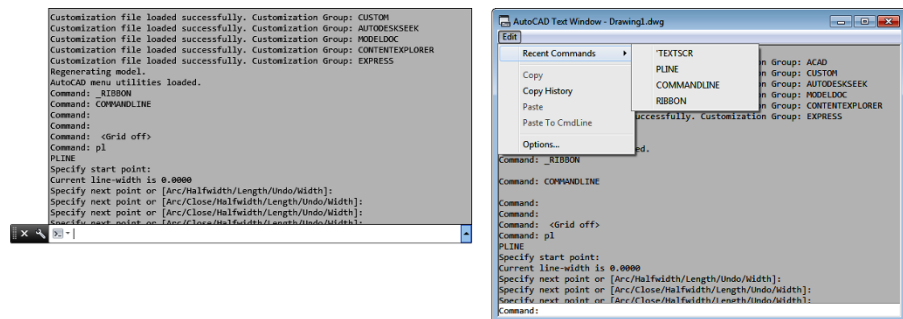
Type a command:

Here are a few other tips and tricks for effective keyboarding:

» **Display the much larger text window.** The normal one-line command line usually shows you what you need to see, but occasionally you want to review a larger chunk of command-line history. Press F2 to see the AutoCAD *text window*, which is simply an enlarged, scrollable version of the command line, as shown in Figure 2-9, left.

Press Ctrl+F2 to see the editable version, as shown in Figure 2-9, right. In this mode, you can copy and paste command history. Question: How do you think I make sure that all my examples and exercises work properly? Answer: I have an excellent Technical Editor who checks everything.

FIGURE 2-9: My, how you've grown: Pressing F2 (on the left side) or Ctrl+F2 (right side) expands the command line to a command text window.





REMEMBER



TIP

» **Press Esc to bail out of the current operation.** Sometimes, you might get confused about what you're doing in AutoCAD or what you're seeing in the command line. If you need to bail out of the current operation, press Esc one or more times until you see a blank command line. A blank command line indicates that AutoCAD is resting, waiting for your next command.

» **Press Enter to accept the default action.** Some command prompts include a default action in angled brackets. For example, the first prompt of the POLYgon command is

```
Enter number of sides <4>:
```

The default is four sides, and you can accept it by simply pressing Enter. (That is, you don't have to type **4** first.)

» **AutoCAD uses two kinds of brackets when it prompts.**

- *Command options* appear in regular square brackets: [Close Undo]. To activate a command option, type the letter(s) that appear in uppercase and then press Enter, or click the option directly in the command line.
- A *default value or option* appears in angled brackets: <4>. To choose the default value or option, press Enter.

You can also right-click and choose Enter as input to a command. Easier yet, you can use the spacebar instead of Enter as long as you're not entering text.

» **Watch the command line.** You can discover a lot about how to use the command line by simply watching it after every action you take. When you click a toolbar button or menu choice, AutoCAD displays the name of the command in the command line. If you're watching the command line, you absorb the command names more or less naturally.

» **Leave the command line in the default configuration.** The command line, like most other parts of the AutoCAD screen, is resizable and movable. The default location (at the bottom of the AutoCAD screen) and size (one line in the command line and three fading semitransparent lines extending into the drawing area) work well for most people. Resist the temptation to mess with the command line's appearance, at least until you're comfortable with using it.

» **Right-click in the command line for options.** If you right-click in the command line, you see a menu with some useful choices. For example, Recent Commands shows the last six commands you ran.

» **Press the up- and down-arrow keys to cycle through the stack of commands you've used recently.** This is another handy way to recall and rerun a command. Press the left- and right-arrow keys to edit the command-line text you've typed or recalled.



TIP

Here's the easiest way to run a command again. Suppose you want to draw several circles. Start the Circle command and draw the first circle. To draw the next one, simply press the spacebar and the Circle command repeats. If you press the spacebar whenever AutoCAD is waiting for you to start a new command, it repeats the last command you used.

Keeping tabs on palettes

Palettes are refined (well-mannered) versions of dialog boxes. Unlike regular dialog boxes, which insist on your undivided attention as long as they're open, palettes stay discreetly on the screen as you carry on with other tasks. AutoCAD still has many dialog boxes, but over the past several releases, palettes have replaced quite a few former dialog boxes.

AutoCAD contains more than a dozen palettes (fewer than a dozen in AutoCAD LT). Unless noted otherwise, you can open any of these palettes from the Palettes panel of the View tab. I describe just a few of them, in their appropriate chapters.

Down the main stretch: The drawing area

After you've taken some warm-up laps, you're probably itching for the main event. The AutoCAD *drawing area* is where you do your drawing. Gee, what a surprise! In the course of creating drawings, you click points to specify locations and distances, click objects to select them for editing, and zoom and pan to get a better view of what you're working on.

Most of this book shows you how to interact with the drawing area, but you should know a few things upfront.

Model space and paper space layouts

AutoCAD operates in two parallel universes, called *spaces*, which AutoCAD indicates with either a status bar button or two or more tabs in the lower left section of the drawing area:

- » **Model:** Where you create and modify the objects that represent things in the real world, such as wheels, wires, walls, widgets, waterways, or whatever.
- » **Paper:** Where you create particular views of these objects for plotting, usually with a title block around them. Paper space comprises one or more *layouts*, each of which can contain a different arrangement of model space views and different title block information. See Chapter 12 for information about creating paper space layouts, and see Chapter 16 for the lowdown on plotting them.

Drawing on the drawing area

Here are a few things you should know about the AutoCAD drawing area:

- » **Get in the habit of looking at the command line after every action you take.** Efficient, confident use of AutoCAD requires that you continually glance from the drawing area to the command line (to see those all-important prompts) and then back up to the drawing area. This sequence isn't a natural reflex for most people, and that's why the Dynamic Input tooltip at the cursor was introduced. But you still get information from the command line that you don't get anywhere else.
- » **When you click in the AutoCAD drawing area, you're almost always performing an action.** Clicking at random in the drawing area isn't quite as harmless in AutoCAD as it is in many other Windows programs. AutoCAD interprets clicks as specifying a point or selecting objects for editing. If you get confused, press Esc a couple of times to clear the current operation and return to the naked command line.
- » **You can still right-click.** In most cases, you can right-click in the drawing area to display a menu with some options for the current situation.

Fun with F1

Unfortunately, in AutoCAD, F1 doesn't stand for Formula One. Pressing F1 at any time opens the online Help window, shown in Figure 2-10, as does clicking the question mark.



TIP

Click the down arrow beside the question mark to open the Help menu with additional help-related options.

As is the case with most Windows programs, AutoCAD Help is context-sensitive; for example, if you start the Line command and just don't know what to do next, Help will, er, help. You can browse the online Product Documentation from the AutoCAD Help page or type words in the Search box to look for specific topics. In this book, I sometimes direct you to the AutoCAD online Help system for information about advanced topics.



TIP

As mentioned, when Dynamic Input (F12) is turned off, the command line tries to anticipate the next command you want to use in a pop-up menu. Better yet, when you move the cursor into a suggested command, a question mark appears next to the command name. Click the question mark to get help. The Help screen appears. Click the Find button near the top, and AutoCAD switches the Ribbon menu to the tab that contains the command in question and highlights its specific panel and icon.

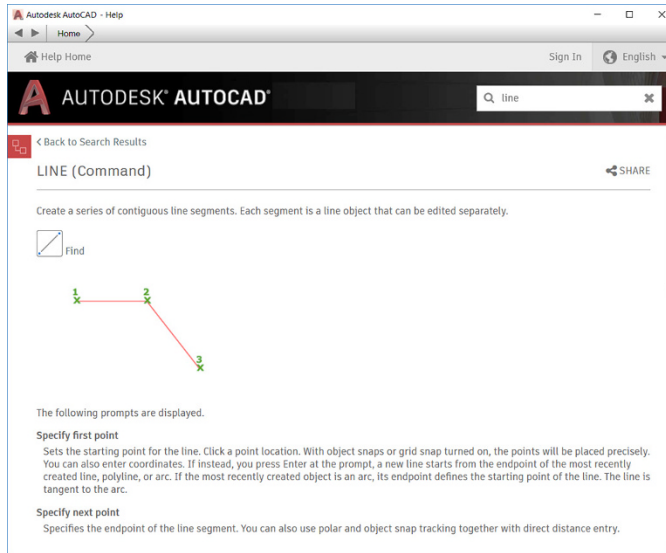


FIGURE 2-10:
Help is at your
F1 fingertip.



REMEMBER

AutoCAD is one program where you really need to take advantage of the online Help resources. AutoCAD contains many commands, options, and quirks. Alas, the quirks aren't listed in the online Help system. Everyone from the greenest beginner to the most seasoned expert can find out something by using the AutoCAD online Help. Take a moment to peruse the home page of the main Help system so that you know what's available. Throughout this book, I direct you to pages in the Help system that I think are particularly useful, but don't be afraid to explore on your own when you get stuck or feel curious.



TIP

The good news is that the online Help system is always being monitored and updated to reflect how people are using it and to update any errors or omissions. The bad news is that if you don't have a current Internet connection, all you get is the local stripped-down version. The good news is that you can go to <https://knowledge.autodesk.com/support/autocad>, where you can download and install the latest version of the full-meal deal. (You'll probably have to scroll down the page a bit to find it.) You can also click the down arrow beside the question mark. After you do so, AutoCAD always looks for an Internet connection first so that you get the latest help — but if it can't connect, it falls back to the downloaded version you installed. The install program offers to download Help, which should be pretty well mandatory for your laptop.

- » Setting up a simple drawing
- » Drawing some objects
- » Zooming and panning in a drawing
- » Editing some objects
- » Plotting a drawing

Chapter 3

A Lap around the CAD Track

Chapters 1 and 2 introduce you to the AutoCAD world and to the AutoCAD interface. Other chapters in this book present the techniques that underlie good drafting practice. By now, you're probably eager to start moving the cursor around and *drawing* something. This chapter leads you on a gentle tour of the most common CAD drafting functions, including setting up a new drawing, drawing and editing objects, zooming and panning the view, and *plotting* (or printing) a drawing. I don't go into full detail about every option of every command, but I give you a feel for what it can do. Go ahead and slam the tires, and don't worry about putting a dent in the doors!

In this chapter, you create a drawing of an architectural detail of a base plate and column. Even if you don't work in architecture or building construction, this exercise gives you some simple shapes to work with and demonstrates commands you can use in most drafting disciplines.

Throughout this book, I show AutoCAD running in the Ribbon-based Drafting & Annotation workspace that is present in both AutoCAD and AutoCAD LT. Likewise, I tell you where to find commands and what to select by using the Ribbon.

Although the drafting example in this chapter is simple, the procedures that it demonstrates are real, honest-to-CAD-ness, proper drafting practices. I emphasize from the beginning the importance of proper drawing setup, putting objects

on appropriate layers, and drawing and editing with due concern for precision. Some of the steps in this chapter may seem a bit strange at first, but they reflect the way that experienced AutoCAD users work. My goal is to help you develop good CAD habits and do things the right way from the start.



The steps in this chapter, unlike the steps in most chapters in this book, form a sequence. You must complete the steps in order. Figuring out how to use AutoCAD is a little like figuring out how to drive, in which parallel parking comes before Indy car racing, except that with AutoCAD you're free to stop in the middle of the street and take a break. If things get away from you, press Esc two or three times to terminate any command that's in progress, and type the letter U and then press the Enter key to undo the last thing you did. Incidentally, U and UNDO are two similar commands and between them are probably the most-often-used commands in AutoCAD.



If you find that selecting and editing objects work differently from the way I describe in this chapter, you have (or someone else has) probably changed the configuration settings on the Selection tab in the Options dialog box. Chapter 24 describes these settings and how to restore the AutoCAD defaults.

A Simple Setup

In this chapter, I walk you through the steps to create, edit, view, and plot a new drawing. See Figure 3-1 to get an idea of what the finished product looks like. I use *Imperial units* in this chapter (you know — inches and feet, for example). I describe how to set imperial units versus metric units in Chapter 4.

In the following exercise, you use several of the status bar buttons at the bottom of the screen. I don't like the icons that AutoCAD displays, and I grew bored from hovering the mouse cursor over each button until the tooltip appeared. Earlier versions of AutoCAD allowed us to switch from icons to Text mode, wherein each button had a text label instead of an icon. Unfortunately, AutoCAD no longer supports this feature, so I have to refer to each button by its tooltip description along with the relevant icon in the margin. The good news is

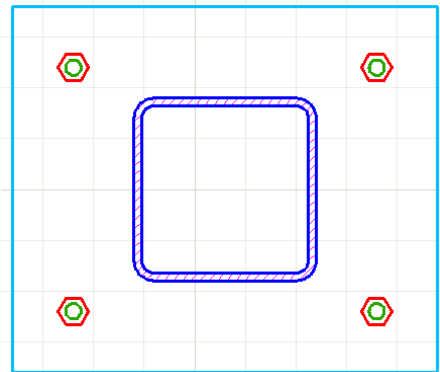


FIGURE 3-1:
How base is my plate.

that you can toggle ten settings by using the F keys (such as F3), which I reference in the text in parentheses, as in (F3). A gray icon indicates that the button's function is Off, while a light blue icon indicates On. (Your screen will show icons against a dark gray background, but I used a white background for a clearer image on the printed page.)

You can find the files I use in this sequence of steps at this book's companion website: Go to www.dummies.com/go/autocadfd18 and download `afd03.zip`. The Zip file contains imperial and metric versions of the base plate exercise at various stages, and the Read Me file on the Downloads tab describes the files in details.



REMEMBER

Pay attention to feedback from AutoCAD. Glance at the messages the program sends after each step via the command line at the bottom of the screen or the Dynamic Input tooltip near the cursor so that you become familiar with the names of commands and their options. If you don't see messages next to the cursor as you use the program, click the Dynamic Input (F12) button on the status bar so that its icon is light blue rather than gray.

In this first set of steps, you create a new drawing from a template, change a few settings to establish a 1:10 scale (that is, 1 inch on the drawing is equivalent to 10 inches on the real object), and save the drawing:

1. Start AutoCAD.

As indicated in Chapter 1, the startup procedure can vary depending on your version of Windows and how it is set up.

2. Start a new drawing that uses AutoCAD's Imperial template.

a. Click the Templates bar at the bottom of the big Start Drawing icon.



WARNING

Don't click the big Start Drawing icon itself or the New button on the Quick Access toolbar. You must use the down arrow. I explain why in Chapter 4 — humor me for now. Have I lied to you recently?

A list of drawing templates (DWT files) appears. Templates in AutoCAD are similar to templates in Microsoft Word and other programs. Chapter 4 describes how and why to create and use custom drawing templates.

b. Select `acad.dwt`, as shown in Figure 3-2. (In AutoCAD LT, select `acad1t.dwt`.)

See Figure 3-2. AutoCAD creates a new, blank drawing that uses the settings in `acad.dwt`. The `acad.dwt` template (`acad1t.dwt` in AutoCAD LT) is AutoCAD's default, plain-Jane (or should that be plain-Pat to be gender-neutral?) template for creating drawings that use imperial units (units expressed in inches or feet or both). Chapter 4 contains additional information about these and other templates.