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# CompTIA® A+® Complete Practice Tests

Core 1 Exam 220-1101 and  
Core 2 Exam 220-1102

Third Edition



Audrey O'Shea

Jeff T. Parker

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*To my life partner Rick, my rock.*

*—Audrey*





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# About the Authors

**Audrey O’Shea** lives along the shore of Lake Ontario and currently teaches electronics and CompTIA A+ and ITF+ courses at a technical school in upstate New York. Prior to this she taught Cisco entry-level courses and has taught courses at the community college level, including *electrical theory and practice for energy workers* and *computer information systems*. Audrey’s information technology career started in 1989 as owner of a computer consulting firm, and since then she has held the positions of network administrator, tech support specialist, trainer, and consultant and has been a public speaker advocating for women to enter the tech field. She holds two degrees and a New York State teaching license.

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# Introduction

If you're picking up this book, there's a good chance that you want to pass the CompTIA A+ exam. It means that you're likely either an IT professional looking for certifications or someone who has a bit of computer knowledge and wants to start an IT career. The A+ exam is entry level and is often the first certification test IT technicians will take.

While still considered an entry-level credential, the exam has become more challenging compared to what it was a few years ago. The newest exam puts a slightly higher importance on operating systems, security, mobile devices, and troubleshooting. New topics include long-range fixed wireless, Wi-Fi 6, the newest USB ports, cable categories, and Windows 11. Overall, our opinion is that the industry will understand this exam to be more practical and vigorous and the credential will be even more valued. The time to gain this credential is now.

While we're confident that if you can answer all the questions in this book you can pass the exam, we encourage you to take time to read the explanations and go beyond memorizing questions and answers. One reason is that the questions on the actual exams will be different than the ones written for this book. Another (better) reason is that life isn't a multiple-choice exam. When you're in the field and trying to fix a computer, you won't have possible solutions given to you—you need to have a solid base of knowledge to work from.

*CompTIA® A+® Complete Practice Tests, Third Edition*, combined with the Sybex *CompTIA® A+® Complete Study Guide, Fifth Edition* (and also the Deluxe Study Guide), will help give you the foundation you need to pass the exams. Study them well and they will also give you the tools you need to navigate a myriad of technical topics and make you more valuable to prospective employers.

## What Is A+ Certification?

The A+ certification program was developed by the Computing Technology Industry Association (CompTIA) to provide an industrywide means of certifying the competency of computer service technicians. The A+ certification is granted to those who have attained the level of knowledge and troubleshooting skills that are needed to provide capable support in the field of personal computers and mobile devices. It is similar to other certifications in the computer industry, such as the Cisco Certified Network Associate (CCNA) program and the Microsoft certification programs. The theory behind these certifications is that if you need to have service performed on a certain vendor's products, you would prefer to use a technician who has been certified in one of the appropriate certification programs rather than just the first "expert" that pops up in a Google search. The difference with A+ is that it's an industry-wide certification and vendor agnostic. That means by passing it, you're capable of handling different issues regardless of the software or hardware vendor.

Everyone must take and pass two exams: Core 1 (220-1101) and Core 2 (220-1102). You don't have to take the 220-1101 exam and the 220-1102 exam at the same time, but the A+ certification isn't awarded until you've passed both tests.

Tests are administered by CompTIA's global testing partner, Pearson VUE. For more information on taking the exam, visit the CompTIA website at [www.comptia.org](http://www.comptia.org). You can also visit Pearson VUE at [www.pearsonvue.com](http://www.pearsonvue.com).

## Who Should Buy This Book?

If you want to pass the A+ exam, this book is definitely for you. This book is an exam prep book. If you're an experienced computer professional, a book like this may be all you need to pass the exam.

However, a book of exam questions isn't designed to give you all the background you need to truly understand the basics of personal computers, mobile devices, and virtualization. If you're newer to the industry, we encourage you to buy a study guide as well, such as the Sybex *CompTIA A+ Complete Study Guide Fifth Edition*. The study guide will provide more depth and context to help you acquire the skills and knowledge you need to be successful. This book then becomes a great companion as you prepare to take the exam.

## How to Use This Book and the Interactive Online Learning Environment and Test Bank

This book includes 1,500 practice test questions, which will help you get ready to pass the A+ exam. The interactive online learning environment that accompanies *CompTIA A+ Complete Practice Tests, Third Edition* provides a robust test bank to help you prepare for the certification exams and increase your chances of passing them the first time! By using this test bank, you can identify weak areas up front and then develop a solid studying strategy using each of these testing features.

The test bank also offers two practice exams. Take these practice exams just as if you were taking the actual exam (without any reference material). When you've finished the first exam, move on to the next one to solidify your test-taking skills. If you get more than 90 percent of the answers correct, you're ready to take the certification exams.



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You can access the Sybex interactive online test bank at [www.wiley.com/go/Sybextestprep](http://www.wiley.com/go/Sybextestprep).



Like all exams, the A+ certification from CompTIA is updated periodically and may eventually be retired or replaced. At some point after CompTIA is no longer offering this exam, the old editions of our books and online tools will be retired. If you have purchased this book after the exam was retired or are attempting to register in the Sybex online learning environment after the exam was retired, please know that we make no guarantees that this exam's online Sybex tools will be available once the exam is no longer available.

## Tips for Taking the A+ Exams

Here are some general tips for taking your exams successfully:

- Bring two forms of ID with you. One must be a photo ID, such as a driver's license or passport. The other can be another ID with your name or a recent photo. Both IDs must have your signature. These requirements sometimes change, so be sure to check for updates on the Candidate ID Policy page of [www.comptia.org](http://www.comptia.org) before scheduling your test.
- Arrive early at the exam center so you can relax and review your study materials, particularly tables and lists of exam-related information.
- Read the questions carefully. Don't be tempted to jump to an early conclusion. Make sure you know exactly what the question is asking.
- Don't leave any unanswered questions. Unanswered questions are scored against you.
- There will be questions with multiple correct responses. Be sure to read the messages displayed to know how many correct answers you must choose.
- When answering multiple-choice questions you're not sure about, use a process of elimination to rule out the obviously incorrect answers first. Doing so will improve your odds if you need to make an educated guess.
- On form-based tests (nonadaptive), because the hard questions will eat up the most time, save them for last. You can move forward and backward through the exam.
- For the latest pricing on the exams and updates to the registration procedures, visit CompTIA's website at [www.comptia.org](http://www.comptia.org).

## Exam Objectives

CompTIA goes to great lengths to ensure that its certification programs accurately reflect the IT industry's best practices. Exam content comes from surveying and receiving feedback from companies and people currently working in the industry, as well as input from subject

matter experts (SMEs). This ensures that the test objectives and weightings truly reflect the job requirements.

The SMEs' work in focus groups to write and review hundreds of test items. The process is estimated to take over 5,000 SME hours to develop a single exam. And, in many cases, they must go back to the drawing board for further refinements before the exam is ready to go live in its final state.

CompTIA also uses a trained psychologist/psychometrician to ensure that the test and test development process exceed the certification industry's standards.

CompTIA ensures that their tests are developed with impartiality and objectivity, and they take security of the exam contents very seriously. By maintaining exam question confidentiality, the certification retains its validity and value in the computer industry.

So, rest assured, the content you're about to learn will serve you long after you take the exam.

## A+ Certification Exam Objectives: Core 1 (220-1101)

The following table lists the domains measured by this examination and the extent to which they are represented on the exam:

<b>Domain</b>	<b>Percentage of Exam</b>
1.0 Mobile Devices	15%
2.0 Networking	20%
3.0 Hardware	25%
4.0 Virtualization and Cloud Computing	11%
5.0 Hardware and Network Troubleshooting	29%
Total	100%



<b>Objective</b>	<b>Chapter(s)</b>
<b>1.0 Mobile Devices</b>	
1.1 Given a scenario, install and configure laptop hardware and components.	1, 10
<b>Domain</b>	<b>Chapter(s)</b>
Hardware/device replacement	1, 10
- Battery	
- Keyboard/keys	
- Random-access memory (RAM)	
- Hard disk drive (HDD)/solid-state drive (SSD) migration	
- HDD/SSD replacement	
- Wireless cards	
Physical privacy and security components	1,10
- Biometrics	
- Near-field scanner features	
1.2 Compare and contrast the display components of mobile devices.	1, 10
Types	1, 10
- Liquid crystal display (LCD)	
- In-plane switching (IPS)	
- Twisted nematic (TN)	
- Vertical alignment (VA)	
- Organic light-emitting diode (OLED)	
Mobile display components	1, 10
Wi-Fi antenna connector/placement	1, 10
Camera/webcam	1, 10
Microphone	1, 10
Touch screen/digitizer	1, 10
Inverter	1, 10
1.3 Given a scenario, set up and configure accessories and ports of mobile devices.	1, 10

<b>Domain</b>	<b>Chapter(s)</b>
Connection methods	1, 10
- Universal Serial Bus (USB)/USB-C/microUSB/miniUSB	
- Lightning	
- Serial interfaces	
- Near-field communication (NFC)	
- Bluetooth	
- Hotspot	
Accessories	1, 10
- Touch pens	
- Headsets	
- Speakers	
- Webcam	
Docking station	1, 10
Port replicator	1, 10
Trackpad/drawing pad	1, 10
1.4 Given a scenario, configure basic mobile-device network connectivity and application support.	1, 10
Wireless/cellular data network (enable/disable)	1, 10
- 2G/3G/4G/5G	
- Hotspot	
- Global System for Mobile Communications (GSM) vs. code-division multiple access (CDMA)	
- Preferred Roaming List (PRL) updates	

Bluetooth	1, 10
- Enable Bluetooth	
- Enable pairing	
- Find a device for pairing	
- Enter the appropriate PIN code	
- Test connectivity	
<b>Domain</b>	<b>Chapter(s)</b>
Location services	1, 10
- Global Positioning System (GPS) services	
- Cellular location services	
Mobile device management (MDM)/mobile application management (MAM)	1, 10
- Corporate email configuration	
- Two-factor authentication	
- Corporate applications	
Mobile device synchronization	1, 10
- Account setup	
- Microsoft 365	
- Google Workspace	
- iCloud	
- Data to synchronize	
- Mail	
- Photos	
- Calendar	
- Contacts	
- Recognizing data caps	

## 2.0 Networking

Domain	Chapter(s)
2.1 Compare and contrast Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) ports, protocols and their purposes.	2, 10
Ports and protocols	2, 10
- 20/21 – File Transfer Protocol (FTP)	
- 22 – Secure Shell (SSH)	
- 23 – Telnet	
- 25 – Simple Mail Transfer Protocol (SMTP)	
- 53 – Domain Name System (DNS)	
- 67/68 – Dynamic Host Configuration Protocol (DHCP)	
- 80 – Hypertext Transfer Protocol (HTTP)	
- 110 – Post Office Protocol 3 (POP3)	
- 137/139 – Network Basic Input/Output System (NetBIOS)/ NetBIOS over TCP/IP (NetBT)	
- 143 – Internet Mail Access Protocol (IMAP)	
- 161/162 – Simple Network Management Protocol (SNMP)	
- 389 – Lightweight Directory Access Protocol (LDAP)	
- 443 – Hypertext Transfer Protocol Secure (HTTPS)	
445 – Server Message Block (SMB)/Common Internet File System (CIFS)	2,10
- 3389 – Remote Desktop Protocol (RDP)	
TCP vs. UDP	2, 10
- Connectionless	
- DHCP	
- Trivial File Transfer Protocol (TFTP)	
- Connection-oriented	
- HTTPS	
- SSH	
2.2 Compare and contrast common networking hardware.	2, 10
Routers	2, 10
Switches	2, 10
- Managed	
- Unmanaged	
Access points	2, 10

<b>Domain</b>	<b>Chapter(s)</b>
Patch panel	2, 10
Firewall	2, 10
Power over Ethernet (PoE)	2, 10
- Injectors	
- Switch	
- PoE standards	
Hub	2, 10
Cable modem	2, 10
Digital subscriber line (DSL)	2, 10
Optical network terminal (ONT)	2, 10
Network interface card (NIC)	2, 10
Software-defined networking (SDN)	2, 10
2.3 Compare and contrast protocols for wireless networking.	2, 10
Frequencies	2, 10
- 2.4 GHz	
- 5 GHz	
Channels	2, 10
- Regulations	
- 2.4 GHz vs. 5 GHz	
Bluetooth	2, 10
802.11	2, 10
- a	
- b	
- g	
- n	
- ac (Wi-Fi 5)	
- ax (Wi-Fi 6)	
Long-range fixed wireless	2, 10
- Licensed	
- Unlicensed	
- Power	
- Regulatory requirements for wireless power	
Near-Field Communication (NFC)	2, 10

<b>Domain</b>	<b>Chapter(s)</b>
Radio-frequency identification (RFID)	2, 10
2.4 Summarize services provided by networked hosts.	2, 10
Server roles	2, 10
- DNS	
- DHCP	
- Fileshare	
- Print servers	
- Mail servers	
- Syslog	
- Web servers	
- Authentication, authorization, and accounting (AAA)	
Internet appliances	2, 10
- Spam gateways	
- Unified threat management (UTM)	
- Load balancers	
- Proxy servers	
Legacy/embedded systems	2, 10
- Supervisory control and data acquisition (SCADA)	
Internet of Things (IoT) devices	2, 10
2.5 Given a scenario, install and configure basic wired/wireless small office/home office (SOHO) .	2, 10
Internet Protocol (IP) addressing	2, 10
- IPv4	
- Private addresses	
- Public addresses	
- IPv6	
- Automatic Private IP Addressing (APIPA)	
- Static	
- Dynamic	
- Gateway	
2.6 Compare and contrast common network configuration concepts.	2, 10

<b>Domain</b>	<b>Chapter(s)</b>
DNS	2, 10
- Address	
- A	
- AAAA	
- Mail exchanger (MX)	
- Text (TXT)	
- Spam management	
(i) DomainKeys Identified Mail (DKIM)	
(ii) Sender Policy Framework (SPF)	
(iii) Domain-based Message Authentication, Reporting, and Conformance (DMARC)	
DHCP	
- Leases	
- Reservations	
- Scope	
Virtual LAN (VLAN)	
Virtual private network (VPN)	
2.7 Compare and contrast Internet connection types, network types, and their features.	2, 10
Internet connection types	2, 10
- Satellite	
- Fiber	
- Cable	
- DSL	
- Cellular	
- Wireless Internet service provider (WISP)	
Network types	2, 10
- Local area network (LAN)	
- Wide area network (WAN)	
- Personal area network (PAN)	
- Metropolitan area network (MAN)	
- Storage area network (SAN)	
- Wireless local area network (WLAN)	

<b>Domain</b>	<b>Chapter(s)</b>
2.8 Given a scenario, use appropriate networking tools.	2, 10
Crimper	2, 10
Cable stripper	2, 10
Wi-Fi analyzer	2, 10
Toner probe	2, 10
Punchdown tool	2, 10
Cable tester	2, 10
Loopback plug	2, 10
Network tap	2, 10
<b>3.0 Hardware</b>	
3.1 Explain basic cable types and their connectors, features, and purposes.	3, 10
Network cables	3, 10
- Copper	
- Cat 5	
- Cat 5e	
- Cat 6	
- Cat 6e	
- Coaxial	
- Shielded twisted pair	
(i) Direct burial	
- Unshielded twisted pair	
- Plenum	
- Optical	
- Fiber	
- T568A/T568B	
Peripheral cables	3, 10
- USB 2.0	
- USB 3.0	
- Serial	
- Thunderbolt	



<b>Domain</b>	<b>Chapter(s)</b>
Video cables	3, 10
- High-Definition Multimedia Interface (HDMI)	
- DisplayPort	
- Digital Visual Interface (DVI)	
- Video Graphics Array (VGA)	
Hard drive cables	3, 10
- Serial Advanced Technology Attachment (SATA)	
- Small Computer System Interface (SCSI)	
- External SATA (eSATA)	
- Integrated Drive Electronics (IDE)	
Adapters	3, 10
Connector types	3, 10
- RJ11	
- RJ45	
- F type	
- Straight tip (ST)	
- Subscriber connector (SC)	
- Lucent connector (LC)	
- Punchdown block	
- microUSB	
- miniUSB	
- USB-C	
- Molex	
- Lightning port	
- DB9	
3.2 Given a scenario, install the appropriate RAM.	3, 10
RAM types	3, 10
- Virtual RAM	
- Small outline dual inline memory module (SODIMM)	
- Double Data Rate 3 (DDR3)	
- Double Data Rate 4 (DDR4)	
- Double Data Rate 5 (DDR5)	
- Error correction code (ECC) RAM	

<b>Domain</b>	<b>Chapter(s)</b>
Single-channel	3, 10
Dual-channel	3, 10
Triple-channel	3, 10
Quad-channel	3, 10
3.3 Given a scenario, select and install storage devices.	3, 10
Hard drives	3, 10
- Speeds	
- 5,400 rpm	
- 7,200 rpm	
- 10,000 rpm	
- 15,000 rpm	
- Form factor	
- 2.5	
- 3.5	
SSDs	3, 10
- Communications interfaces	
- Non-volatile Memory Express (NVMe)	
- SATA	
- Peripheral Component Interconnect Express (PCIe)	
- Form factors	
- M.2	
- mSATA	
Drive configurations	
- Redundant Array of Independent (or inexpensive) Disks (RAID) 0, 1, 5, 10	
Removable Storage	3, 10
- Flash drives	
- Memory cards	
- Optical drives	
3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.	3, 10

<b>Domain</b>	<b>Chapter(s)</b>
Motherboard form factor	3, 10
- Advanced Technology eXtended (ATX)	
- Information Technology eXtended (ITX)	
Motherboard connector types	3, 10
- Peripheral Component Interconnect (PCI)	
- PCI Express (PCIe)	
- Power connectors	
- SATA	
- eSATA	
-Headers	
- M.2	
Motherboard compatibility	3, 10
-CPU sockets	
- Advanced Micro Devices, Inc. (AMD)	
- Intel	
-Server	
-Multisocket	
-Desktop	
-Mobile	
Basic Input/Output System (BIOS)/Unified Extensible Firmware Interface (UEFI) settings	3,10
- Boot options	
- USB permissions	
- Trusted Platform Module (TPM) security features	
- Fan considerations	
- Secure Boot	
- Boot password	
Encryption	3, 10
- TPM	
- Hardware security module (HSM)	

<b>Domain</b>	<b>Chapter(s)</b>
CPU architecture	3, 10
- x64/x86	
- Advanced RISC Machine (ARM)	
- Single-core	
- Multicore	
- Multithreading	
- Virtualization support	
Expansion cards	3, 10
- Sound card	
- Video card	
- Capture card	
- Network interface card (NIC)	
Cooling	3, 10
- Fans	
- Heat sink	
- Thermal paste/pads	
- Liquid	
3.5 Given a scenario, install or replace the appropriate power supply.	3, 10
Input 110-120 VAC vs. 220-240 VAC	3, 10
Output 3.3 V vs. 5 V vs. 12 V	3, 10
20-pin to 24-pin motherboard adapter	3, 10
Redundant power supply	3, 10
Modular power supply	3, 10
Wattage rating	3, 10
3.6 Given a scenario, deploy and configure multifunction devices/printers and settings.	3, 10
Properly unboxing a device – setup location considerations	3, 10
Use appropriate drivers for a given OS	3, 10
- Printer Control Language (PCL) vs. PostScript	

<b>Domain</b>	<b>Chapter(s)</b>
Device connectivity	3, 10
- USB	
- Ethernet	
- Wireless	
Public/shared devices	3, 10
- Printer share	
- Print server	
Configuration settings	3, 10
- Duplex	
- Orientation	
- Tray settings	
- Quality	
Security	3, 10
- User authentication	
- Badging	
- Audit logs	
- Secured prints	
Network scan services	3, 10
- Email	
- SMB	
- Cloud services	
Automatic document feeder (ADF)/flatbed scanner	3, 10
3.7 Given a scenario, install and replace printer consumables.	3, 10
Laser	3, 10
- Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separation pads, duplexing assembly	
- Imaging process: processing, charging, exposing, developing, transferring, fusing, and cleaning	
- Maintenance: Replace toner, apply maintenance kit, calibrate, clean	

<b>Domain</b>	<b>Chapter(s)</b>
Inkjet	3, 10
- Ink cartridge, print head, roller, feeder, duplexing assembly, carriage belt	
- Calibration	
- Maintenance: Clean heads, replace cartridges, calibrate, clear jams	
Thermal	3, 10
- Feed assembly, heating element	
- Special thermal paper	
- Maintenance: Replace paper, clean heating element, remove debris	
- Heat sensitivity of paper	
Impact	3, 10
- Print head, ribbon, tractor feed	
- Impact paper	
- Maintenance: Replace ribbon, replace print head, replace paper	
3-D printer	3, 10
- Filament	
- Resin	
- Print bed	
<b>4.0 Virtualization and Cloud Computing</b>	
4.1 Summarize cloud computing concepts.	4, 10
Common cloud models	4, 10
- Private cloud	
- Public cloud	
- Hybrid cloud	
- Community cloud	
- Infrastructure as a service (IaaS)	
- Software as a service (SaaS)	
- Platform as a service (PaaS)	