Now includes
Prepware software!
UNLIMITED study sessions and practice tests—FREE with book

2025–2026

Instrument Rating
TEST PREP

Pass your test the first time

Now includes
Prepware software!
UNLIMITED study sessions and practice tests—FREE with book

2025–2026
Instrument Rating
TEST PREP

Pass your test the first time

AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

Instrument Rating Test Prep
2025–2026 Edition

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059
asa@asa2fly.com | 425.235.1500 | asa2fly.com

Visit **asa2fly.com/TPI** for additional information and resources related to this book.

Sample Federal Aviation Administration (FAA) questions herein contain information as of: September 2024. Stay informed of changes since the book was printed: **asa2fly.com/testupdate**

None of the material in this publication supersedes any documents, procedures or regulations issued by the Federal Aviation Administration.

Aviation Supplies & Academics, Inc. (ASA), assumes no responsibility for any errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Cover photo: Maksim Vivtsaruk/Shutterstock.com

ASA-TP-I-25
ISBN 978-1-64425-432-5

Additional format available:
eBook PDF ISBN 978-1-64425-433-2

Printed in the United States of America

2025 2024 5 4 3 2 1

About the Contributors

Jackie Spanitz
General Manager
Aviation Supplies & Academics, Inc.

As ASA General Manager, Jackie Spanitz oversees maintenance and development of the books and pilot supplies in the ASA product line. Ms. Spanitz has worked with airman training and testing for more than 30 years, including participation in the Airman Certification Standards (ACS) committees. Jackie holds a Bachelor of Science in Aviation Technology from Western Michigan University, a Master of Science from Embry-Riddle Aeronautical University, and Instructor and Commercial Pilot certificates. She is the technical editor for ASA's Test Prep and FAR/AIM series.

James Johnson
Director of Aviation Training
Aviation Supplies & Academics, Inc.

James Johnson holds a Bachelor of Science in Aeronautics and minors in Aviation Safety and Airport Management from Embry-Riddle Aeronautical University. He has worked as a flight and ground instructor with both Part 141 and 61 flight schools and as a pilot for corporate flight departments and media outlets covering breaking news and traffic. As Director of Aviation Training, James provides ongoing product research, development, and support of aviation training curriculum and pilot supplies. He is a regular contributor to ASA's Learn To Fly Blog and part of the editorial team for the *Pilot's Manual* textbook series. James holds a Commercial Pilot Certificate with Instrument rating and Advanced and Instrument Ground Instructor Certificates.

Aviation Supplies & Academics, Inc. (ASA) is an industry leader in the development and sale of aviation supplies and publications for pilots, flight instructors, aviation mechanics, aircraft dispatchers, air traffic controllers, and drone operators. ASA has provided trusted training materials to millions of aviators resulting in successful airman certification for over 80 years. Visit **asa2fly.com** to learn more.

Stay informed with ASA online resources.

Website
asa2fly.com

Updates
asa2fly.com/testupdate

Blog
learntoflyblog.com

Author Talks
asapresents.net

Follow, like, share.
instagram.com/asa2fly
facebook.com/asa2fly
youtube.com/asa2fly
linkedin.com/company/asa2fly

Contents

Updates and Practice Tests

Free Test Updates for the Life Cycle of Test Prep Books

The FAA modifies tests as needed throughout the year. ASA keeps abreast of changes to the tests and posts free Test Updates on the ASA website. Before taking your test, be certain you have the most current information by visiting the ASA Test Updates webpage: **asa2fly.com/testupdate**. Additionally, sign up for free email notifications, which are sent when new Test Updates are available.

We Invite Your Feedback

After you take your FAA exam, let us know how you did. Were you prepared? Did ASA's products meet your needs and exceed your expectations? We want to continue to improve these products to ensure applicants are prepared and become safe aviators. Send your feedback to: **cfi@asa2fly.com**.

Introduction

Welcome to the Aviation Supplies & Academics, Inc., (ASA) Test Prep Series. This series has been helping pilots prepare for the FAA Knowledge Tests for more than 60 years with great success. We are confident that with proper use of this book you will score very well on your Instrument Rating test.

Begin your studies with a classroom or home-study ground school course, which will involve reading a comprehensive textbook. Visit the Reader Resources for this Test Prep (**asa2fly.com/TPI**) and become familiar with the FAA guidance materials available for this certification exam. Then use this Test Prep to prepare for your exam: read the question, select your choice for the correct answer, and then read the explanation. Use the references that conclude each explanation to identify additional resources for further study of a subject. Upon completion of your studies, take practice tests at **prepware.com** (see inside the front cover for your activation code).

The questions in this book have been arranged into chapters based on subject matter to promote better understanding, aid recall, and provide a more efficient study guide. Place emphasis on questions most likely to be included in your test (identified by the aircraft category above each question). For example, a pilot preparing for the Instrument Airplane test would focus on the questions marked "ALL" and "AIR," and a pilot preparing for the Instrument Helicopter test would focus on the questions marked "ALL" and "RTC." Applicants who are preparing for the Instrument Ground Instructor need to study all the questions. See the Description of the Tests section for more on planning your studies.

Prior to taking an FAA Airman Knowledge Test, all applicants must establish an FAA Tracking Number (FTN) by creating a profile in the Integrated Airman Certification and Rating Application (IACRA) system at **iacra.faa.gov**. Then visit **faa.psiexams.com** to register for your exam and take FAA-created practice tests to become familiar with the computer testing platform.

It is important to answer every question assigned on your FAA Knowledge Test. If in their ongoing review, the FAA decides a question has no correct answer, is no longer applicable, or is otherwise defective, your answer will be marked correct no matter which one you chose. However, you will not be given the automatic credit if you have not marked an answer. Unlike some other exams you may have taken, there is no penalty for guessing in this instance.

The FAA exams are "closed tests" which means the exact database of questions is not available to the public. The question and answer choices in this book are based on our extensive history and experience with the FAA testing and airman certification process. You might see similarly worded questions on your official FAA exam, or answer stems might be rearranged from the order you see in this book. Therefore, be sure to fully understand the intent of each question and corresponding answer while studying, rather than memorizing the letter associated with the correct response. You may be asked a question that has unfamiliar wording; studying and understanding the information in this book and the associated references will give you the tools to answer question variations with confidence.

If your study leads you to question an answer choice, we recommend you seek the assistance of a local instructor. We welcome your questions, recommendations, and concerns—send them to:

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, WA 98059-3153
Phone: 425.235.1500
Email: cfi@asa2fly.com
Website: asa2fly.com

The FAA appreciates testing experience feedback. You can contact them at:

Federal Aviation Administration
Training & Certification Group,
Testing Standards Section
PO Box 25082
Oklahoma City, OK 73125
Email: TestingStandardsComments@faa.gov

Description of the Tests

The FAA Knowledge Exam is an objective, multiple choice test. Each question can be answered by one of the three choices. Each test question is independent of the others—a correct response to one question does not depend on the correct response to another. You must score at least 70 percent to pass the test.

A significant number of the questions are "category-specific" and appear only on the airplane test or the helicopter test. The 20 question "added rating" tests are composed mostly of these category-specific questions. A 20 question "added rating" test is administered to an instrument instructor applicant (CFII) who already holds an instrument instructor rating in one category (airplane or helicopter) and wishes to meet the knowledge requirements for the other category. The category-specific questions pertain to such knowledge areas as recency of experience and weather minimums.

If you are pursuing a Powered Lift Instrument Rating, you may take either the Airplane or the Helicopter Knowledge Test. You are not required to take an additional knowledge test when you already hold an Instrument Rating.

The same questions are used for the Instrument Rating (airplane/helicopter) on the CFII (Instrument Flight Instructor) and IGI (Instrument Ground Instructor) Knowledge Tests. For those persons planning to acquire all three of these ratings within a two-year span, we recommend preparing for all three exams at the same time to save study time. However, the FAA does require all three tests be taken separately; one test session cannot be applied to all three tests.

The table below lists the number of questions and the allotted time for each test. Each question in this book is preceded by a category. Use these categories to study the content that may appear on your test. Study all the questions first, then refer to the following table, placing emphasis on those questions most likely to be included on your test (identified by the test prep category above each question number).

Test Code	Test Name	Test Prep Study	Number of Questions	Min. Age	Allotted Time (hrs)
IRA	Instrument Rating—Airplane	ALL, AIR	60	15	2.0
IRH	Instrument Rating—Helicopter	ALL, RTC	60	15	2.5
IFP	Instrument Rating—Foreign Pilot	ALL & AIR or RTC	50	N/A	2.5
FII	Instrument Flight Instructor—Airplane	ALL, AIR	50	16	2.5
FIH	Instrument Flight Instructor—Helicopter	ALL, RTC	50	16	2.5
IGI	Instrument Ground Instructor	All questions	50	16	2.5
AIF	Instrument Flight Instructor—Airplane (Added Rating)	ALL, AIR	20	16	1.0
HIF	Instrument Flight Instructor—Helicopter (Added Rating)	ALL, RTC	20	16	1.0
ICP	Airplane Instrument Rating, Canadian Conversion*	ALL, AIR	40	15	2.0
ICH	Instrument Rating Helicopter, Canadian Conversion*	ALL, RTC	40	15	2.0
IEP	Instrument Rating Airplane EU Part–FCL Conversion*	ALL, AIR	40	16	2.0

* This test focuses on U.S. regulations, airspace, ATC services and practices, communications, and emergency procedures.

Knowledge Test Registration

The FAA testing provider authorizes hundreds of test center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, visit **faa.psiexams.com**.

When you contact a knowledge testing center, be prepared to select a test date and make payment. You may register for test(s) several weeks in advance online or by phone, and you may cancel in accordance with the testing center's cancellation policy.

Regardless of your registration method, you will need an FAA Tracking Number (FTN) prior to registering for the FAA Airman Knowledge Test. This FTN will follow you throughout your aviation career. You will obtain your FTN as part of the test registration process, by creating a profile in the Integrated Airman Certificate and Rating Application (IACRA) system at **iacra.faa.gov/IACRA**. This FTN will be printed on your Airman Knowledge Test Report (AKTR).

The test registration process includes collection of this information: name, FTN, physical address, date of birth, email address, photo identification, phone number, test authorization (credentials of the individual such as an instructor endorsement), and previous number of test attempts.

Step 1: Create a profile using the IACRA system and login to obtain your FTN.
Step 2: Register for your knowledge test with PSI by phone or online.

For more information, contact:
PSI Services LLC
844-704-1487 or examschedule@psionline.com
faa.psiexams.com

Knowledge Test Eligibility

When you take your FAA Knowledge Test, you will be required to show proper identification and have certification of your preparation for the examination, endorsed by an appropriately certified flight or ground instructor.

Ground schools will issue an endorsement when you complete their course. If you choose to home-study, you can either get an endorsement from your instructor or submit your home-study materials to an FAA Office for review and approval prior to taking the test.

Complete two Prepware practice tests with scores of 80% or higher to get your knowledge test endorsement for any pilot rating directly from ASA. Visit **asa2fly.com/prepware** or **prepware.com** for more details.

If you are taking the test again, you must present the unsatisfactory AKTR (if failed) or register after 30 days (if seeking a higher passing score). See Retesting Procedures for more details.

If a flight or ground instructor is providing your endorsement, they may adapt the following statement:

Instrument Rating Endorsement

Endorsement for aeronautical knowledge: 14 CFR §61.65(b)

I certify that *(First name, MI, Last name)* _____ has received the training of 14 CFR §61.65(b). I have determined he/she is prepared for the *(Test name; e.g., Instrument Rating – Airplane)* _____ knowledge test.

Signed _____ Date _____

CFI Number _____ Expires _____

FIH, FII, ICH, ICP, IEP, IFP, and IGI

Requires no instructor endorsements or other form of written authorization.

AIF and HIF

Written statement or logbook endorsement from an authorized ground or flight instructor certifying that the applicant completed an applicable ground training or home study course (14 CFR §61.185(a)(3)).

IRA and IRH

You will be required to show proper identification and the following:

1. Certificate of graduation or a statement of accomplishment certifying the satisfactory completion of the ground school portion of a course from an FAA certified pilot school within 60 days from the date of graduation. (14 CFR §61.71(a))
2. Written statement or logbook endorsement from an FAA authorized ground or flight instructor certifying that the applicant is prepared to take the required knowledge test. (14 CFR §61.65(a)(4))

Acceptable Materials

The applicant may use the following aids, reference materials, and test materials during the test, as long as the material does not include actual test questions or answers.

Acceptable Materials	Unacceptable Materials	Notes
Supplement book provided by proctor.	Written materials that are handwritten, printed, or electronic.	Testing centers may provide calculators and/or deny the use of personal calculators.
All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions.	Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability.	Test proctor may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability.
Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages.	Magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved.	Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature.
Scales, straight-edges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test.	Dictionaries.	Before, and upon completion of the test, while in the presence of the test proctor, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits.
Manufacturer's permanently inscribed instructions on the front and back of such aids, such as formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and ATC procedures.	Any booklet or manual containing instructions related to use of test aids.	Test proctor makes the final determination regarding aids, reference materials, and test materials.

Testing Procedures for Applicants Requesting Special Accommodations

If you are an applicant with a learning or reading disability, you may request approval from the local FAA office to take an airman knowledge test, using the special accommodations procedures outlined in the most current version of FAA Order 8080.6 Conduct of Airman Knowledge Tests.

Prior to approval of any option, the FAA Aviation Safety Inspector must advise you of the regulatory certification requirement of being able to read, write, speak, and understand the English language.

Test Reports

Your test will be graded immediately upon completion and your score will display on the computer screen. You will receive your Airman Knowledge Test Report (AKTR), which will state your score. See sample AKTR on next page.

Visit **faa.psiexams.com** to request a duplicate or replacement AKTR due to loss or destruction.

Airman Knowledge Test Reports are valid for 24 calendar months. If the AKTR expires before completion of the practical test, you must retake the knowledge test.

The AKTR lists the Airman Certification Standard (ACS) code (if an Airman Certification Standard is available for the certificate and rating specific to the test) or Learning Statement Code (LSC) (if a Practical Test Standard is in effect for the certificate and rating specific to the test) for questions answered incorrectly. The total number of ACSs/LSCs shown on the AKTR is not necessarily an indication of the total number of questions answered incorrectly. Study these knowledge areas to improve your understanding of the subject matter. See Cross-Reference B in the back of this book for a listing of ACSs/LSCs and their associated questions.

Your instructor is required to provide instruction on each of the knowledge areas listed on your AKTR and to complete an endorsement of this instruction. You must present this to the examiner prior to taking the practical test. During the oral portion of the practical test, the examiner is required to evaluate the noted areas of deficiency.

Retesting Procedures

Applicants retesting ***after failure*** are required to submit the applicable AKTR indicating failure, along with an endorsement (on the test report) from an authorized instructor, who gave the applicant the additional training, certifying the applicant is competent to pass the test. The original failed AKTR and retest endorsement presented as authorization shall be retained by the proctor and attached to the applicable sign-in/out log. The latest test taken will reflect the official score.

Applicants retesting ***in an attempt to achieve a higher passing score*** may retake the same test for a better grade after 30 days. The latest test taken will reflect the official score. Applicants are required to submit the original applicable AKTR indicating previous passing score to the testing center prior to testing. Testing center personnel must collect and destroy this report prior to issuing the new test report.

Cheating or Other Unauthorized Conduct

Computer testing centers must follow strict security procedures to avoid test compromise. These procedures are established by the FAA and are covered in FAA Order 8080.6 Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test proctor suspects a cheating incident has occurred. An FAA investigation will then be conducted. If the investigation determines that cheating or unauthorized conduct has occurred, then any airman certificate or rating that you hold may be revoked, and you will be prohibited for one year from applying for or taking any test for a certificate or rating under 14 CFR Part 61.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Airman Knowledge Test Report

NAME: TAYLOR SMITH

FAA TRACKING NUMBER (FTN): C1234567 **EXAM ID:** 98765432109876543

EXAM: Instrument Rating – Airplane (IRA)

EXAM DATE: 09/15/2024 **EXAM SITE:** ABC12345

SCORE: 88% **GRADE:** Pass **TAKE:** 1

The Airman Certification Standards (ACS) codes listed below represent incorrectly answered questions. These ACS codes and their associated Areas of Operation/Tasks/Elements may be found in the appropriate ACS document at http://www.faa.gov/training_testing/testing/acs.

A single code may represent more than one incorrect response.

IR.I.B.K2 IR.I.C.K2 IR.I.C.K3a IR.II.B.K1a IR.II.B.R1 IR.IV.A.K1 IR.VI.E.K1 IR.VII.A.K1

EXPIRATION DATE: 09/30/2026

DO NOT LOSE THIS REPORT

AUTHORIZED INSTRUCTOR'S STATEMENT: (if applicable)

On _____ (date) I gave the above named applicant _____ hours of additional instruction, covering each subject area shown to be deficient, and consider the applicant competent to pass the knowledge test.

Name _____

Cert. No. _____ *(print clearly)*

Type of instructor certificate _____

Signature _____

FRAUDULENT ALTERATION OF THIS FORM BY ANY PERSON IS A BASIS FOR SUSPENSION OR REVOCATION OF ANY CERTIFICATES OR RATINGS HELD BY THAT PERSON.
ISSUED BY: PSI Services LLC
FEDERAL AVIATION ADMINISTRATION

THIS INFORMATION IS PROTECTED BY THE PRIVACY ACT. FOR OFFICIAL USE ONLY.

Sample Airman Knowledge Test Report

Test-Taking Tips

Prior to launching the actual test, the test proctor's testing software will provide you with an opportunity to practice navigating through the test. This practice (or tutorial) session may include a "sample" question(s). These sample questions have no relation to the content of the test, but are meant to familiarize you with the look and feel of the system screens, including selecting an answer, marking a question for later review, time remaining for the test, and other features of the testing software.

Follow these time-proven tips, which will help you develop a skillful, smooth approach to test-taking:

- Visit **faa.psiexams.com** to take a small sample test to become familiar with the latest PSI exam interface you will see on your actual FAA knowledge test.
- Be careful to fully understand the intent of each question and corresponding answer while studying, rather than memorize the A, B, C answer choice—answer stems may appear in a different order than you studied and have some wording differences.
- Remember to bring a sign-off from an instructor, photo I.D., the testing fee, calculator, flight computer (ASA's E6-B or CX-3 Flight Computer), plotter, magnifying glass, and a sharp pointer, such as a safety pin.
- Your first action when you sit down should be to write any formulas and information you can remember from your study on the scratch paper they will provide. Remember, some of the formulas may be on your E6-B.
- Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
- After formulating an answer, determine which answer choice corresponds the closest with your answer. The answer chosen should completely resolve the problem.
- From the answer choices given, it may appear that there is more than one possible answer. However, there is only one answer that is correct and complete. The other answers are either incomplete, erroneous, or represent popular misconceptions.
- Answer each question in accordance with the latest regulations and guidance publications.
- If a certain question is difficult for you, tag it for REVIEW and proceed to the other questions. After you answer the less difficult questions, return to those which you tagged and answer them. Be sure to untag these questions once you have answered them. The review marking procedure will be explained to you prior to starting the test. Although the computer should alert you to unanswered questions, make sure every question has an answer recorded. This will allow you to use the available time to your maximum advantage.
- Perform each math calculation twice to confirm your answer. If adding or subtracting a column of numbers, reverse your direction the second time to reduce the possibility of error.
- When solving a calculation problem, select the answer nearest to your solution.
- Remember that information is provided in the Legends and Figures contained within the Airman Knowledge Testing Supplement (FAA-CT-8080 document) you'll be using during the test.
- Remember to answer every question, even the ones with no completely correct answer, to ensure the FAA gives you credit for a bad question.
- Take your time and be thorough but relaxed. Take a minute off every half-hour or so to relax your brain and body. Stay hydrated.

Instrument Rating Eligibility Requirements

If you are pursuing an Instrument Rating, you should review 14 CFR §61.23 “Medical Certificates: Requirement and Duration,” §61.35 “Knowledge Test: Prerequisites and Passing Grades,” and §61.65 “Instrument rating requirements.”

To be eligible for an Instrument Rating in the Airplane category, a pilot must:

- Hold at least a current Private Pilot Certificate with an aircraft rating appropriate to the Instrument rating sought.
- Be able to read, speak, write, and understand the English language.
- Score at least 70 percent on the FAA Knowledge Test on the appropriate subjects.
- Pass an oral and flight check on the subjects and maneuvers outlined in the Instrument Rating Airman Certification Standards (FAA-S-ACS-8).
- Have a total of 50 hours cross-country flight time as pilot-in-command, of which at least 10 hours must be in airplanes for an airplane instrument rating (each flight must have a landing at least 50 NM from the departure point).
- Have 40 hours of simulated or actual instrument time (no more than 30 hours may be instruction in a ground trainer if following a Part 142 program, and no more than 20 hours if not following a Part 142 program).
- Have 15 hours instrument flight instruction by an authorized flight instructor.
- Must have received ground instruction or logged home-study pertaining to IFR regulations, procedures, various methods of navigation, weather report procurement and use, and the *Aeronautical Information Manual*, among others. A complete list of requirements can be found in 14 CFR §61.65.

Knowledge Exam References

The FAA references the following documents to write the FAA Knowledge Exam questions. You should be familiar with all of these as part of your ground school studies, which you should complete before starting test preparation.

FAA-H-8083-1 *Aircraft Weight and Balance Handbook*
FAA-H-8083-2 *Risk Management Handbook*
FAA-H-8083-3 *Airplane Flying Handbook*
FAA-H-8083-13 *Glider Flying Handbook*
FAA-H-8083-15 *Instrument Flying Handbook*
FAA-H-8083-16 *Instrument Procedures Handbook*
FAA-H-8083-21 *Helicopter Flying Handbook*
FAA-H-8083-25 *Pilot's Handbook of Aeronautical Knowledge*
FAA-H-8083-28 *Aviation Weather Handbook*

FAA-S-ACS-8 *Instrument Rating Airman Certification Standards, Airplane*
FAA-S-ACS-14 *Instrument Rating Airman Certification Standards, Helicopter*
FAA-S-8081-9 *Instrument Flight Instructor Practical Test Standards*

AC 00-54 *Pilot Wind Shear Guide*
AC 60-28 *English Language Skill Standard for an FAA Certificate Issued Under 14 CFR Parts 61, 63, 65, and 107*
AC 91-74 *Pilot Guide: Flight in Icing Conditions*

Chart Supplements U.S.
Low Altitude Enroute Chart
U.S. Terminal Procedures

Aeronautical Information Manual (AIM)
14 CFR Parts 1, 61, 68, 91, 97
49 CFR Part 830 (NTSB)

Visit **asa2fly.com** for these and many more titles and pilot supplies for your aviation endeavors.
Visit **asa2fly.com/TPI** for reader resources useful to instrument pilots.

Acronyms

For reference, acronyms appearing in this book are defined below.

AC	Convective Outlook
ADS-B	Automatic Dependent Surveillance–Broadcast
AGL	above ground level
AHRS	attitude and heading reference system
AIM	Aeronautical Information Manual
AIRMET	airman's meteorological information
ALD	available landing distance
AOA	angle of attack
ASR	airport surveillance radar
ATC	air traffic control
AWC	Aviation Weather Center
CAS	calibrated airspeed
CAT	clear air turbulence
CDI	course deviation indicator
CONUS	continental United States
COP	changeover point
DA	decision altitude
DH	decision height
DME	distance measuring equipment
DP	departure procedure
EAC	expect approach clearance
EAS	equivalent airspeed
EFC	expect further clearance
ELT	emergency locator transmitter
ETA	estimated time of arrival
FA	area forecast
FAF	final approach fix
FAP	final approach point
FAR	Federal Aviation Regulations
FB	winds and temperatures aloft forecast
FL	flight level
FSDO	Flight Standards District Office
FSS	Flight Service Station
GFA	Graphical Forecast for Aviation
GPS	Global Positioning System
GS	glide slope
HAT	height above touchdown
HIRL	high intensity runway lights
HSI	horizontal situation indicator
IAF	instrument approach fix
IAP	instrument approach procedure
IAS	indicated airspeed
IFR	instrument flight rules
ILS	instrument landing system
IM	inner marker (ILS)
IMC	instrument meteorological conditions
ISA	International Standard Atmosphere
KCAS	knots calibrated airspeed
KIAS	knots indicated airspeed
LAHSO	land and hold short operations
LDA	Localizer-Type Directional Aid
LMM	locator middle marker (ILS)
LNAV	lateral navigation
LOC	localizer (ILS)
LOM	locator outer marker (ILS)
LPV	localizer performance with vertical guidance
MAWP	missed approach waypoint
MCA	minimum crossing altitude
MDA	minimum decision altitude
MEA	minimum enroute altitude
METAR	aviation routine weather report
MHA	minimum holding altitude
MM	middle marker (ILS)
MOA	Military Operations Area
MOCA	minimum obstacle clearance altitude
MSA	minimum sector altitude
MSL	mean sea level
NAVAID	navigational aid
NDB	non-directional beacon
NM	nautical mile
NOTAM	Notice to Air Missions
NTSB	National Transportation Safety Board
OAT	outside air temperature
OBS	omni bearing selector

OCS	obstacle clearance surface
ODP	obstacle departure procedure
OM	outer marker (ILS)
PAPI	precision approach path indicator
PAR	precision approach radar
PFD	primary flight display
PIC	pilot-in-command
PIREP	pilot report
PRM	precision runway monitoring
PT	procedure turn
RAIM	receiver autonomous integrity monitoring
REIL	runway end identifier lights
RNAV	area navigation
RVR	runway visual range
SDF	Simplified Directional Facility
SIAP	standard instrument approach procedure
SIGMET	significant meteorological information
SM	statute mile
STAR	standard terminal arrival route
TAA	technically advanced aircraft
TACAN	tactical air navigation system
TAF	terminal aerodrome forecast
TAS	true airspeed
TCH	threshold crossing height
TDZE	touchdown zone elevation
TPP	Terminal Procedures Publication
UHF	ultra high frequency
UTC	Coordinated Universal Time
VASI	visual approach slope indicator
VDA	vertical descent angle
VDP	visual descent point
VFR	visual flight rules
VMC	visual meteorological conditions
VNAV	vertical navigation
VOR	VHF Omnidirectional Range
VORTAC	VOR-TACAN navigation system
VOT	VOR Test Facility
VSI	vertical speed indicator
WAAS	Wide Area Augmentation System
WW	severe weather watch bulletin

ASA Test Prep Layout

Sample FAA questions have been sorted into chapters according to subject matter. Within each chapter, similar questions are grouped together following introductory chapter text. Figures referenced in the chapter text are numbered with the appropriate chapter number, e.g., "Figure 1-1" is Chapter 1's first chapter text figure.

Some sample FAA questions refer to Figures or Legends immediately following the question number, e.g., "4201. (Refer to Figure 14.)." These are FAA Figures and Legends from the Airman Knowledge Testing Supplement (FAA-CT-8080-3F) that can be found at the back of this book. This supplement will be provided to you as a separate booklet when you take your FAA test.

Following each sample FAA test question is ASA's explanation in italics. The last line of the explanation contains a Learning Statement Code (LSC), for those tests referencing an FAA Practical Test Standard (PTS), or Airman Certification Standards (ACS) code, for those tests with an ACS, as well as a reference for further study. Some questions include an explanation for the incorrect answers for added clarity. When you encounter a difficult question, find the LSC or ACS code in Cross-Reference B, and then look for material relating to the subject description within the given reference(s). Refer to Cross-Reference B for more information on how to use LSCs or ACS codes for effective studying.

Answers to each question are found at the bottom of each page.

EXAMPLE:

Chapter text

Four aerodynamic forces are considered to be basic because they act upon an aircraft during all flight maneuvers. There is the downward-acting force called WEIGHT which must be overcome by the upward-acting force called LIFT, and there is the rearward-acting force called DRAG, which must be overcome by the forward-acting force called THRUST.

Category rating. This question may be found on tests for these ratings.*

ALL, AIR, RTC

4201. (Refer to Figure 14.) The four forces acting on an airplane in flight are

See the Airman Knowledge Testing Supplement at the back of the book.

A— lift, weight, thrust, and drag.
B— lift, weight, gravity, and thrust.
C— lift, gravity, power, and friction.

Question and answer choices

Lift, weight, thrust, and drag are the four basic aerodynamic forces acting on an aircraft in flight. (PLT235, IR.IV.A.K1, IH.IV.A.K1) — FAA-H-8083-25

Explanation

Code line. FAA LSC and ACS codes in parentheses, followed by references for further study.

Answer (B) is incorrect because the force of gravity is always the same number and reacts with the airplane's mass to produce a different weight for almost every airplane. Answer (C) is incorrect because weight is the final product of gravity, thrust is the final product of power, and drag is the final product of friction. Power, gravity, and friction are only parts of the aerodynamic forces of flight.

Incorrect answer explanation. Reasons why answer choices are *incorrect* explained here.

* **Note:** The FAA does *not* identify which questions are on the different ratings' tests. Unless the wording of a question is pertinent to only one rating category, it may be found on *any* of the tests.

ALL = All aircraft **AIR** = Airplane **RTC** = Rotorcraft (helicopter)

Chapter 1
Weather

The Earth's Atmosphere

We classify the atmosphere into layers, or spheres, by characteristics exhibited in these layers. The troposphere is the layer from the surface to an average altitude of about 7 miles (37,000 feet). It is characterized by an overall decrease of temperature with increasing altitude. The height of the troposphere varies with latitude and season. It slopes from about 20,000 feet over the poles to about 65,000 feet over the Equator; and it is higher in summer than in winter.

At the top of the troposphere is the tropopause, a very thin layer marking the boundary between the troposphere and the layer above. It is characterized by an abrupt change in temperature lapse rate.

Above the tropopause is the stratosphere. This layer is typified by relatively small changes in temperature with height except for a warming trend near the top. See Figure 1-1.

ALL

4097. A characteristic of the stratosphere is

A—an overall decrease of temperature with an increase in altitude.
B—a relatively even base altitude of approximately 35,000 feet.
C—relatively small changes in temperature with an increase in altitude.

Above the tropopause is the stratosphere. This layer is typified by relatively small changes in temperature with height except for a warming trend near the top. (PLT203, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

Answer (A) is incorrect because temperature increases (not decreases) with an increase in altitude. Answer (B) is incorrect because the stratosphere fluctuates in altitude, as the base is higher at the equator compared to the poles.

ALL

4154. The average height of the troposphere in the middle latitudes is

A—20,000 feet.
B—25,000 feet.
C—37,000 feet.

The height of the troposphere varies with latitude and seasons. It slopes from about 20,000 feet over the poles, to an average of 37,000 feet over the mid-latitudes, to about 65,000 feet over the equator, and it is higher in summer than in winter. (PLT203, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

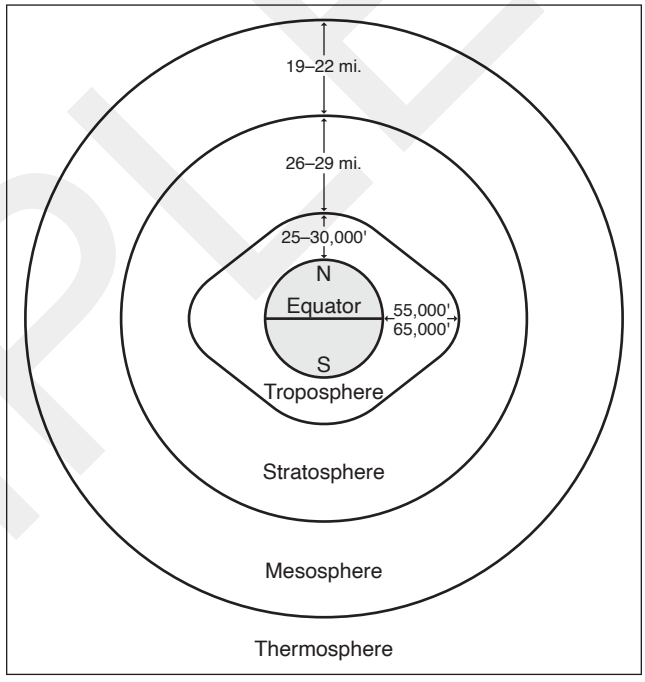

Figure 1-1. Layers of the atmosphere

ALL

4227. Which feature is associated with the tropopause?

A—Absence of wind and turbulent conditions.
B—Absolute upper limit of cloud formation.
C—Abrupt change in temperature lapse rate.

Temperature over the tropical tropopause increases with height, but temperatures over the polar tropopause remain almost constant. An abrupt change in temperature lapse rate characterizes the tropopause. (PLT203, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

Answer (A) is incorrect because the winds are usually very strong in the tropopause. Answer (B) is incorrect because clouds can form above the tropopause.

Answers

4097 [C] 4154 [C] 4227 [C]

High Altitude Weather

The jet stream is a river of high speed winds (50 knots or more) associated with the tropopause. The location of the jet stream changes seasonally. In the winter, the jet stream moves south and increases in velocity. During the summer, the jet stream moves north and slows.

ALL

4155. A jet stream is defined as wind of

A—30 knots or greater.
B—40 knots or greater.
C—50 knots or greater.

A jetstream occurs in an area of intensified temperature gradients characteristic of the break in the tropopause. The concentrated winds, by arbitrary definition, must be 50 knots or greater to classify as a jetstream. (PLT302, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

ALL

4168. The strength and location of the jet stream is normally

A—stronger and farther north in the winter.
B—weaker and farther north in the summer.
C—stronger and farther north in the summer.

In mid-latitudes, wind speed in the jetstream averages considerably stronger in winter than in summer. Also the jet shifts farther south in winter than in summer. (PLT302, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

Temperature

The major source of all weather is the sun. Changes or variations of weather patterns are caused by the unequal heating of the Earth's surface. In aviation, surface and aloft temperature is measured in degrees Celsius (°C).

Standard temperature is 15°C at sea level. To calculate International Standard Atmosphere (ISA), use the average lapse rate of 2°C per 1,000 feet.

ALL

4096. The primary cause of all changes in the Earth's weather is

A—variation of solar energy received by the Earth's regions.
B—changes in air pressure over the Earth's surface.
C—movement of the air masses.

Every physical process of weather is accompanied by or is the result of a heat exchange. Differences in solar energy create temperature variations. These temperature variations create forces that drive the atmosphere in its endless motion. (PLT510, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

Answer (B) is incorrect because changes in air pressure are due to temperature variations. Answer (C) is incorrect because movement of air masses is a result of varying temperatures and pressures.

ALL

4095. How much colder than standard temperature is the forecast temperature at 9,000 feet, as indicated in the following excerpt from the winds and temperature aloft forecast?

FT	6000	9000
	0737-04	1043-10

A—3°C.
B—10°C.
C—7°C.

According to the winds and temperatures aloft forecast, the temperature is -10°C at 9,000 feet. Using the average lapse rate of 2°C per 1,000 feet, the temperature change from sea level to 9,000 feet is 18°C. Standard sea level temperature is 15°C. Subtract 18°C from 15°C to get -3°C. Compared to the winds and temperatures aloft forecast for 9,000 feet, the difference is 7°C (10–3). (PLT492, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

Answer (A) is incorrect because 3°C is the standard temperature at 9,000 feet, which is not what the question is asking for. Answer (B) is incorrect because 10°C is the given temperature at 9,000 feet, which is not what the question is asking for.

Answers

4155 [C] 4168 [B] 4096 [A] 4095 [C]

ALL

4113. If the air temperature is +8°C at an elevation of 1,350 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

A—3,350 feet MSL.
B—5,350 feet MSL.
C—9,350 feet MSL.

Temperature normally decreases with increasing altitude throughout the troposphere. This decrease of temperature with altitude is defined as lapse rate. The average decrease of temperature (average lapse rate) in the troposphere is 2°C per 1,000 feet. An 8°C loss is necessary to reach 0°C, or freezing, in this situation. At 2°/1,000 feet the amount of altitude gain necessary would be:

1. 8°C ÷ 2 = 4 or 4,000 ft

2. 1,350 ft MSL (altitude at +8°C)
+ 4,000 ft (altitude gain necessary to reach 0°C)
5,350 ft MSL (approximate freezing level)

(PLT492, IR.I.B.K3a, IH.I.B.K3a) — FAA-H-8083-28

ALL

4094. A common type of ground or surface based temperature inversion is that which is produced by

A—warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
B—the movement of colder air over warm air, or the movement of warm air under cold air.
C—ground radiation on clear, cool nights when the wind is light.

An increase in temperature with altitude is defined as an inversion. An inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates and cools much faster than the overlying air. Air in contact with the ground becomes cold while the temperature a few hundred feet above changes very little. Thus, temperature increases with height. (PLT301, IR.I.B.K3c, IH.I.B.K3c) — FAA-H-8083-28

Answer (A) is incorrect because when warm air is lifted, an unstable situation occurs, and a temperature inversion requires stable conditions. Answer (B) is incorrect because warm air over cold air constitutes an inversion (not cold air over warm air).

ALL

4112. The most frequent type of ground- or surface-based temperature inversion is that produced by

A—radiation on a clear, relatively still night.
B—warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
C—the movement of colder air under warm air, or the movement of warm air over cold air.

An inversion often develops near the ground on clear, cool nights when wind is light. The ground radiates and cools much faster than the overlying air. Air in contact with the ground becomes cold while the temperature a few hundred feet above changes very little. Thus, temperature increases with height. (PLT301, IR.I.B.K3c, IH.I.B.K3c) — FAA-H-8083-28

Answer (B) is incorrect because it describes orographic lifting. Answer (C) is incorrect because it describes fronts.

ALL

4114. What feature is associated with a temperature inversion?

A—A stable layer of air.
B—An unstable layer of air.
C—Air mass thunderstorms.

A temperature inversion occurs when the temperature increases with altitude. A stable layer of air is characterized by warmer air lying above colder air. With an inversion, the layer is stable and convection is suppressed. (PLT301, IR.I.B.K3c, IH.I.B.K3c) — FAA-H-8083-28

Answer (B) is incorrect because unstable air is characterized by a decrease in temperature with an increase in altitude. Answer (C) is incorrect because air mass thunderstorms are characteristic of unstable conditions.

ALL

4125. A temperature inversion will normally form only

A—in stable air.
B—in unstable air.
C—when a stratiform layer merges with a cumuliform mass.

If the temperature increases with altitude through a layer (an inversion), the layer is stable and convection is suppressed. Air may be unstable beneath the inversion. (PLT301, IR.I.B.K3c, IH.I.B.K3c) — FAA-H-8083-28

Answer (B) is incorrect because unstable air has warmer air below colder air. Answer (C) is incorrect because when a stratiform layer merges with a cumuliform mass it is associated with a cold front occlusion.

Answers

4113 [B] 4094 [C] 4112 [A] 4114 [A] 4125 [A]

ALL

4200. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity is high?

A—Smooth air and poor visibility due to fog, haze, or low clouds.
B—Light wind shear and poor visibility due to haze and light rain.
C—Turbulent air and poor visibility due to fog, low stratus-type clouds, and showery precipitation.

A ground-based inversion favors poor visibility by trapping fog, smoke, and other restrictions into low levels of the atmosphere. Wind just above the inversion may be relatively strong. A wind shear zone develops between the calm and the stronger winds above. Eddies in the shear zone cause airspeed fluctuations as an aircraft climbs or descends through the inversion. (PLT301, IR.I.B.K3c, IH.I.B.K3c) — FAA-H-8083-28

Answer (B) is incorrect because wind shear may be expected within (not beneath) a low-level temperature inversion. Answer (C) is incorrect because inversions cause steady precipitation and create a stable layer of air, thus making it smooth (not turbulent).

Wind

The rules in the Northern Hemisphere are:

1. Air circulates in a clockwise direction around a high pressure system.
2. Air circulates in a counterclockwise direction around a low pressure system.
3. The closer the isobars are together, the stronger the wind speed.
4. Due to surface friction (up to about 2,000 feet AGL), surface winds do not exactly parallel the isobars, but move outward from the center of the high toward lower pressure.
5. Coriolis force is at a right angle to wind direction and directly proportional to wind speed. The force deflects air to the right in the Northern Hemisphere.

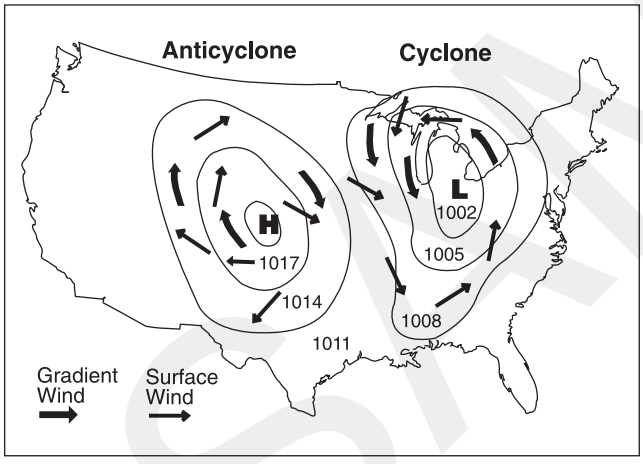

Figure 1-2. Gradient and surface wind

ALL

4105. What causes surface winds to flow across the isobars at an angle rather than parallel to the isobars?

A—Coriolis force.
B—Surface friction.
C—The greater density of the air at the surface.

Friction between the wind and the surface slows the wind. As frictional force slows the wind speed, Coriolis force decreases. However, friction does not affect pressure gradient force. Pressure gradient and Coriolis forces are no longer in balance. The stronger pressure gradient force turns the wind at an angle across the isobars toward lower pressure until the three forces balance. The angle of surface wind to isobars is about 10° over water, increasing with roughness of terrain. (PLT516, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

Answer (A) is incorrect because as wind decreases, so does the Coriolis force. Answer (C) is incorrect because the density of the air has little effect on the relation to the winds and the isobars.

Answers

4200 [A] 4105 [B]

ALL

4106. Winds at 5,000 feet AGL on a particular flight are southwesterly while most of the surface winds are southerly. This difference in direction is primarily due to

A—a stronger pressure gradient at higher altitudes.
B—friction between the wind and the surface.
C—stronger Coriolis force at the surface.

Surface winds and winds at altitude can differ due to friction. Friction between the wind and the surface slows the wind. (PLT516, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

Answer (A) is incorrect because the pressure gradient is relatively uniform at altitudes. Answer (C) is incorrect because the winds are weaker at the surface, therefore the Coriolis force is weaker.

ALL

4107. What relationship exists between the winds at 2,000 feet above the surface and the surface winds?

A—The winds at 2,000 feet and the surface winds flow in the same direction, but the surface winds are weaker due to friction.
B—The winds at 2,000 feet tend to parallel the isobars while the surface winds cross the isobars at an angle toward lower pressure and are weaker.
C—The surface winds tend to veer to the right of the winds at 2,000 feet and are usually weaker.

Close to the earth, wind direction is modified by the contours over which it passes and wind speed is reduced by friction with the surface. Also, the winds at the surface are at an angle across the isobars due to the stronger pressure gradient. At levels 2,000 feet above the surface, the speed is greater and the direction is usually parallel to the isobars. (PLT516, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

Answer (A) is incorrect because the winds at 2,000 feet and those at the surface flow in different directions due to the Coriolis force being weaker at the surface. Answer (C) is incorrect because surface winds do not veer to the right of the winds at 2,000 feet, the winds at 2,000 feet veer to the right of the surface winds.

ALL

4108. Which force, in the Northern Hemisphere, acts at a right angle to the wind and deflects it to the right until parallel to the isobars?

A—Centrifugal.
B—Pressure gradient.
C—Coriolis.

Coriolis force is at a right angle to wind direction and directly proportional to wind speed. In the Northern Hemisphere, the air is deflected to the right. (PLT510, IR.I.B.K3b, IH.I.B.K3b) — FAA-H-8083-28

Answer (A) is incorrect because centrifugal force acts outwardly to any moving objective in a curved path. Answer (B) is incorrect because pressure gradient causes the wind to move perpendicular to the isobars, but it is then deflected by Coriolis force.

Moisture and Precipitation

Air contains moisture (water vapor). The water vapor content of air can be expressed in two different ways: relative humidity and dew point.

Relative humidity relates the actual water vapor present in the air to that which could be present. Temperature largely determines the maximum amount of water vapor the air can hold. Warm air can hold more water vapor than cold air can. Air with 100% relative humidity is said to be saturated, and air with less than 100% is unsaturated.

Dew point is the temperature to which air must be cooled to become saturated by the water already present in the air.

When water vapor condenses on large objects, such as leaves, windshields, or airplanes, it will form dew. When it condenses on microscopic particles, such as salt, dust, or combustion by-products (condensation nuclei), it will form clouds or fog.

If the temperature and dew point spread is small and decreasing, condensation is about to occur. If the temperature is above freezing, fog or low clouds will be most likely to develop.

The growth rate of precipitation is enhanced by upward currents. Cloud particles collide and merge into a larger drop in the more rapid growth process. This process produces larger precipitation particles and does so more rapidly than the simple condensation growth process. Upward currents also support larger drops.

Answers

4106 [B] 4107 [B] 4108 [C]

2025–2026
Instrument Rating
TEST PREP

Tests are hard. Studying doesn't need to be.

Join millions of pilots and mechanics who chose ASA and passed their tests the first time, using the most trusted resource in FAA test preparation. Test material is expertly organized into chapters based on subject matter and includes introductory text and illustrations, questions, answer choices, answers, explanations (for correct and incorrect answers), and references for further study. Use the book to become familiar with the FAA Knowledge Exam, then use Prepware for unlimited study sessions and practice tests, and receive your test authorization (endorsement) at no additional cost!

The ASA Test Prep and Prepware software include the figures, legends, and full-color charts you'll see at the testing center. Questions cover all Instrument Rating, Instrument Flight Instructor (CFII), Instrument Ground Instructor, and Foreign Pilot FAA Knowledge Exams and are identified by test: airplane and helicopter. You can also count on ASA to monitor FAA test changes and update you through a free email service.

ASA's *Instrument Rating Test Prep* is the pilot's best resource for successful test-taking.

- **Includes Prepware software for your computer and a 24-month subscription to Prepware Online with access from any internet-connected device**
- **Explanations for correct and incorrect answers, FAA references for further study, and airman test report codes for remedial study**
- **Figures from the FAA Airman Knowledge Testing Supplement**
- **Test-taking tips and quick cross-references for easy question-finding**
- **Free online updates and subscription service to stay informed of test changes**

TRANSPORTATION USD $44.95
ISBN 978-1-64425-432-5
54495 >
9 781644 254325

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059
425-235-1500 | asa2fly.com

ASA-TP-I-25

Instrument Pilot

Flashcards on the go!

Get the PREPWARE mobile app
for Apple and Android devices