

2009

Fire Fighter

Written Examination Study Guide



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www.state.nj.us/personnel

This study guide is designed to help applicants prepare for the written, cognitive portion of the New Jersey Department of Personnel's Fire Fighter Examination. (As you may know, the complete exam will also include a physical performance test and a video-based, situational judgment test.) Although reading this guide is not required to prepare for the Fire Fighter Examination, it may help candidates gain a better understanding of the cognitive test component and will allow for some practice test taking.

This booklet contains the following:

1. The answers to frequently asked questions about the Fire Fighter test.
(Pages 2-8)
2. A sample written test.
(Pages 9-23)
3. Answers to the sample questions, along with an explanation of why the keyed answer is correct.
(Pages 24-41)
4. A sample answer sheet.
(Page 42)

Frequently Asked Questions

Q. Why are Department of Personnel examinations given?

A. The New Jersey Constitution states that, “Appointments and promotions in the civil service of the State, and of such political subdivisions as may be provided by law, shall be made according to merit and fitness to be ascertained, as far as practicable, by examination which, as far as practicable, shall be competitive...”

The Merit System examination process, in its various forms, is the instrument by which this constitutional mandate is carried out. Basically, the procedure described applies to the open-competitive process but in certain areas, it is also applicable to the promotional process. Appointments and promotions are made without consideration of race, color, national origin, age, sex, religious creed, or political affiliation.

Q. What is the Fire Fighter Examination?

A. It is the examination administered by the New Jersey Department of Personnel to select candidates for the position of Fire Fighter in the participating municipalities.

Q. What is the examination like?

A. The Fire Fighter examination consists of three parts: a written cognitive component, a situational judgment component, and a physical performance test. The cognitive examination will be used as a ranking device, in concert with the situational judgment and physical performance components. Each of the three components will be weighted as one-third of a candidate’s final score. A minimum score must be obtained in order to pass each of the three components of the examination. Failure to meet the established minimum score on any of the three examination components will result in a failing score.

The cognitive test component is designed to measure the general knowledge and abilities of candidates relevant to the Fire Fighter job. It will include such things as reading comprehension and basic mathematics (see sample test on pages 9-23). For the reading comprehension section, a reading passage is presented and followed by questions pertaining to the passage. No previous knowledge of the subject is required to answer the questions correctly. The basic mathematics section is simply designed to measure your ability to perform basic arithmetic calculations (addition, subtraction, multiplication, and division).

The video-based, situational judgment component is designed to measure a candidate’s teamwork abilities and job-relevant knowledge and abilities that contribute to an individual’s success as a Fire Fighter. The exam is a video presentation of vignettes depicting characters engaged in firefighter-related situations. Following each vignette, there are a series of multiple-choice questions that ask candidates to identify the “best” and “worst” actions to take in response to the situation presented. In addition, after all of the vignettes are

presented, candidates are asked to make character judgments about each of the characters in the vignettes. All of the questions are presented in multiple-choice format. Sample questions for this component can be found at www.ergometrics.org. This test component will be either administered on the same day as the cognitive examination or on a separate test date. Candidates will be notified when to appear for each examination component.

The physical performance test is designed to measure the physical ability and endurance of candidates. It will include a series of events that are directly related to those physical activities performed on the Fire Fighter job, such as dragging a hose, climbing a ladder, and carrying equipment. Candidates will be notified of the date, time, and location for taking the physical performance test. A Physical Fitness Conditioning Manual (available on our website at www.state.nj.us/personnel) describes the specific events to be performed during the physical performance test. It also provides basic tips on preparing for the test.

- Q. What types of questions are found on the written, cognitive portion of the examination?
- A. The cognitive component will consist of approximately 70 multiple-choice items. Ten of these items will be for research purposes only and will not count towards your score. The test is designed to measure the following: the ability to read, comprehend, and follow instructions and written orders, and the ability to add, subtract, divide, and multiply whole numbers.
- Q. Can a calculator be used during the examination?
- A. No. The use of calculators will not be permitted during the examination.
- Q. How does one study for the cognitive test?
- A. It may be helpful to brush up on your ability to read and follow directions, and on your knowledge of basic mathematics. Sample test questions are available in this booklet. These are good examples of the types of questions that will be included on the examination. The Reading Comprehension Passages that appear in the sample test are similar in nature to those which will appear on the actual test, although the content of the passages will be different.

A candidate's performance on the cognitive portion of the examination will most likely improve if he/she becomes familiar with the strategies presented in this guide. There is an old anecdote: "How do you get to Carnegie Hall? -- Practice." The same holds true for this portion of the Fire Fighter examination. The more you practice and familiarize yourself with the strategies in this guide, the better your performance will be on the actual test.

It may even be helpful to study with friends. In this way, you will be able to exchange ideas or interpretations of the sample test content and questions.

- Q Are there any general test-taking strategies that may be applied to the cognitive component of the Fire Fighter examination?
- A. 1. Read all of the directions carefully and thoroughly. 2. Mark your answer sheet carefully and correctly. 3. Keep track of your time.

1. Read all of the directions carefully and thoroughly.

It is important that you understand the meaning of every question. Be careful to notice the “direction” of the question as well as its “content.” The “content” of a question describes what the question is about. The “direction” of the question indicates how the question is to be answered. As an example of “direction” one question might ask, “which is the most dangerous practice?” Another might ask, “which is **NOT** a dangerous practice?”

The following item will illustrate the idea of “content” and “direction.”

Personal Protective Equipment should be worn when working in hot environments. A person working under extreme conditions should drink at least 8 ounces of water every 20-30 minutes. The person should also be familiar with first aid techniques for heat stress.

Which is **NOT** recommended as a preventative technique for people who work in hot environments?

- (a) Wear protective clothing
- (b) Drink water frequently
- (c) Become familiar with first aid techniques for heat stress
- (d) Get medical attention

In this example, the “content” of the question refers to “preventative techniques for people working in hot environments.” The “direction” of the question involves selecting the technique that does NOT fit into the category of “preventative.” Choice “(d) Get medical attention” is the BEST answer, because it is not a preventative measure – rather, it is what will take place when preventative measures have not been used, or have failed.

Remember: ALL QUESTIONS ON THE COGNITIVE TEST REQUIRE THAT YOU PICK THE BEST CHOICE AMONG THE FOUR POSSIBLE ALTERNATIVES.

You may write or make notes on your examination booklet, so feel free to mark things in a way that makes sense to you. For example, you may want to underline or circle key words or phrases to help you focus on important concepts or on topic sentences. You can practice these techniques using the sample test in this booklet.

2. Mark your answer sheet carefully and correctly.

A sample answer sheet is presented on the last page of this booklet. You should use this answer sheet when taking the practice test.

At the test center, be careful when marking your answers. Your answer sheet will be scored by machine. Accurate scoring depends upon how well you follow instructions. Read and follow these instructions carefully:

1. Read each question and decide which answer is best.
2. On your ANSWER SHEET, locate the row of lettered circles opposite the NUMBER of the question you are answering.
3. Find the lettered circle that matches the letter of the answer you have chosen as the best.
4. Blacken only this lettered circle with a heavy PENCIL mark, completely filling in the circle by going over the mark two or three times. Use a #2 PENCIL only.
5. Erase completely any answers you wish to change. DO NOT cross them out. Misplaced answers are scored as wrong answers.
6. DO NOT rest the point of your pencil on the answer sheet or make any unnecessary marks. Stray marks near a lettered circle may change your score.
7. DO NOT mark more than one answer for each question. Double answers are scored as wrong answers.
8. Keep your answer sheet on a hard surface while marking your answers. DO NOT fold or crease it.
9. Make sure to mark all of your answers on the answer sheet. If you mark the answers on the test booklet, they will NOT be scored, and you will NOT RECEIVE CREDIT for answers appearing only in the test booklet. All of your answers must appear on the answer sheet.

The above instructions on marking your answer sheet will also appear on the back cover of your test booklet at the examination center. As a refresher, you will be asked to read them before the test begins.

3. Keep track of your time.

At the test center, after the monitor has checked your identification and given all instructions, the monitor will tell the candidates to begin the test. The monitor will then write the start time on the blackboard. You will have 105 minutes (1 hour and 45 minutes) to complete this portion of the test. It will be up to you to gauge your time. If you come to a question which you find to be particularly difficult, read it, but temporarily postpone answering it. Don't waste valuable time on a difficult question that is giving you a problem. Use your time wisely. Come back to answer the difficult questions after you have completed the easier questions. Difficult questions are NOT worth more than easier questions.

If you do skip questions and come back to them later, make sure that the test question numbers that you are responding to correspond to the question numbers on your answer sheet. It's common to accidentally skip over a question or answer. Mistakes such as this will cost you time to correct, so be sure that your question numbers and response numbers match. Since you will be allowed to write in your test booklet, it would be a good idea to clearly mark questions that you have skipped, so they will be easier to find when you are ready to return to them.

If you do not know the answer to a question, try to use the process of elimination. Cross off choices if you are sure they are incorrect. You may want to mark the remaining alternatives in some way to show your first impression of them. For example, you might put a plus sign (+) next to a choice you think is good, a star (*) next to a choice you think is better, a question mark (?) next to a choice you think is possible or questionable, and cross off the last choice because you are sure it is wrong. If you then decide to skip this question and come back to it later, it will be easier to remember how you felt about each choice, and you will not even have to read the choice you already eliminated. If you still cannot decide which choice is the best answer, guess. There are no penalties for wrong answers. A guess has a better chance of being correct than leaving an answer blank. If you leave an answer blank, you will get zero points for that answer. If you have no idea what the answer is, you have a 25% chance of guessing correctly, because each question gives you four choices to choose from. If you were able to eliminate one of the choices as definitely wrong, you've increased your odds of guessing from the remaining three choices up to a 33% chance of guessing correctly. If you were able to eliminate two of the choices as definitely wrong, you then have a 50-50 chance of guessing correctly.

If you complete the test before time is up, go back and check your work, but remember that often your first response is correct. Make sure that you have a response for each question on your answer sheet.

Q. How else may I prepare for the written examination?

A. Relax. Although a certain amount of concern about taking the examination is normal, healthy and good, excessive worry may cause stress and reduce your alertness and ability to focus on the test. On the night before the examination, go to bed early and get a good night's sleep.

Arrive at the examination center ahead of time, perhaps fifteen minutes to one half hour early. There may be many candidates taking the test at the same time, and you don't want to have to worry about parking. It may be helpful to make a practice run to the test center a few days before your test date, to reduce the potential stress you might otherwise experience from driving an unfamiliar route.

Q. How will the written examination begin?

A. A test monitor will check your identification (bring an I.D. card, driver's license, etc.) in the room to which you have been assigned. Bring TWO forms of identification, one of which MUST BE A PHOTO identification. You will receive a copy of the "Examination Procedures" and a "Review Form". Read these carefully. You will also receive an answer sheet.

If you are not able to see or hear the directions from your seat, raise your hand to let the monitor know. If you have other difficulties during the examination, such as with your test booklet, scoring pencil, or answer sheet, let the monitor know about it. Listen carefully to all directions from the monitor. If there is something you do not understand about the directions, ask questions. However, the monitor will not answer questions about test content.

Once you have the test booklet in your hands, the temptation to get going is very strong. CAUTION! There is more to success than knowing the right answers. You must know how to identify your papers and to understand variations in the types of questions used in this particular examination. Follow these suggestions for maximum results from your efforts:

1. **Cooperate with the Monitor** - The monitor has a duty to create a situation in which you can be at ease. The monitor will give all the instructions, tell you when to begin, and check to see that you are marking your answer sheet correctly. The monitor is there to help you and to ensure that your competitors do not take unfair advantage.
2. **Listen to all Instructions** - Do not jump the gun! Wait until you understand all directions. In most merit systems tests, you get more time than you need to answer the questions. Read each word of the instructions until you clearly understand the meaning. Study the examples. Listen to all announcements. Follow directions.

3. **Plan Your Time** - Enough time to answer all of the questions will normally be provided, but this does not mean that you have all day. An overall time limit has been set. Divide the total time (in minutes) by the number of questions to get the approximate time you have for each question. If, for example, you have 100 minutes to answer 75 questions, that means that you have one minute and twenty seconds for answering each question.
4. **Be Sure Question Number and Answer Sheet Number Agree** - If you skip a question in the booklet, be sure to skip the corresponding number on the answer sheet. Check often to be sure that you have not lost your place and that you are marking in the row numbered the same as the question you are answering.
5. **Read the Question** - Be sure you understand what the question asks. Many capable people fail tests because they do not read the questions correctly or completely.
6. **Review Your Answers** - If you finish before time is called, go back to the questions you omitted and to the answers which you have guessed, to give further thought to them. Review other answers too if you have time.
7. **Return Your Test Materials** - If you are ready to leave before others have finished, or before time is called, raise your hand to get the monitor's attention. Then take all of your materials to the monitor and leave quietly. Never take any test material with you from the room. The monitor will discover whose papers are not complete. Taking a test booklet, or any part of one, will be grounds for disqualification and possible prosecution.

Sample Test

The following Sample Test contains a series of questions similar to those that will appear on the Fire Fighter Examination. The correct answers to the questions are located on pages 24 through 41 of this booklet.

Reading Passage 1

The classification of a fire is important to the firefighter when discussing extinguishment. Each class of fire has its requirements for extinguishment. Class A fires involve ordinary flammable materials such as wood, cloth, paper, rubber, and many plastics. Applying water is the most effective way to put out this type of fire. Water cools the burning material.

Class B fires involve flammable and combustible liquids and gases such as gasoline, oil, paint, and alcohol. The smothering or blanketing effect of oxygen exclusion (keeping oxygen away from the fire) is the most effective way to put out these fires.

Fires involving energized electrical equipment are Class C fires. Household appliances, computers, and transformers are examples. These fires are sometimes controlled by a nonconducting agent such as dry chemicals or carbon dioxide. The fastest way to put out these fires is to first turn off high-voltage circuits and then fight the fire appropriately depending on the fuel involved.

Class D fires involve flammable metals such as aluminum, magnesium, sodium, and potassium. The extremely high temperature of burning metals makes water and other common extinguishing agents ineffective. No single agent effectively controls fires in all combustible metals. Special extinguishing agents are available for control of fire in each of the metals.

Based upon the material presented in **Reading Passage 1**, answer the following questions:

1. What classification would be given to a paint fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

2. What classification would be given to a computer fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

3. What classification would be given to a rubber fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

4. What classification would be given to a sodium fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

5. Which classification uses the smothering or blanketing effect of oxygen exclusion as the most effective way to put out a fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

6. For which classification is water the most effective way to put out a fire?
 - (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D

Reading Passage 2

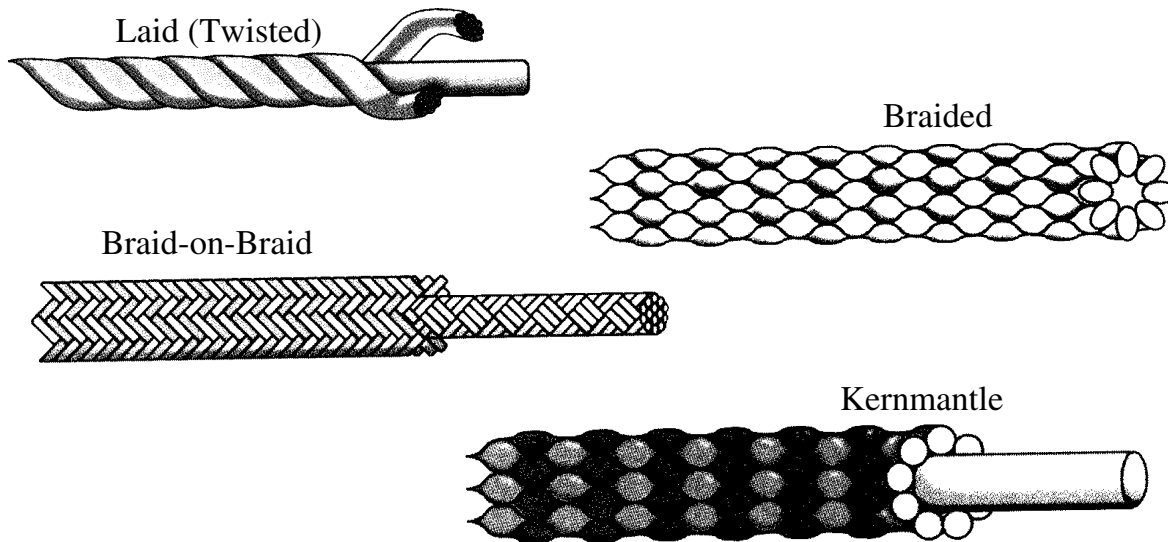
Rope is one of the oldest tools used by the fire service. The most common types of rope construction are laid, braided, braid-on-braid, and kernmantle.

Laid ropes are made by twisting yarns together to form strands. How tightly these ropes are twisted and the type of fiber used determine the rope's properties. Twisted rope is susceptible to abrasion and other types of physical damage. Twisting a rope leaves all three load-bearing strands exposed at various points along the rope, meaning that any damage immediately affects the rope's strength.

Although some braided ropes are made from natural fibers, most are synthetic. *Braided rope* is constructed by intertwining strands of rope together (similar to braiding a person's hair). Braided rope reduces the twisting common to laid ropes. Because of the way it is made, the load-bearing fibers are subject to direct abrasion and damage.

Since braid-on-braid is a jacketed rope, it is often confused with kernmantle rope. *Braid-on-braid rope* is what the name implies; it is made with both a braided core and a braided covering or sheath. The sheath has a herring-bone-pattern appearance. Braid-on-braid rope is very strong. Half of its strength is in the sheath and the other half is in the core. A disadvantage of braid-on-braid rope is that it does not resist abrasion as well as kernmantle rope. Another disadvantage is that the sheath may slide along the inner core of the rope.

Kernmantle, a jacketed rope, is made of a braided covering or sheath (in this type of rope only, the "mantle" portion) over the main load-bearing strands (in this type of rope only, the "kern" portion). The core runs parallel with the covering, which increases the rope's stretch resistance and load characteristics. The core (kern) is made of high-strength fibers; these account for most of the total strength of the rope. The sheath provides a small amount of the rope's overall strength, absorbs most of the abrasion, and protects the load-bearing core. Kernmantle is most commonly used as a rescue rope, where stretch is an undesirable characteristic.



Based upon the material presented in **Reading Passage 2**, answer the following questions:

7. Which types of rope are jacketed?
- (a) Laid and braided
 - (b) Braided and braid-on-braid
 - (c) Braid-on-braid and kernmantle
 - (d) Laid and kernmantle
8. Which type of rope is **LEAST** susceptible to abrasions?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle
9. As described by the passage, concerns about twisting are **MOST** likely for which type of rope?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle
10. Which type of rope has half its strength in the sheath and the other half in the core?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle
11. Based upon the information provided, what is the **BEST** definition of a sheath?
- (a) The outer covering of the rope's core
 - (b) The mantle, of which the rope is constructed
 - (c) The herring-bone-pattern appearance of the rope
 - (d) A jacketed rope
12. Which type of rope would **MOST** likely be used as a rescue rope?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle

Reading Passage 3

A major goal of a fire building search is to find victims. A *primary search* is a fast but complete search that is done before or during firefighting operations. It is often done under extreme conditions, and it must be quick. Firefighters should always use the buddy system – working in teams of two or more. Firefighters should always carry forcible entry tools with them to get to trapped victims. Tools used to force entry may be needed to force obstructions out of the way, or to force a way out of the building if firefighters become trapped.

Depending on conditions, firefighters may be able to search while walking upright, or they may have to crawl on their hands and knees. If conditions allow, walking is the fastest way to search. Searching on hands and knees (under the smoke) can increase visibility and reduce the chances of tripping or falling into stairways or holes in floors. Movement in this position is much slower than when walking, but it is usually much cooler near the floor. Even though it is more difficult to move around when crawling, it should still be done as quickly as possible.

When searching, firefighters should move systematically from room to room, searching each room completely, while steadily listening for sounds from victims. On the fire floor, firefighters should start their search as close to the fire as possible and then search toward the entrance door, allowing them to reach those victims in the most danger first.

Firefighters should search the outside edge of each room, and they should extend their arms or legs or use the handle of a forcible entry tool to reach under beds and furniture. With limited visibility, firefighters may have to rely on the sense of touch to find victims. When the outside edge has been searched, they should then search the middle of the room.

Based upon the material presented in **Reading Passage 3**, answer the following questions:

13. Which is **NOT** a use for forcible entry tools described by the passage?
- (a) Force a way out of the building if trapped.
 - (b) Search for victims by reaching under beds and other furniture.
 - (c) Get to trapped victims by forcing obstructions out of the way.
 - (d) Increase visibility by using for ventilation.
14. Which is an advantage of searching while walking upright?
- (a) It is faster.
 - (b) It is cooler.
 - (c) There is better visibility.
 - (d) There is a reduced chance of tripping.
15. What should **NOT** be done in performing a primary search?
- (a) Work in teams of two or more.
 - (b) Work slowly.
 - (c) Move systematically from room to room.
 - (d) Carry forcible entry tools.
16. Which victims are in the most danger?
- (a) The ones hiding under beds and furniture
 - (b) Those who are crawling
 - (c) Those closer to the fire
 - (d) The ones on the outside edge of a room

Reading Passage 4

Public or private water systems supply water to populated areas. As the population increases in rural areas, rural communities seek to improve water distribution systems from reliable sources.

The water department may be a city operated utility or a regional or private water authority. Its main function is to provide drinkable water. Water department officials are the experts in water supply problems. The fire department must work with the water department in planning fire protection coverage. Water department officials should realize that fire departments are mainly concerned with water supply and work with them on water supply needs and the locations and types of fire hydrants.

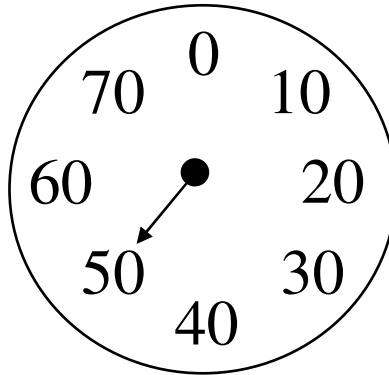
A main water supply can be obtained from either surface water or groundwater. Although most water systems are supplied from only one source, there are instances where both sources are used. Examples of surface water supply are rivers and lakes. Groundwater supply can be water wells or water-producing springs.

An engineering estimate determines the amount of water that a town needs. This estimate is the total amount of water needed for home and business use and for fire fighting use. In cities, the home/business needs far exceed that needed for fire protection. In small towns, the needs for fire protection exceed other needs.

Based upon the material presented in **Reading Passage 4**, answer the following questions:

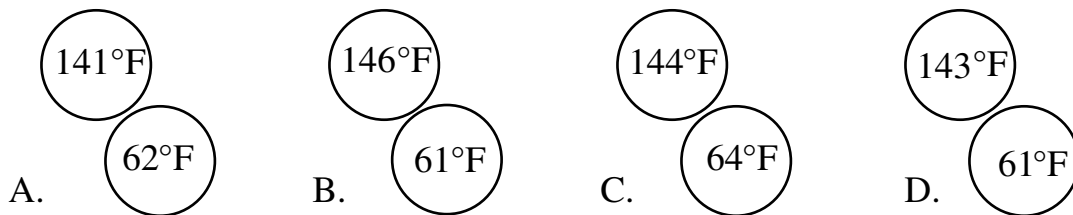
17. Who are considered to be the experts in water supply problems?
- (a) fire department officials
 - (b) engineers
 - (c) water department officials
 - (d) rural community officials
18. In a small town, who needs a greater amount of water?
- (a) homes
 - (b) businesses
 - (c) fire departments
 - (d) populated areas
19. Which is an example of a surface water supply?
- (a) a hydrant
 - (b) a water-producing spring
 - (c) a water well
 - (d) a lake
20. What is the main purpose of a water department? To provide
- (a) drinkable water
 - (b) a water supply to fire departments
 - (c) improved water distribution systems
 - (d) water to homes and businesses
21. Which is **NOT** true about main water supplies?
- (a) They can be obtained from rivers and lakes.
 - (b) They can be obtained from groundwater.
 - (c) They may come from more than one source.
 - (d) They may come from fire hydrants.

Questions 22 through 23 refer to the gauge pictured below.

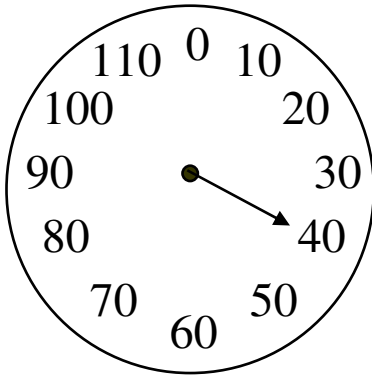


22. How much would the gauge need to be decreased in order to read 20?
- (a) 20
 - (b) 30
 - (c) 40
 - (d) 50
23. If there were seven gauges all reading the same as the one pictured above, what would be combined total of the seven gauges?
- (a) 7
 - (b) 50
 - (c) 350
 - (d) 490

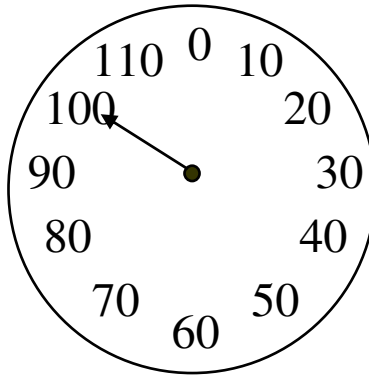
Questions 24 and 25 refer to the gauge pictured below.



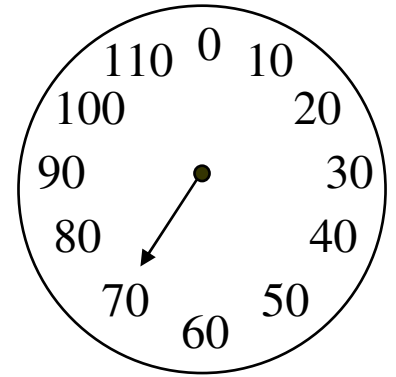
24. Which pair of circles has the largest total combined temperature?
25. Which pair of circles has the smallest total combined temperature?



1



2



3

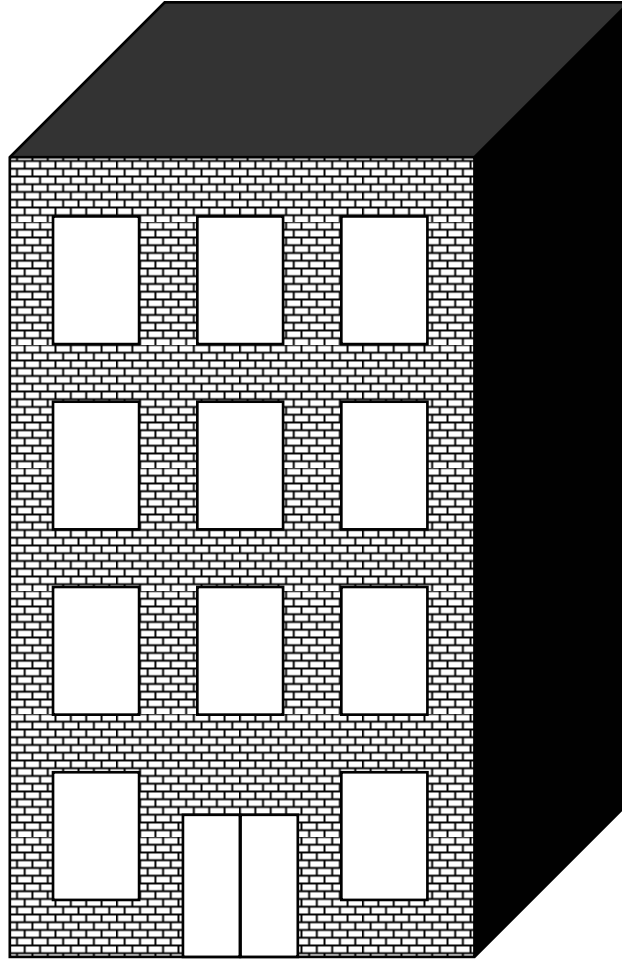
26. What is the sum of the readings on gauges 1, 2 and 3?

- (a) 110
- (b) 130
- (c) 170
- (d) 210

27. How much would gauge 2 need to be decreased to equal gauge 3?

- (a) 30
- (b) 60
- (c) 90
- (d) 100

Questions 28 and 29 refer to the building pictured below.

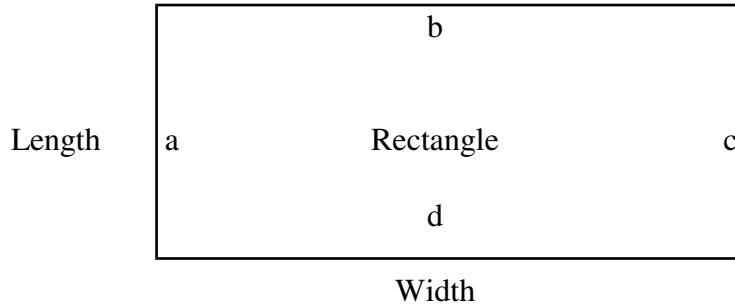


28. Each window is 5 feet tall. The distance from the top of each window to the bottom of the window directly above it is three feet. The distance from the ground to the bottom of the first story window is also three feet, as is the distance from the top of the fourth story window to the top of the building. What is the total distance from the ground to the bottom of the fourth story windows?
- (a) 24 feet
 - (b) 27 feet
 - (c) 32 feet
 - (d) 35 feet
29. Using the same measurements as in the previous question, what is the total height of the building?
- (a) 24 feet
 - (b) 27 feet
 - (c) 32 feet
 - (d) 35 feet

Questions 30 and 31 are based on the following information.

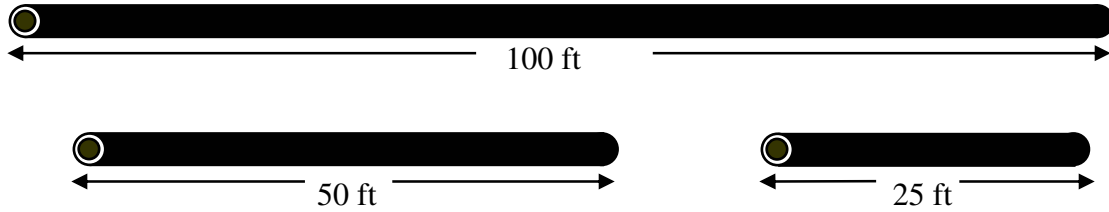
The perimeter is the total distance around a two-dimensional figure. The formula for finding the perimeter of a rectangle is:

$$\begin{aligned} \text{Length} + \text{Width} + \text{Length} + \text{Width} &= \text{Perimeter, or} \\ a + b + c + d &= \text{Perimeter} \end{aligned}$$



30. What is the perimeter of a rectangle that has sides equal to 4 feet, 6 feet, 4 feet and 6 feet?
- (a) 16 feet
 - (b) 20 feet
 - (c) 22 feet
 - (d) 24 feet
31. What is the perimeter of a rectangle that is 8 feet in length and 8 feet in width?
- (a) 16 feet
 - (b) 32 feet
 - (c) 36 feet
 - (d) 64 feet

Questions 32 to 33 refer to the three hoses pictured below.



32. If there were 6 lengths of 25 ft hose and 5 lengths of 50 ft hose, how many lengths of 100 ft hose would that equal?
- (a) 4
 - (b) 6
 - (c) 9
 - (d) 11
33. If there were 5 lengths of 25 ft hose, 3 lengths of 50 ft hose, and 1 length of 100 ft hose, how many total feet of hose would there be?
- (a) 175 feet
 - (b) 250 feet
 - (c) 375 feet
 - (d) 425 feet

Questions 34 and 35 are based on the following information.

From a series of numbers, an average can be determined by adding the numbers in the series, and then dividing their sum by the amount of numbers appearing in the series. For example, the average of the numbers 4, 6 and 11 is equal to 7. This is determined by first adding $4 + 6 + 11$. Their sum is equal to 21. The sum (21) is then divided by the amount of numbers in the series. There are three numbers in this example, so to determine the average, 21 is divided by 3; the average of the numbers 4, 6 and 11 is equal to 7.

34. What is the average of the following three numbers?
95, 113 and 1157
- (a) 107
 - (b) 433
 - (c) 455
 - (d) 1365
35. What is the average of the following six numbers?
19, 44, 48, 52, 73 and 76
- (a) 40
 - (b) 44
 - (c) 48
 - (d) 52

ANSWERS

Reading Passage 1

1. What classification would be given to a paint fire?

- (a) Class A
- (b) Class B**
- (c) Class C
- (d) Class D

The second paragraph of Reading Passage 1 describes the types of fires that are classified as Class B fires. The paragraph says that “Class B fires involve flammable and combustible liquids and gases such as gasoline, oil, paint, and alcohol.” Choice “b” is the best answer.

2. What classification would be given to a computer fire?

- (a) Class A
- (b) Class B
- (c) Class C**
- (d) Class D

The third paragraph of Reading Passage 1 describes the types of fires that are classified as Class C fires. The paragraph says that “Household appliances, computers, and transformers are examples.” Choice “c” is the best answer.

3. What classification would be given to a rubber fire?

- (a) Class A**
- (b) Class B
- (c) Class C
- (d) Class D

The first paragraph of Reading Passage 1 describes the types of fires that are classified as Class A fires. The paragraph says that “Class A fires involve ordinary flammable materials such as wood, cloth, paper, rubber, and many plastics.” Choice “a” is the best answer.

4. What classification would be given to a sodium fire?
- (a) Class A
 - (b) Class B
 - (c) Class C
 - (d) Class D**

The last paragraph of Reading Passage 1 describes the types of fires that are classified as Class D fires. The paragraph says, “Class D fires involve flammable metals such as aluminum, magnesium, sodium, and potassium.” Choice “d” is the best answer.

5. Which classification uses the smothering or blanketing effect of oxygen exclusion as the most effective way to put out a fire?
- (a) Class A
 - (b) Class B**
 - (c) Class C
 - (d) Class D

The second paragraph of Reading Passage 1 describes Class B fires. The paragraph says that “The smothering or blanketing effect of oxygen exclusion (keeping oxygen away from the fire) is the most effective way to put out these fires.” Choice “b” is the best answer.

6. For which classification is water the most effective way to put out a fire?
- (a) Class A**
 - (b) Class B
 - (c) Class C
 - (d) Class D

The first paragraph of Reading Passage 1 describes Class A fires. The paragraph says that “Applying water is the most effective way to put out this type of fire.” Choice “a” is the best answer.

Reading Passage 2

7. Which types of rope are jacketed?
- (a) Laid and braided
 - (b) Braided and braid-on-braid
 - (c) **Braid-on-braid and kernmantle**
 - (d) Laid and kernmantle

The fourth paragraph of Reading Passage 2 describes braid-on-braid rope as jacketed, and the last paragraph describes kernmantle rope as jacketed. As laid rope and braided rope are not described as jacketed, choice “c” is the best answer.

8. Which type of rope is **LEAST** susceptible to abrasions?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) **Kernmantle**

It is important to note the word **LEAST** in the question. What this means is that some or all of the types of ropes listed may be susceptible to abrasions, to varying degrees. You need to identify the best answer to the question. In the second paragraph, Reading Passage 2 says, “Laid ropes are made by twisting...” and “Twisted rope is susceptible to abrasion...” indicating that choice “a” is incorrect. The third paragraph, in describing braided rope, says, “Because of the way it is made, the load-bearing fibers are subject to direct abrasion...” indicating that choice “b” is incorrect. The fourth paragraph, in describing braid-on-braid rope, says that it “...does not resist abrasion as well as kernmantle rope” indicating that choice “c” is incorrect and also indicating that choice “d” is the best answer. This is also supported in the last paragraph where, in describing kernmantle rope, the passage says that “The sheath...absorbs most of the abrasion, and protects the load-bearing core.”

9. As described by the passage, concerns about twisting are **MOST** likely for which type of rope?
- (a) **Laid**
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle

In the second paragraph, Reading Passage 2 explains that laid ropes "...are made by twisting..." This is the first indication that choice "a" is the correct answer. The next paragraph supports choice "a" as the best answer by stating that twisting is "...common to laid ropes."

10. Which type of rope has half its strength in the sheath and the other half in the core?
- (a) Laid
 - (b) Braided
 - (c) **Braid-on-braid**
 - (d) Kernmantle

The fourth paragraph of Reading Passage 2, in describing braid-on-braid rope, says "Half of its strength is in the sheath and the other half is in the core." Choice "c" is the best answer.

11. Based upon the information provided, what is the **BEST** definition of a sheath?
- (a) **The outer covering of the rope's core**
 - (b) The mantle, of which the rope is constructed
 - (c) The herring-bone-pattern appearance of the rope
 - (d) A jacketed rope

To varying degrees, all four choices are related to the definition of a sheath, but the question asks for the BEST definition. Choice "a" is the best answer. The last two paragraphs both describe jacketed ropes as having a "...braided covering or sheath", indicating that the words "covering" and "sheath" are interchangeable. The paragraphs also say that the sheath or covering is the outer part of the rope. "The outer covering of the rope's core" (choice "a") is the best definition. Choice "b" defines the sheath as "the mantle, of which the rope is constructed". While this is true of kernmantle rope, it is not true for braid-on-braid rope – this is not the best definition. "The herring-bone-pattern appearance of the rope" (choice "c") is not a definition of what a sheath is. Rather, it is a description of what the sheath looks like, but only for braid-on-braid ropes, and not for kernmantle ropes. A sheath is also not "a jacketed rope" (choice "d"). A sheath is only part of a jacketed rope (the jacket part). A jacketed rope has a sheath and a core. Also, "a jacketed rope" does not define a part of a rope – it is a description of the rope itself.

12. Which type of rope would most likely be used as a rescue rope?
- (a) Laid
 - (b) Braided
 - (c) Braid-on-braid
 - (d) Kernmantle**

The last paragraph of Reading Passage 2 says that “Kernmantle is most commonly used as a rescue rope...” Choice “d” is the best answer.

Reading Passage 3

13. Which is **NOT** a use for forcible entry tools described by the passage?
- (a) Force a way out of the building if trapped.
 - (b) Search for victims by reaching under beds and other furniture.
 - (c) Get to trapped victims by forcing obstructions out of the way.
 - (d) Increase visibility by using for ventilation.**

It is important to note the word **NOT** in the question. What this means is that three of the choices will describe a use for forcible entry tools, found within Reading Passage 3. The remaining choice, which is not found in the passage, is the correct answer. It is possible that correct answer may be a viable use for forcible entry tools, but it is not described in the passage. Reading the question carefully will give you clues as to what you need to look for in the passage to find the best answer.

The last two sentences of the first paragraph in Reading Passage 3 say “Firefighters should always carry forcible entry tools with them to get to trapped victims. Tools used to force entry may be needed to force obstructions out of the way, or to force a way out of the building if firefighters become trapped.” Choices “a” and “c” are clearly uses for forcible entry tools found in the passage. The last paragraph of the passage says “Firefighters should...use the handle of a forcible entry tool to reach under beds and furniture.” Choice “b” is clearly a use for forcible entry tools found in the passage. Choice “d” is the best answer to the question.

14. Which is an advantage of searching while walking upright?
- (a) **It is faster.**
 - (b) It is cooler.
 - (c) There is better visibility.
 - (d) There is a reduced chance of tripping.

All of the information needed to answer this question is found in the second paragraph of Reading Passage 3. It says "...walking is the fastest way to search" which is the first indication that choice "a" is likely the correct answer. The paragraph also says that "searching on hands and knees can increase visibility and reduce the chances of tripping...", which eliminates choices "c" and "d" as possible answers. The next line says that it is "...much cooler near the floor", which eliminates choice "b". Choice "a" is the best answer.

15. What should **NOT** be done in performing a primary search?
- (a) Work in teams of two or more.
 - (b) **Work slowly.**
 - (c) Move systematically from room to room.
 - (d) Carry forcible entry tools.

The last sentence in the second paragraph says "Even though it is more difficult to move around when crawling, it should still be done as quickly as possible." Choice "b" is the best answer. The passage does not recommend that firefighters work slowly.

16. Which victims are in the most danger?
- (a) The ones hiding under beds and furniture
 - (b) Those who are crawling
 - (c) **Those closer to the fire**
 - (d) The ones on the outside edge of a room

The third paragraph of the passage states "...firefighters should start their search as close to the fire as possible...allowing them to reach those victims in the most danger first." This sentence indicates that victims closest to the fire are in the most danger. Choice "c" is the best answer.

Reading Passage 4

17. Who are considered to be the experts in water supply problems?
- (a) fire department officials
 - (b) engineers
 - (c) **water department officials**
 - (d) rural community officials

The second paragraph of Reading Passage 4 says “Water department officials are the experts in water supply problems.” While fire department officials, engineers, and rural community officials may have knowledge of water supply problems, the paragraph clearly indicates that choice “c” is the best answer.

18. In a small town, who needs a greater amount of water?
- (a) homes
 - (b) businesses
 - (c) **fire departments**
 - (d) populated areas

The last sentence of the passage says “In small towns, the needs for fire protection exceed other needs.” Choice “c” is the best answer.

19. Which is an example of a surface water supply?
- (a) a hydrant
 - (b) a water-producing spring
 - (c) a water well
 - (d) **a lake**

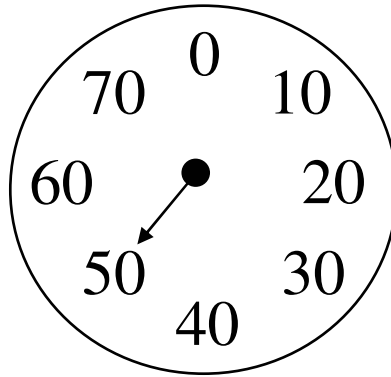
The third paragraph of the passage says that “Examples of surface water supply are rivers and lakes.” Choice “d” is the best answer.

20. What is the main purpose of a water department? To provide
- (a) **drinkable water**
 - (b) a water supply to fire departments
 - (c) improved water distribution systems
 - (d) water to homes and businesses

The second paragraph of the passage says that “The water department(‘s)...main function is to provide drinkable water.” Choice “a” is the best answer. While a water department may also provide a water supply to fire departments, provide improved water distribution systems, and provide water to homes and businesses, its main function is to provide drinkable water.

21. Which is **NOT** true about main water supplies?
- (a) They can be obtained from rivers and lakes.
 - (b) They can be obtained from groundwater.
 - (c) They may come from more than one source.
 - (d) **They may come from fire hydrants.**

The third paragraph in the passage addresses this question. Choices “a”, “b” and “c” are clearly found in the paragraph to be true regarding main water supplies. The question asks “which is **NOT** true...” Choice “d” is the best answer.



22. How much would the gauge need to be decreased in order to read 20?
- (a) 20
 - (b) 30**
 - (c) 40
 - (d) 50

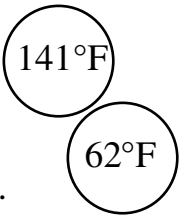
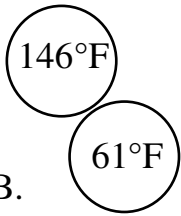
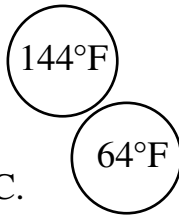
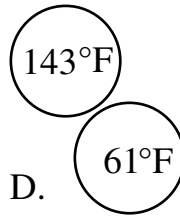
The reading on the gauge is 50. To determine how much to decrease the gauge so that it reads 20, you must subtract the desired reading (20) from the present reading (50). $50 - 20 = 30$. Choice “b” is the best answer.

23. If there were seven gauges all reading the same as the one pictured above, what would be combined total of the seven gauges?
- (a) 7
 - (b) 50
 - (c) 350**
 - (d) 490

The reading on the gauge is 50. To determine the combined total of seven gauges, each of which has a reading of 50, you can either add 50 seven times ($50 + 50 + 50 + 50 + 50 + 50 + 50$) or multiply 50 by 7.

50		50
50	<u>OR</u>	<u>x 7</u>
50		350
50		
50		
50		
50		
<u>+ 50</u>		
350		

Choice “c” is the best answer.

A.  B.  C.  D. 

24. Which pair of circles has the largest total combined temperature?

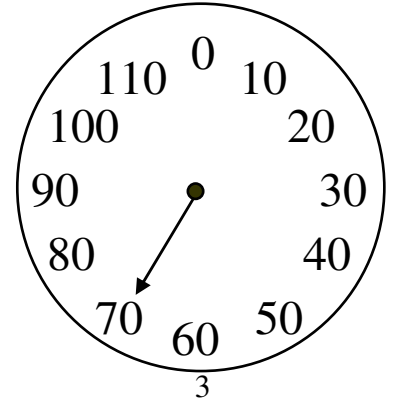
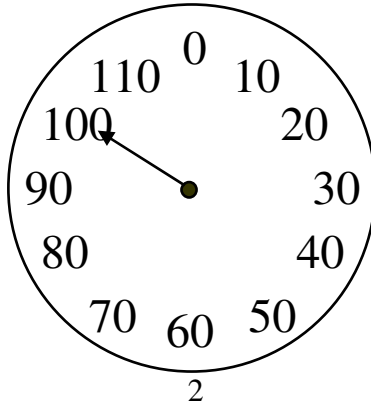
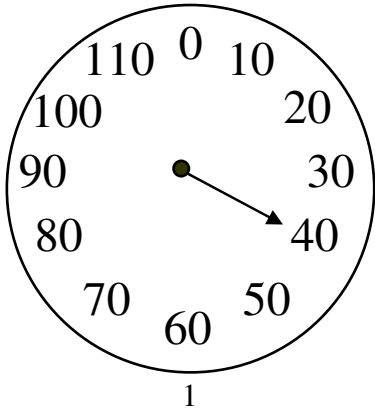
To determine the correct answer, you must first add each pair of circles in order to see which pair has the highest combined total.

A	141	B	146	C	144	D	143
	<u>+62</u>		<u>+61</u>		<u>+64</u>		<u>+61</u>
	203		207		208		204

The pair of circles with the highest combined total is choice “c”, with a total of 208. Choice “c” is the correct answer.

25. Which pair of circles has the smallest total combined temperature?

Using the same totals found in question 24 above, the smallest combined total appears in choice “a”, with a total of 203. Choice “a” is the correct answer.



26. What is the sum of the readings on gauges 1, 2 and 3?

- (a) 110
- (b) 130
- (c) 170
- (d) 210

In order to determine the sum of the readings on the three gauges, you must add the three readings.

$$\begin{array}{r}
 \text{Gauge 1} = 40 \\
 \text{Gauge 2} = 100 \\
 \text{Gauge 3} = \underline{+ 70} \\
 \text{Total} = 210
 \end{array}$$

Choice "d" is the correct answer.

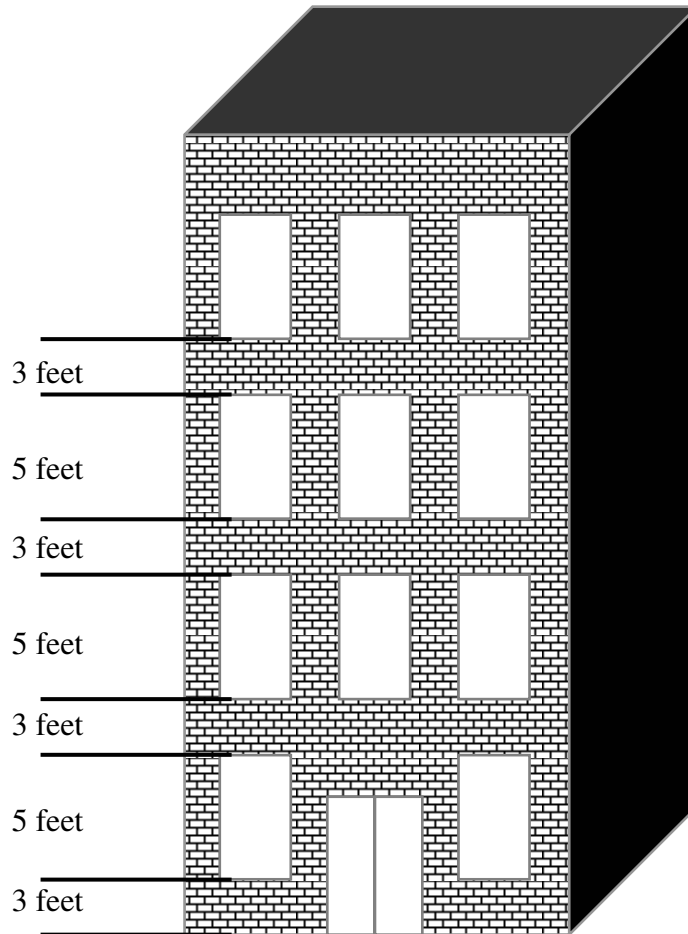
27. How much would gauge 2 need to be decreased to equal gauge 3?

- (a) 30
- (b) 60
- (c) 90
- (d) 100

To determine how much gauge 2 needs to be decreased in order to equal the reading on gauge 3, subtract the gauge 3 reading from that of gauge 2.

$$\begin{array}{r}
 \text{Gauge 2} = 100 \\
 \text{Gauge 3} = \underline{- 70} \\
 30
 \end{array}$$

Choice "a" is the correct answer.

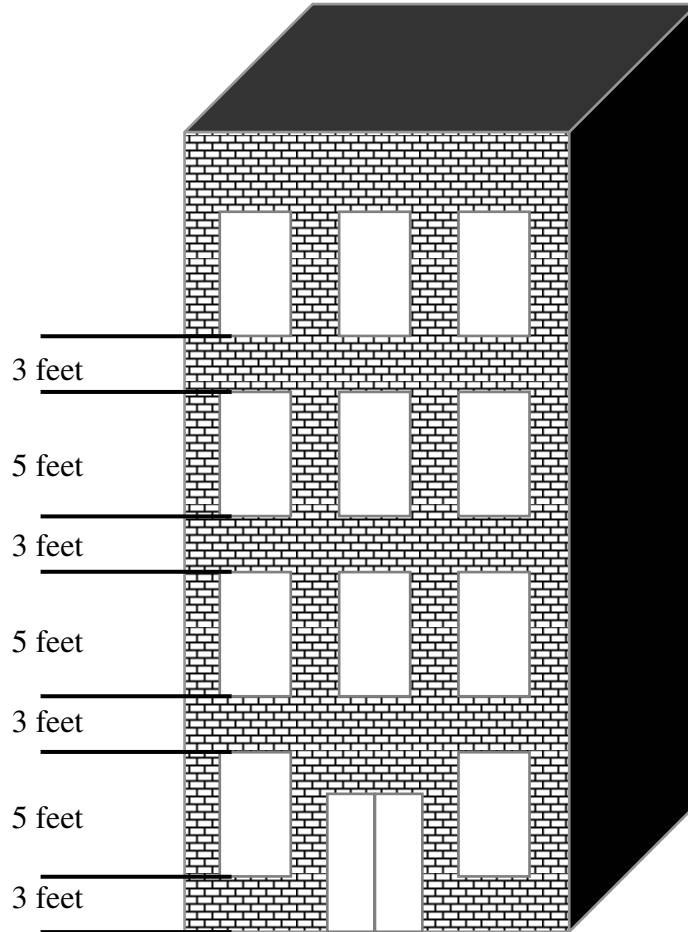


28. Each window is 5 feet tall. The distance from the top of each window to the bottom of the window directly above it is three feet. The distance from the ground to the bottom of the first story window is also three feet, as is the distance from the top of the fourth story window to the top of the building. What is the total distance from the ground to the bottom of the fourth story windows?

- | | | | |
|-----|----------------|---|---------------|
| (a) | 24 feet | Ground to window = | 3 feet |
| (b) | 27 feet | First story window = | 5 feet |
| (c) | 32 feet | Top of 1 st story window to bottom of 2 nd story window = | 3 feet |
| (d) | 35 feet | Second story window = | 5 feet |
| | | Top of 2 nd story window to bottom of 3 rd story window = | 3 feet |
| | | Third story window = | 5 feet |
| | | Top of 3 rd story window to bottom of 4 th story window = | <u>3 feet</u> |
| | | | 27 feet |

To determine the distance from the ground to the bottom of the fourth story windows, add the measurements for all of the breakdowns pictured above.

Choice “b” is the correct answer.

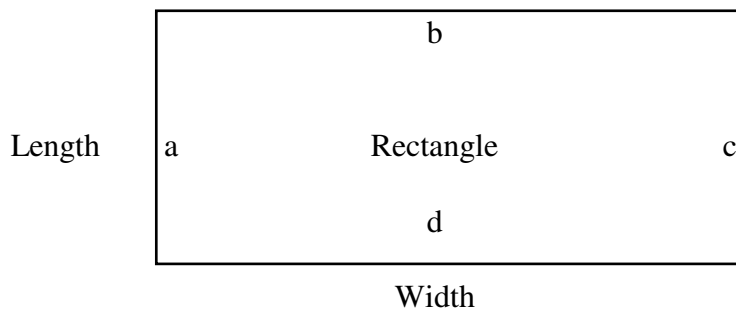


29. Using the same measurements as in the previous question, what is the total height of the building?

- | | | | |
|-----|----------------|---|---------------|
| (a) | 24 feet | Ground to window = | 3 feet |
| (b) | 27 feet | First story window = | 5 feet |
| (c) | 32 feet | Top of 1 st story window to bottom of 2 nd story window = | 3 feet |
| (d) | 35 feet | Second story window = | 5 feet |
| | | Top of 2 nd story window to bottom of 3 rd story window = | 3 feet |
| | | Third story window = | 5 feet |
| | | Top of 3 rd story window to bottom of 4 th story window = | 3 feet |
| | | Fourth story window = | 5 feet |
| | | Top of 4 th story window to roof = | <u>3 feet</u> |
| | | | 35 feet |

To determine the distance from the ground to the bottom of the fourth story windows, add the measurements for all of the breakdowns pictured above.

Choice "d" is the correct answer.



$$\begin{aligned} \text{Length} + \text{Width} + \text{Length} + \text{Width} &= \text{Perimeter, or} \\ a + b + c + d &= \text{Perimeter} \end{aligned}$$

30. What is the perimeter of a rectangle that has sides equal to 4 feet, 6 feet, 4 feet and 6 feet?
- (a) 16 feet
 - (b) 20 feet**
 - (c) 22 feet
 - (d) 24 feet

Using the formula above to determine the perimeter, $a + b + c + d = \text{Perimeter}$. Using the figures from question 30,

$$\begin{array}{r} 4 \\ 6 \\ 4 \\ \hline +6 \\ 20 \end{array}$$

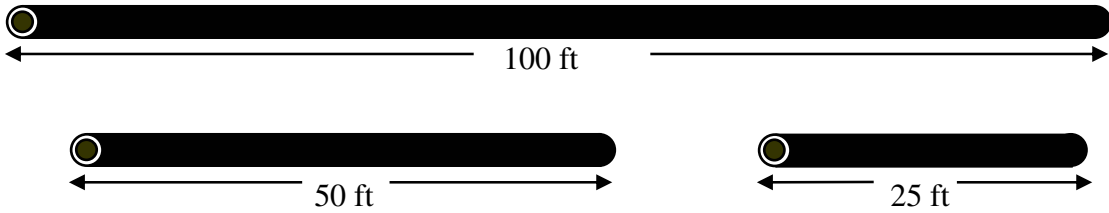
Choice "b" is the correct answer.

31. What is the perimeter of a rectangle that is 8 feet in length and 8 feet in width?
- (a) 16 feet
 - (b) 32 feet**
 - (c) 36 feet
 - (d) 64 feet

Again, using the formula above to determine the perimeter, $a + b + c + d = \text{Perimeter}$. Using the figures from question 30,

$$\begin{array}{r} 8 \\ 8 \\ 8 \\ \hline +8 \\ 32 \end{array}$$

Choice "b" is the correct answer.



32. If there were 6 lengths of 25 ft hose and 5 lengths of 50 ft hose, how many lengths of 100 ft hose would that equal?
- (a) 4
 - (b) 6
 - (c) 9
 - (d) 11

To answer this question, you must first determine the combined length of the hoses presented in the question. The question says that there are 6 lengths of 25 ft hose and 5 lengths of 50 ft hose.

You can multiply $\begin{array}{r} 25 \\ \times 6 \\ \hline 150 \end{array}$ and $\begin{array}{r} 50 \\ \times 5 \\ \hline 250 \end{array}$ and then add to find $\begin{array}{r} 250 \\ +150 \\ \hline 400 \end{array}$ the total length

You then need to determine how many lengths of 100 ft hose equal 400 ft. This is done through division.

$$100 \overline{)400}^4$$

Choice "a" is the correct answer

33. If there were 5 lengths of 25 ft hose, 3 lengths of 50 ft hose, and 1 length of 100 ft hose, how many total feet of hose would there be?
- (a) 175 feet
 - (b) 250 feet
 - (c) **375 feet**
 - (d) 425 feet

As in the previous question, you must determine the combined length of the hoses presented in the question. The question says that there are 5 lengths of 25 ft hose, 3 lengths of 50 ft hose, and 1 length of 100 ft hose.

	25	50	100		125
Multiply	$\underline{\times 5}$	and	$\underline{\times 3}$	and	$\underline{\times 1}$
	125		150		100
				then add to find	150
				the total length	<u>+100</u>
					375

Choice “c” is the correct answer.

From a series of numbers, an average can be determined by adding the numbers in the series, and then dividing their sum by the amount of numbers appearing in the series. For example, the average of the numbers 4, 6 and 11 is equal to 7. This is determined by first adding $4 + 6 + 11$. Their sum is equal to 21. The sum (21) is then divided by the amount of numbers in the series. There are three numbers in this example, so to determine the average, 21 is divided by 3; the average of the numbers 4, 6 and 11 is equal to 7.

34. What is the average of the following three numbers?
95, 113 and 1157
- (a) 107
 - (b) 433
 - (c) **455**
 - (d) 1365

Using the explanation above, the first step in calculating the average for a series of numbers is to add the numbers.

$$\begin{array}{r} 1157 \\ 113 \\ + 95 \\ \hline 1365 \end{array}$$

The second step is to divide the sum (1365) by the amount of numbers in the series. There are 3 numbers in the series presented in question 34, so in this step you need to divide 1365 by 3.

$$\begin{array}{r} 455 \\ 3 \overline{)1365} \\ \underline{12} \\ 16 \\ \underline{15} \\ 15 \\ \underline{15} \\ 0 \end{array}$$

Choice "c" is the correct answer.

35. What is the average of the following six numbers?
19, 44, 48, 52, 73 and 76
- a. 40
 - b. 44
 - c. 48
 - d. 52**

Again, the first step in calculating the average for a series of numbers is to add the numbers.

$$\begin{array}{r} 19 \\ 44 \\ 48 \\ 52 \\ 73 \\ + 76 \\ \hline 312 \end{array}$$

The second step is to divide the sum (312) by the amount of numbers in the series. There are 6 numbers in the series presented in question 35, so in this step you need to divide 312 by 6.

$$\begin{array}{r} 52 \\ 6 \overline{) 312} \\ \underline{30} \\ 12 \\ \underline{12} \\ 0 \end{array}$$

Choice “d” is the correct answer.

1. ○○○○
2. ○○○○
3. ○○○○
4. ○○○○
5. ○○○○
6. ○○○○
7. ○○○○
8. ○○○○
9. ○○○○
10. ○○○○
11. ○○○○
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21. ○○○○
22. ○○○○
23. ○○○○
24. ○○○○
25. ○○○○
26. ○○○○
27. ○○○○
28. ○○○○
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36. ○○○○
37. ○○○○
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39. ○○○○
40. ○○○○

41. ○○○○
42. ○○○○
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45. ○○○○
46. ○○○○
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78. ○○○○
79. ○○○○
80. ○○○○

Part II

81. ○○○○○
82. ○○○○○
83. ○○○○○
84. ○○○○○
85. ○○○○○
86. ○○○○○
87. ○○○○○
88. ○○○○○
89. ○○○○○
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