# **F**IRE
# **R**ECRUIT
# **A**SSISTANCE
# **P**ROGRAM

## STUDY GUIDE
**3/2022**

Presented by:

KERN COUNTY FIRE DEPARTMENT
KERN COUNTY PERSONNEL DEPARTMENT

**Kern County Fire Chief**

# Aaron Duncan

Congratulations on your decision to apply for the Kern County Firefighter Recruit examination. The process of becoming a firefighter is challenging, but the efforts are very rewarding. An honorable career in public service has many benefits; most importantly, making a long-lasting difference in the community.

The Kern County Fire Department is one of the premier firefighting agencies in the nation. We have over 75 years in setting the standard of excellence providing exceptional, all hazard emergency services, not only in our own county, but around the state. This department is dedicated to protecting life and property by providing effective public education, fire prevention and emergency services.

In addition to responding daily to fire and medical emergencies, firefighters have a wide range of responsibilities to prepare their crew to be ready to respond to these emergencies. Every shift, firefighters engage in several activities including:

- Maintaining the fire station
- Public education events
- Daily training evolutions
- Fire safety inspections

- Maintenance of fire apparatus and equipment
- Participation in physical fitness programs
- Maintenance of fire hydrants
- Hazard reduction in the wildland areas

The qualities that make a great firefighter are being a team player, dependable, honest, and want to make a positive impact on the community. Firefighting is both physically and mentally demanding, requiring you to be physically fit, highly trained, motivated, and possess a strong work ethic. I look forward to seeing your journey commence.
Good Luck on your way to becoming a Kern County Firefighter!

Aaron Duncan
Fire Chief & Director of Emergency Services

# Deputy Fire Chief
# Butch Agosta

As a Deputy Fire Chief with Kern County Fire Department, I know that this position comes with great responsibility which includes the commitment, excitement, and honor in overseeing the Recruit Firefighter examination process. The Kern County Fire Department works very closely with the Kern County Human Resources Department to develop and provide helpful resources for the people interested in becoming firefighters within our local communities and unincorporated areas of the county of Kern. Those resources consist of the Kern County Fire Department Fire Recruit Assistance Program (FRAP), Fire Recruit Study Guide, "Your Path to Becoming a Firefighter", and overall assistance with the Firefighter Recruit examination process.

My job as the Deputy Fire Chief is to conduct the "Chief's Interview." Those candidates who are invited to the Chief's Interview have successfully completed the requirements for the Firefighter Recruit examination. At this point, it is my job to assess your knowledge, skills, and ability to successfully perform the duties of a Firefighter Recruit, which rely on the core values of the Kern County Fire Department: Leadership, Integrity, and Service. During the Chief's Interview, you should be at the "top of your game". Not only does this mean having the completed requirements of a Firefighter Recruit, but also being dressed appropriately while being polished and prepared to respond to questions that have been developed for the interview. The questions will be general in nature and are designed to assist me in evaluating each candidate appropriately. This will ultimately lead to my candidate recommendations for hire and placement in the Kern County Firefighter Recruit Academy.

I encourage you to use this study guide to prepare yourself for the different components of the Firefighter Recruit examination.

I am very proud to be part of the Kern County Fire Department and I look forward to meeting you in the Chief's Interview.

BEST OF LUCK!

Butch Agosta
Deputy Fire Chief

# INTRODUCTION

This study guide has been developed to assist Firefighter Recruit applicants to prepare for the competitive written civil service exam.

The study guide includes general information related to the application process, the written examination, and the oral examination process. Test taking techniques, sample questions and exercises have been designed to acquaint the applicant with the various types of test questions which may be included in the written examination.

It is not recommended for applicants to use this study guide to memorize specific technical tasks but rather use it to gain experience and practice in answering multiple choice questions and to become acquainted with test taking techniques.

The written examination test does not require prior Firefighting knowledge.

The written examination is scored based on the number of questions answered correctly.

The Kern County Fire Department Physical Ability Test is Pass / Fail.

The oral examination will be scored based on the questions and answers provided.

**Applicants must attain at least a 70% on the written and oral exam phases of the examination process.**

# PREPARING YOUR APPLICATION FOR EMPLOYMENT WITH KERN COUNTY

Preparing your application for employment is as important as preparing to take an examination with Kern County.  You should think of your application as your first impression. The following guidelines have been prepared to assist you in completing an application form to your best advantage.

1. ***Complete your applications neatly,*** take your time and review your application before submitting online.

2. ***Provide all information requested on the application.*** The requested information on your application is necessary in order to verify your qualifications. Information about termination of employment and conviction record is required.  This information may be sensitive, but it will be kept confidential.  A written explanation for the reason of termination is all that is necessary. You are also required to provide the date, charge, place, action taken and present status of each conviction.

3. ***Provide enough information to show that you meet the minimum qualifications listed on the job bulletin.*** All relevant qualifying experience should be listed on your application.  The application asks only for the last five (5) years of experience. However, you should include **any** qualifying experience, even if it was more than five (5) years ago.  Resumes are accepted but not required.  Resumes are used as a supplement to the County application.  All applicable employment history must be indicated on your application.  Applicants qualifying with a G.E.D. must present a copy of their G.E.D. with their application materials by final filing deadline.

4. ***Attach required documentation.*** Carefully read the qualifications section of the job bulletin to verify all documentation of the required qualifications.  Depending on the recruitment, you may also need to submit a copy of all relevant certificates, professional licenses, or college diploma(s)/degree(s) and/or transcripts.  Be sure to submit copies, not originals.

***Additional Guidelines:*** Applications submitted for the Firefighter Recruit examination must be an original; photocopied applications are not accepted.  ONCE APPLICATIONS ARE SUBMITTED, THEY ARE THE PROPERTY OF THE KERN COUNTY PERSONNEL DEPARTMENT.

Best of luck as you pursue your employment goals with Kern County.

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## STUDY HABITS CAN AFFECT TEST PERFORMANCE

Studies indicate those who use good study habits to prepare for written examinations do better than their counterparts who do not.

Systematic practice familiarizes the candidate with the type of questions that may be asked on a written examination and ensures the candidate is aware of what is expected of him or her. This can also alleviate nervousness that is associated with test taking and provide the candidate with mental and physical endurance to complete the examination without hesitation. Candidates who are prepared to take written examinations have a higher probability of successfully passing the exam.

## WRITTEN TEST PREPARATION

Written tests administered by the Kern County Personnel Department are objective tests, which are generally scored by a computer. Most written exams consist of multiple-choice questions, alternate choice, true/false and/or matching questions.

The written exam is designed to measure some of the critical knowledge, skills, and abilities **(See Job Bulletin – Written Exam)** required for successful on-the-job training and performance.

***How can I find out what will be on the test?*** Carefully read the job bulletin, which will indicate subject areas that may be covered on the written examination. This will give you a general guideline of what subjects will be covered on the written exam. **Note:** The subjects listed on the job bulletin are only suggestions for study, and not a binding indication of what will be on the written exam.

***How can I prepare for the written exam?*** Google the position you're interested in and research the topic for free study guides and test preparation exams. The Kern County Library also has test preparation resources, including practice tests.

***Test Taking Strategies.***

1. Get plenty of rest the night before the exam.

2. Get a bite to eat before the exam. It will give you added brain power.

3. Arrive fifteen (15) to thirty (30) minutes early so you are not rushed, and you have plenty of time for those unanticipated events, such as parking, traffic and etc.

4. Leave your cell phone in your vehicle. Cell phones are not allowed during the examination process.

5. Take deep breaths to relax, if necessary. Eliminate outside distractions from your mind before you start the exam.

6. Make sure you know how to fill in the computerized answer form correctly.  The test proctor will give instructions at the beginning of the exam.  If you don't understand, ask questions.

7. Read all instructions carefully.

8. Use your time wisely. Do not spend a disproportionate amount of time on any single question or group of questions.  Move on and complete those questions that you are certain about and then go back to those questions that you find especially difficult. If you are unable to answer the question, go ahead and guess as opposed to leaving it blank.    On a true/false question, you have a 50/50 chance of getting it right.  On a four-part multiple-choice question, you have a 25% chance.   If you leave the question blank, you have a 0% chance.

9. For multiple choice questions, thoughtfully consider and eliminate each option before selecting the correct answer.

10. Responses which do not allow for exceptions are generally wrong.  Absolute terms like all, always, not, never, and only indicate no exceptions. Safer choices are words like sometimes, occasionally, normally, usually, probably, likely, or rarely which do allow for some exceptions.

11. The correct response will agree in gender, number, and person with the question stem, and will otherwise be grammatically consistent with the question stem.

12. Keep in mind the larger meaning of a question.  Do not pick an answer that refers to only a narrow portion of the question.

13. Your answer should be based on information provided.  Do not make unwarranted assumptions in selecting your answers.

14. Periodically during the test, double check to make sure that you have been filling in the correct answer columns.  Just imagine what can happen if you get one column off track for fifty (50) questions!

15. Finally, review your responses.  Double check to make sure you have answered all questions.

# ORAL EXAMINATION PREPARATION

The oral examination is your opportunity to demonstrate you are well suited for the position of Firefighter Recruit. The purpose of the oral exam is to appraise training, experience, interest, and personal fitness for the position. The oral exam will consist of a panel charged with rating specific areas, such as, but not limited to, decision-making, interpersonal skills, and ability to understand and follow oral and written directions.

The following information is provided to assist the candidate in preparation for the oral examination.

***How long will the oral examination last?*** Most oral examinations last between 15 and 30 minutes, depending upon the type of position being tested.

***Who will interview me?*** A representative from the Personnel Department and raters selected from public and/or private agencies. All oral board panel members are experienced and knowledgeable about the position of Firefighter.

***How can I prepare for my oral exam?*** First, carefully read the essential functions section of the job bulletin. This will tell you what the job of a Firefighter Recruit includes. You may wish to visit a fire station and/or speak to a Firefighter with the Kern County Fire Department to get a better understanding of the position. Utilize the Fire Recruit Assistance Program "Your Path to Becoming a Firefighter" and attend a zoom workshop. Second, prepare questions and practice responding to the questions. A friend or relative can assist you in this regard and provide you with feedback concerning your responses and demeanor during the mock exam. If no one is available to assist you, practice in front of a mirror.

***What are the oral board panel members looking for?*** During most interviews, you can expect raters to assess the following, including Kern County Fire Department Core Values of Leadership, Integrity, and Service.

1. Related education, training, and experience.

2. Interpersonal skills (i.e., the ability to get along with your supervisor, your co-workers, and the public).

3. Judgment (the ability to consider a variety of factors and make sound decisions).

4. Communication (the extent to which an individual expresses oneself, presenting ideas clearly, concisely, and persuasively).

5. Work ethic, (The principle that hard work is intrinsically vitious or worthy of reward).

The raters will ask the same questions of every candidate. Candidates will be ranked based on their overall oral examination score and placed on an eligible list.

***What types of questions can I expect?*** Most oral examinations will consist of variations of the following questions:

1. Describe your education, training, and experience that qualifies you for this position?

2. Why are you interested in this position?

3. What do you think this position consists of?

4. How does this position fit into your career goals?

5. Why are you the best candidate for this position?

You may be asked to make a brief (one-minute) closing statement that summarizes your qualifications for and interest in the position of Firefighter Recruit.

***Are there any subjects I should avoid during the oral exam?*** Yes. Avoid questions about salary at the Personnel Department oral examination. The salary is clearly stated on the job bulletin. Also, do not ask what the position includes. This is also clearly stated on the job bulletin. Both questions show that you have limited interest in the position and have not done your homework, which will reflect negatively on your oral exam score. You may, however, ask how many immediate openings the Fire Department anticipates.

***How many interviews are required to successfully be hired by the Kern County Fire Department?*** At least two. The first is the oral examination to rank and place each candidate on the Firefighter Recruit eligible list. This exam is conducted at the Kern County Personnel Department. The second interview is the "Chief's Interview," which is conducted at the Kern County Fire Department.

***How long will my name remain on the Firefighter Recruit eligible list?*** The eligible list will remain in effect for one year. The Kern County Fire Department, in accordance with Civil Service Rules, may elect to extend the eligible list for an additional year or may hire from an expired eligible list for up to one year.

***What are the guidelines regarding dress and appearance?*** Your goal during the oral exam is to project professionalism, confidence, and the ability to represent the Kern County Fire Department well. Your appearance should reflect these attributes. Hairstyle, clothing, jewelry, and make-up should be conservative and in good taste. Tattoos, scarifications, and piercings should be covered and not visible.

***Additional Guidelines:***

1. Leave your cell phone in your vehicle. Cell phones are not allowed during the examination process.

2. Arrive 5-10 minutes before your scheduled oral exam time. Check in with the receptionist.

3. Shake hands with each rater. Use a firm grip.

4. Remember and use the names of raters during the exam.

5. Do not chew gum during your oral examination.

6. Avoid saying negative things about past supervisors and/or employers.

7. Make eye contact with each rater. Do not look down or away in responding to questions.

8. Listen carefully to each question. Do not start to answer a question unless you understand the question in its entirety. If necessary, ask to have the question repeated.

9. State your answers clearly and concisely. Avoid mumbling and rambling.

Best of luck!

# STUDY GUIDE FOR DATA INTERPRETATION

The ability to read and interpret graphs, charts and tables is an important test-taking skill. What's more, it is one of those skills that can be sharpened by study and drill.

TIPS ON INTERPRETING GRAPHIC MATERIALS

1.  Get a grasp of the data before you start. Check dates, kind of information supplied, units of measure, etc.
2.  Do the easier questions first, those that can be answered by observation alone. Then turn to those questions that require calculating. There are usually some easy questions in each set, and they count just as much as the more difficult ones in determining your score.
3.  Visualize rather than calculate answers wherever possible. When dealing with averages, for example, imagine a line between the highest and lowest readings given in the particular graph or chart. Since the average of any group of numbers must fall somewhere between the highest and lowest points, establishing a visual midpoint can save valuable time.
4.  Use the edge of your answer sheet or your pencil to help you read line and bar graphs or tables more accurately.
5.  Rephrase questions that seem to stump you at first. Change verbal problems into mathematical ones or vice versa to see if you can get a better grasp of the situation.
6.  Work with round numbers where possible. Often questions do not require exact answers and you can arrive at the correct answer faster and more easily by using approximate numbers.
7.  Work with the smallest possible units. It is a waste of time to convert readings to fractional parts of a million and then try to work with the resulting huge numbers. If a table concerns population in millions, for example, calculate as follows:
    2 units + 1 1/2 units = 3 1/2 units.
    If each unit = 2 million, then 3 1/2 x 2 million = 7 million.
8.  Do your figuring as neatly as possible so that you can refer to it if necessary. Calculations from a previous question in the set may save valuable time in answering subsequent questions on the same data.
9.  Make certain that the answer you choose is in the same terms as the question, for example, dollars, millions, tons, miles. Pay particular attention to problems involving percentages. Remember that to change a number to a percentage you must multiply by 100. Thus, .049
    x 100 = 4.9% while .49 x 100 = 49%.
10. Work only with the information stated or implied in the data presented. Attempting to bring outside knowledge to bear in answering a particular question may only lead you astray.

# DATA INTERPRETATION

These exercises are designed to assist you in understanding how to read and interpret tables, graphs and charts as well as read maps and become knowledgeable of directions.

EXAMPLE

FIREFIGHTERS FORCED TO LEAVE DEPARTMENT BECAUSE OF OCCUPATIONAL DISEASES

| Year | Value |
|------|-------|
| 2000 | 465 |
| 2001 | 511 |
| 2002 | 695 |
| 2003 | 702 |
| 2004 | 604 |
| 2005 | 721 |
| 2006 | 673 |
| 2007 | 828 |
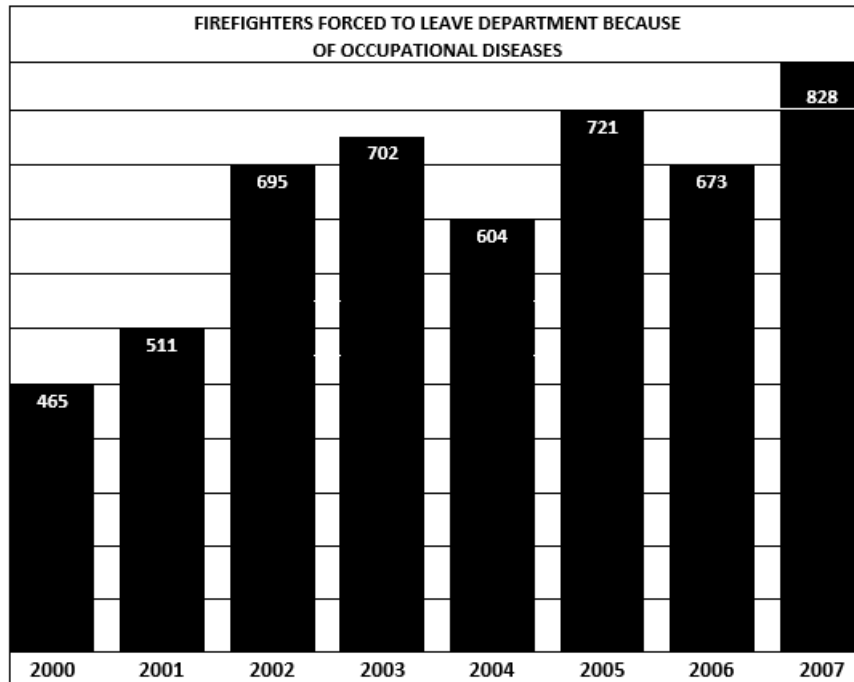
Between 2000 and 2007 how many firefighters were forced to leave the department because of occupational deceases?

     a. 5299
     b. 5199
     c. 5155
     d. 5951

The correct answer is "b"

ADDITIONAL STUDY RESOURCES ARE:

Available on the internet. Google "Firefighter Recruit Trainee Study Guide" "Firefighter Recruit Trainee Practice Test.

| Table1-5B. Estimated Number of Building Fires by Fire Ignition Sequence, 2000 – 2004 | | | | | |
|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 |
| **Heating and Cooking Equipment** | | | | | |
| Defective, misused equipment | 79,600 | 87,800 | 89,400 | 97,500 | 93,300 |
| Chimneys, fuels | 20,300 | 22,400 | 21,800 | 23,900 | 14,000 |
| Hot ashes, coals | 7,200 | 8,000 | 6,800 | 6,500 | 12,600 |
| Combustibles near heaters, stoves | 35,800 | 39,500 | 37,200 | 37,900 | 40,100 |
| Total: | 142,900 | 157,700 | 155,200 | 165,800 | 160,000 |
| **Smoking Related** | 107,200 | 118,400 | 109,700 | 115,200 | 121,600 |
| **Electrical** | | | | | |
| Wiling distribution equipment | 89,500 | 98,800 | 101,600 | '106,700 | 112,200 |
| Motors and appliances | 56,200 | 62,100 | 61,100 | 64,000 | 52,800 |
| Total: | 145,700 | 160,900 | 162,600 | '170,700 | 165,000 |
| **Trash Burning** | 31,100 | 34,400 | 36,000 | 35,200 | 177,000 |
| **Flammable Liquids** | 58,800 | 64,900 | 65,200 | 67,300 | 56,100 |
| **Open Flames, Sparks** | | | | | |
| Sparks, embers | 5,000 | 5,500 | 6,200 | 6,500 | 13,300 |
| Welding, cutting | 8,800 | 9,700 | 8,200 | 9,800 | 11,600 |
| Friction, sparks from machinery | 14,700 | 16,200 | 17,000 | 16,200 | 11,900 |
| Thawing pipes | 5,200 | 5,700 | 5,500 | 5,500 | 5,800 |
| Other open flames | 33,500 | 37,000 | 35,000 | 32,000 | 34,900 |
| Total: | 67,200 | 74,100 | 71,900 | 70,000 | 77,500 |
| **Lightning** | 20,100 | 22,200 | 22,700 | 21,600 | 16,600 |
| **Children and Fire** | 63,800 | 70,400 | 69,200 | 70,800 | 59,600 |
| **Exposure** | 2'1,000 | 23,200 | 25,400 | 25,200 | 44,200 |
| **Incendiary, Suspicious** | 65,300 | 72,100 | 84,200 | 94,300 | 114,400 |
| **Spontaneous Ignition** | 14,200 | 15,700 | '15,100 | 14,900 | 11,000 |
| **Gas Fires, Explosions** | 7,400 | 8,200 | 8,700 | 9,600 | 11,900 |
| **Fireworks, Explosives** | 7,500 | 4,400 | 4,200 | 4,300 | 4,200 |
| **Miscellaneous known Causes** | 77,800 | 3,800 | 65,900 | 70,500 | 91,700 |
| **Unknown Causes** | 162,000 | 166,200 | 154,200 | 150,500 | 159,200 |
| Total Building Fires: | 992,000 | 996,600 | 1,050,200 | 1,085,900 | 'i,270,000 |

DIRECTIONS:   Using the table above, answer the following questions

1.   What is the total number of building fires caused by heating and cooking equipment between 2000 and 2004?

    a. 142,900
    b. 160,000
    c. 718,000
    d. 781,600

2.   In 2002 the fewest number of building fires were caused by:

    a. Trash burning
    b. Fireworks, explosives
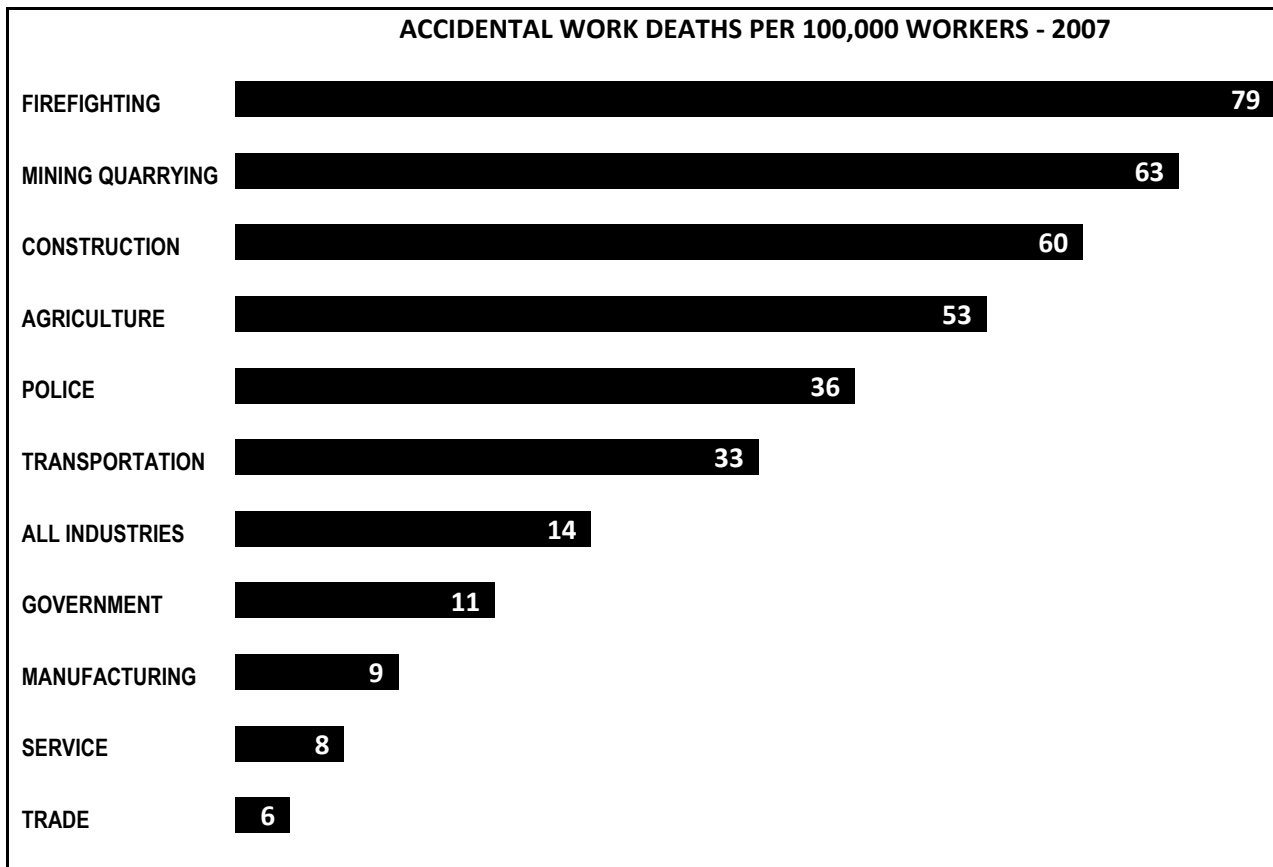    c. Gas fires, explosives
    d. Hot ash, coals

3.	Between 2000 and 2004 there were a total of 5,394,700 building fires.  In which year did the most building fires occur?

	a.  2000
	b.  2002
	c.  2003
	d.  2004

4.	Which kind of open flame and spark fires caused the most building fires between 2000  and 2004?

	a.  other open flames
	b.  sparks, embers
	c.  thawing pipes
	d.  welding, cutting

5.	Between which years was there an increase of 35,700 total building fires?

	a.  2003 and 2004
	b.  2002 and 2003
	c.  2001 and 2004
	d.  2000 and 2001

# INJURIES SUSTAINED BY FIREFIGHTERS

| | | |
|---|---|---|
| Fire Scene | 40,610 | 73.0% |
| Fire Station | 9,502 | 17.0% |
| Training | 1,892 | 3.4% |
| Responding to or Returning From Alarm | 3,202 | 5.7% |
| False Alarm Related | 155 | .3% |
| Harassment | 201 | .4% |

DIRECTIONS:   Using the above table, answer the following questions.

1.    The total number of injuries sustained by firefighters from all causes is:
   a. 55,562
   b. 55,652
   c. 54,222
   d. 57,952

2.    A total of 6% of all injuries occur from:
   a. Training and harassment
   b. Harassment and responding to or returning from alarm
   c. Responding to or returning from alarm and false alarm related
   d. False alarm related and training

3.    Injuries sustained at the fire station, and from training and harassment equal what percent of all injuries sustained?
   a. 20.7
   b. 20.8
   c. 20.6
   d. 20.87

4.    How many more injuries were sustained at the fire scene of fire than were sustained from training?
   a. 39718
   b. 38718
   c. 38781
   d. 38709

**ACCIDENTAL WORK DEATHS PER 100,000 WORKERS - 2007**

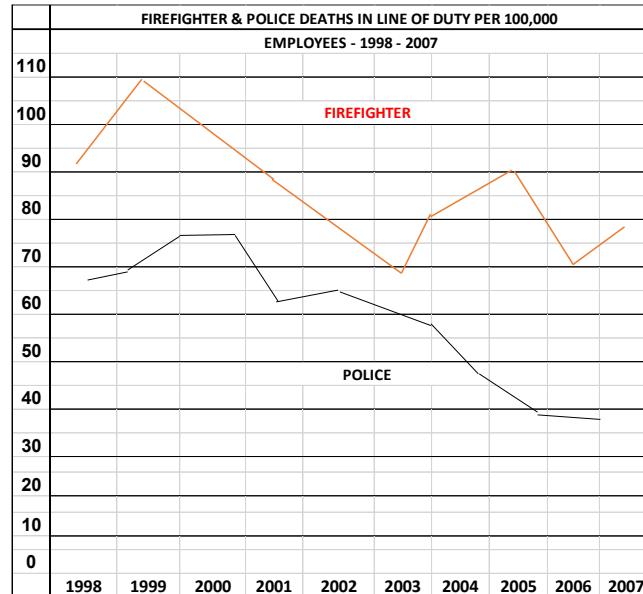| Profession | Deaths |
|---|---|
| FIREFIGHTING | 79 |
| MINING QUARRYING | 63 |
| CONSTRUCTION | 60 |
| AGRICULTURE | 53 |
| POLICE | 36 |
| TRANSPORTATION | 33 |
| ALL INDUSTRIES | 14 |
| GOVERNMENT | 11 |
| MANUFACTURING | 9 |
| SERVICE | 8 |
| TRADE | 6 |

DIRECTIONS: Using the bar graph above, answer the following questions.

1.   While firefighting had the greatest number of accidental work deaths, which profession had the least number of accidental deaths?

   a. Manufacturing
   b. Agriculture
   c. Service
   d. Trade

2.   Which professions combined is the accident work death rate equal to that of firefighting?

   a. Transportation and Police
   b. Trade, Government, Mining-Quarrying
   c. Service, Construction, Government
   d. Construction and all Industries

3.   What is the difference between the number of accidental work deaths for firefighters and the profession with the fourth smallest accidental work death rate?

   a. 68
   b. 69
   c. 67
   d. 66

# FIREFIGHTER AND POLICE DEATHS IN LINE OF DUTY PER 100,000 EMPLOYEES - 1998 to 2007

| FIREFIGHTER & POLICE DEATHS IN LINE OF DUTY PER 100,000 EMPLOYEES - 1998 - 2007 |
|---|

FIREFIGHTER

POLICE

1998 1999 2000 2001 2002 2003 2004 2005 2006 2007

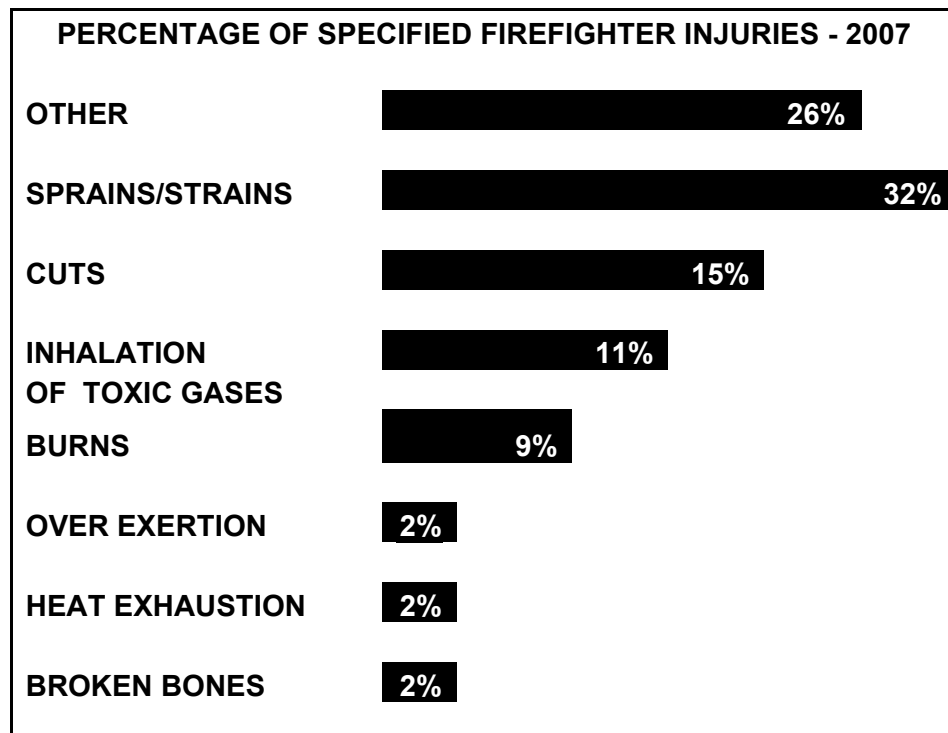DIRECTIONS: Using the graph above, answer the following questions.

1.        How many firefighter fatalities occurred from on-the-job accidents in 2007?
        a. 80
        b. 79
        c. 70
        d. 69

2.        In which year did the fewest number of firefighter fatalities occur?
        a. 2006
        b. 2000
        c. 2003
        d. 2007

3.        In which year did the most firefighter fatalities occur?
        a. 2000
        b. 2005
        c. 1998
        d. 1999

4.        Between 2005 and 2006 the number of fatalities decreased by:
        a. 19
        b  21
        c. 30
        d. 20

Table. 1-5A Factors Responsible for Fire Spread Involving Property Damage of $250,000 or More to Buildings

| | | Public Assembly & Office Facilities | Mercantile Facilities | Industrial Facilities | Manufacturing Facilities | Storage Faculties |
|---|---|---|---|---|---|---|
| **A** | **Principal Structural Defects Influencing Fire Spread** | | | | | |
| 1 | Stairways and elevators not enclosed by walls or partitions | 27 | 9 | 4 | 4 | 3 |
| 2 | Nonfire topped walls | 14 | 8 | | 4 | 4 |
| | **Horizontal Spread** | | | | | |
| 1 | Nonfire stopped areas including floors and concealed spaces above or below floors & ceilings | 73 | 60 | 3 | 51 | 53 |
| 2 | Interior wall openings unprotected | 8 | 6 | 2 | 10 | 5 |
| 3 | Exterior Finish | 4 | 1 | 2 | 7 | 15 |
| | **Combustible Framing/Finishing** | | | | | |
| 1 | Structure or Framing | 62 | 41 | 7 | 56 | 58 |
| 2 | Ceilings, walls, floors | 8 | 6 | 1 | 2 | 4 |
| **B** | **Contents Features Influencing Fire Spread** | | | | | |
| 1 | Products in Storage | 3 | 19 | | 24 | 53 |
| 2 | Flammable Liquids, gas not properly contained | 3 | 3 | | 12 | 9 |
| **C** | **Principal Fire Protection Defects Influencing Fire Spread Automatic Sprinkler Performance** | | | | | |
| 1 | Extinguished/Controlled Fire | 4 | 3 | 2 | 17 | 9 |
| 2 | Did not control/extinguish fire | 12 | 4 | 2 | 27 | 34 |
| 3 | Standpipe/hand extinguisher helped control fire | 6 | | 10 | 11 | not reported |
| 4 | Standpipe/hand extinguisher did not help control fire | 22 | 2 | 6 | 10 | not reported |

DIRECTIONS: Using the table above, answer the following questions.

1. Construction deficiencies are major factors in causing large loss fires. In Public Assembly and office facilities, which kind of principal structural defects causes the most fires involving property damage of $250,000 or more?

   a. Stairways and elevators not enclosed by fire walks or partitions
   b. Nonfire stopped areas including floors and concealed spaces above or below floors and ceilings
   c. Nonfire stopped walls
   d. Exterior finish

2. Principal structural defects in the structure or framing of building cause the least number of fires in:

   a. Storage facilities
   b. Manufacturing facilities
   c. Industrial facilities
   d. Mercantile facilities

3. What is the most frequent contents factor contributing to fire spread?

   a. Products in storage
   b. Flammable liquids, gas not properly stored
   c. Poor housekeeping
   d. None of the above

4 In all the facilities named, how many fires were caused by automatic sprinklers that did not control-extinguish the fire?

   a. 72
   b. 81
   c. 98
   d. 89

## PERCENTAGE OF SPECIFIED FIREFIGHTER INJURIES - 2007

| Injury Type | Percentage |
|---|---|
| OTHER | 26% |
| SPRAINS/STRAINS | 32% |
| CUTS | 15% |
| INHALATION OF TOXIC GASES | 11% |
| BURNS | 9% |
| OVER EXERTION | 2% |
| HEAT EXHAUSTION | 2% |
| BROKEN BONES | 2% |

DIRECTIONS:  Using the bar graph above, answer the following questions

1. What is the most common type of injury sustained by firefighters?
   - a. heat exhaustion
   - b. burns
   - c. sprains and strains
   - d. other

2. What percent of firefighter injuries are caused by the least common type of injuries?
   - a. 5%
   - b. 6%
   - c. 2%
   - d. 3%

3. Sprains and strains, cuts and burns are responsible for what percent of firefighter injuries?
   - a. 57%
   - b. 55%
   - c. 53%
   - d. 56%

4. Which three types of injuries account for 35% of all injuries sustained by firefighters?

   - a. burns, over-exertion, and cuts
   - b. burns, cuts, inhalation of toxic gases
   - c. burns, cuts, heat exhaustion
   - d. burns, inhalation of toxic gases, broken bones

# ANSWERS DATA INTERPRETATION
## TABLE 1-5B

TABLE 1-5B
1. d
2. b
3. d
4. a
5. b

GRAPH: INJURIES SUSTAINED BY FIREFIGHTERS
1. a
2. c
3. b
4. b

TABLE: METAL FIRE EXTINGUISHING AGENTS
1. d
2. b
3. c
4. a

GRAPH: ACCIDENTAL WORK DEATHS
1. d
2. c
3. a

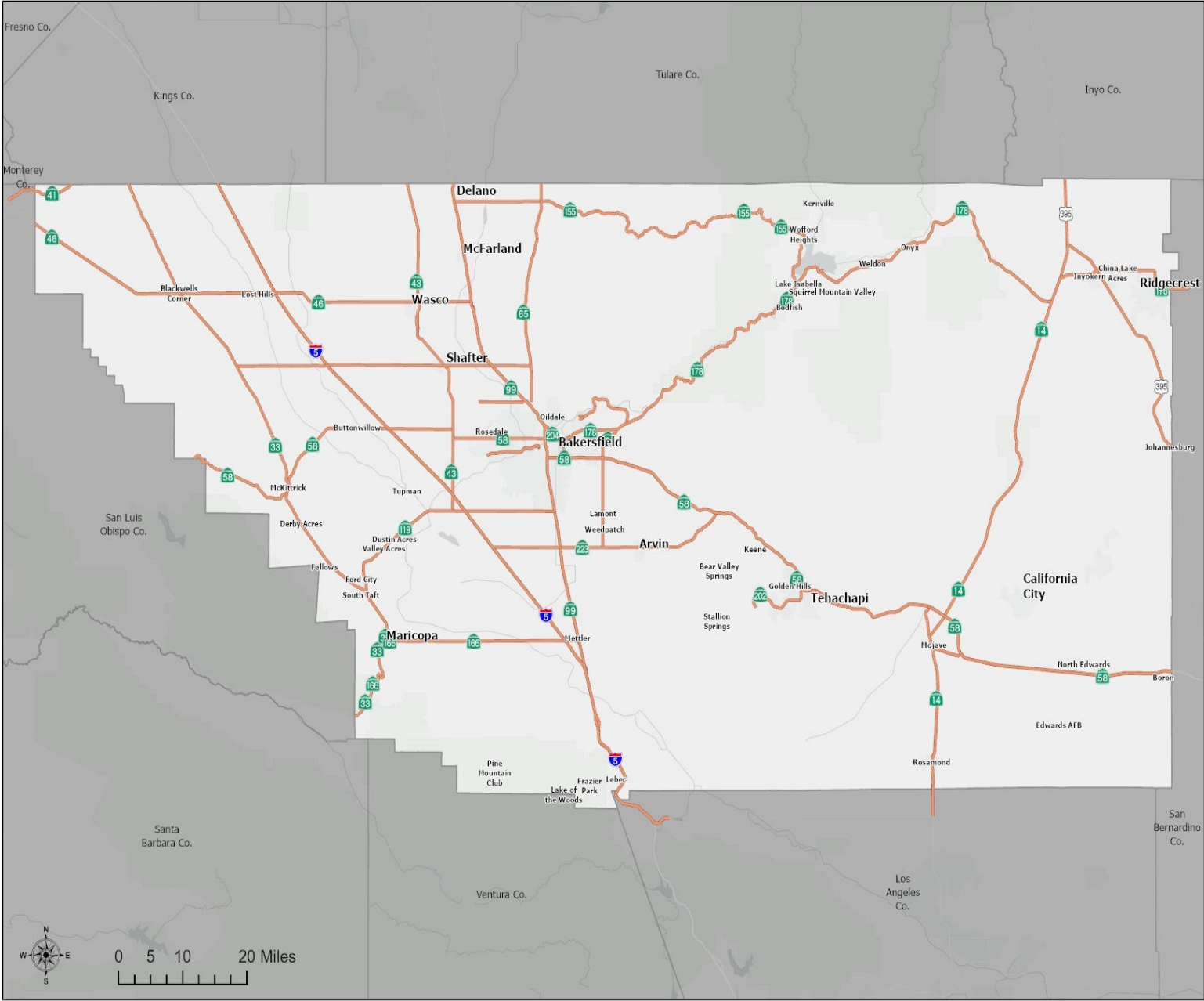GRAPH: FIREFIGHTER AND POLICE DEATHS IN LINE OF DUTY
1. b
2. c
3. a
4. d

TABLE: TABLE 1-5A
1. b
2. c
3. a
4. d

GRAPH: PERCENTAGES OF SPECIFIED FIREFIGHTER INJURIES – 2007
1. c
2. b
3. d
4. b

# KERN COUNTY

# MAP READING

DIRECTIONS: Using the map of Kern County, answer the following questions:

1.      Which main highway would you take to get to Lake Isabella?
        a. US 99
        b. US 178
        c. US 58
        d. US 46

2.      In which part of Kern County is Maricopa?
        a. Northeast
        b. Northwest
        c. Southeast
        d. Southwest

3.      In which part of Kern County is Boron?
        a. Northeast
        b. Northwest
        c. Southeast
        d. Southwest

4.      In which part of Kern County is Lost Hills?
        a. Northeast
        b. Northwest
        c. Southeast
        d. Southwest

5.      In which part of Kern County is Inyokern?
        a. Northeast
        b. Northwest
        c. Southeast
        d. Southwest

6.      Blackwells Corner, Lost Hills and Wasco are located on which highway?
        a. US 58
        b. US 99
        c. US 46
        d. US 43

7.      Which highways would you take to get from Bakersfield to Mojave?
        a. US 58 and US 14
        b. US 14 and US 178
        c. US 99 and US 58
        d. US 99 and US 166

**ANSWER  SHEET**
**MAP  OF  KERN  COUNTY**

Question 1          (b)

Question 2          (d)

Question 3          (c)

Question 4          (b)

Question 5          (a)

Question 6          (c)

Question 7          (a)

# MEASUREMENT

**Length**

| | |
|---|---|
| 12 inches (in) | = 1 foot (ft) |
| 3 feet (ft) | = 1 yard (yd) |
| 5280 feet (ft) | = 1 mile (mi) |
| 1760 yards (yd) | = 1 mile (mi) |

**Time**

| | |
|---|---|
| 60 seconds (sec) | = 1 minute (min) |
| 60 minutes (min) | = 1 hour (hr.) |
| 24 hours (hr.) | = 1 day |
| 7 days | = 1 week |

**Liquid**

| | |
|---|---|
| 3 teaspoons (tsp) | = 1 tablespoon (tbs) |
| 2 cups (c) | = 1 pint (pt) |
| 2 pints (pt) | = 1 quart (qt) |
| 4 quarts (qt) | = 1 gallon (gal) |

**Weight**

| | |
|---|---|
| 16 ounces (oz) | = 1 pound (lb.) |
| 2000 pounds (lb) | = 1 ton |

# METRIC SYSTEM

| Symbol | Prefix |
|---|---|
| k | Kilo |
| H | hecto |
| | |
| d | desi |
| c | centi |
| m | milli |

| Suffix | Symbol |
|---|---|
| meter | m length |
| Liter | l liquid |
| Gram | g weight |

1 liter fills 1 cubic decimeter
1 milliliter fills 1 cubic centimeter

# USEFUL SKILLS FOR WORKING WITH FRACTIONS

**Rules for Divisibility**:

**TWO**:         A number is divisible by 2 if the last digit is an even number that is, 0, 2, 4, 6, or 8.

Examples of numbers divisible by 2:   1406        432            7904            1138        643,342

**THREE**:       A number is divisible by 3 if the sum of its digits is divisible by 3.

Examples of numbers divisible by 3:

    402    4+ 0 + 2 = 6
    960    9 + 6 + 0 = 15
    7014   7 + 0 + 1 + 4 = 12

**FIVE**:        A number is divisible by 5 if the last digit is 5 or 0.

Examples of numbers divisible by 5:    20    4005    2160    10,025    7,400,005

Example: Find the <u>LCM</u> of 60 and 72 (Lowest Common Multiple)

Step 1. Write each number as a product of primes

    60 =  2 x 2 x 3 x 5
          2 | 60
          2 | 30
          3 | 15
               5

    72 =  2 x 2 x 2 x 3 x 3
          2 | 72
          2 | 36
          2 | 18
          3 | 9
               3

**OR**

    $60 = 2^2 \times 3^1 \times 5^1$

    $72 = 2^3 \times 3^3$

Step 2. Write each base prime that appears in number.     2        3        5

Step 3. Attach to each prime the largest exponent that appears on it in either number.

| $2^3$ | $3^3$ | $5^3$ |
|---|---|---|
| From | from | from |
| $2^3$ in 72 | $3^2$ in 72 | $5^1$ in 60 |

Step 4. Multiple to find the LCM.

    $LCM = 2^3 \times 3^2 \times 5^1$

        $= 8 \times 9 \times 5 = 360$

The LCM of 360 is the lowest common denominator for the fractions below. Now you can use this to add these fractions:

$$\frac{1}{60} \quad \times \times \quad \frac{6}{6} \quad = \quad \frac{6}{360}$$

+

$$\frac{5}{72} \quad \times \times \quad \frac{5}{5} \quad = \quad \frac{25}{360}$$

$$\frac{31}{360}$$

# UNIT 1 TEST

<u>Write the numbers in expanded form</u>

1.   74 =          2.   835 =          3.   9,305 =          4.   52,043 =

<u>Find the Sums</u>

| 5. | 43 | 6. | 756 | 7. | 87 | 8. | 627 |
|---|---|---|---|---|---|---|---|
| | 36 | | 493 | | 43 | | 532 |
| | +83 | | +848 | | 97 | | 843 |
| | | | | | +29 | | +386 |

<u>Find the Differences</u>

| 9. | 86 | 10. | 473 | 11. | 887 | 12. | 9,375 |
|---|---|---|---|---|---|---|---|
| | -37 | | -88 | | -348 | | -8,276 |

<u>Find the Product</u>

| 13. | 48 | 14. | 78 | 15. | 538 | 16. | 386 |
|---|---|---|---|---|---|---|---|
| | x 7 | | x 64 | | x 67 | | x 549 |

<u>Find the Quotients</u>

17.   92 ÷ 6 =                    18.   387 ÷ 8 =

19.   3821 ÷ 29 =                 20.   34128 ÷ 74 =

**UNIT 2 TEST**

Write the Prime Factorization of Each Number

1.   15 =           2.  18 =           3.  40 =           4.  48 =           5.  360 =

Find the LCM of the Numbers

6.   9 , 12           7.  15 , 63           8.  54 , 40           9.  8 , 20 , 50           10.  36 , 48 , 30

Reduce Each Fraction to the Lowest Terms

11. $\dfrac{9}{18}$ =           12. $\dfrac{12}{16}$ =           13. $\dfrac{48}{40}$ =           14. $\dfrac{84}{56}$ =           15. $\dfrac{216}{144}$ =

Fill the Missing Numbers

16.   $\dfrac{5}{8}$ = $\dfrac{\_\_}{32}$           17. $\dfrac{2}{9}$ = $\dfrac{\_\_}{72}$           18.   $\dfrac{17}{36}$ = $\dfrac{\_\_}{144}$

19. $\dfrac{5}{56}$ = $\dfrac{\_\_}{280}$           20. $\dfrac{13}{54}$ = $\dfrac{\_\_}{378}$

# UNIT 3 TEST

Express Each Answer in Lowest Terms
Find the Products.

1. $\frac{3}{4}$ x $\frac{5}{7}$ =

2. $\frac{4}{8}$ x $\frac{3}{7}$ =

3. $\frac{4}{9}$ x $\frac{3}{8}$ =

4. $\frac{12}{16}$ x $\frac{30}{27}$ =

5. $\frac{32}{54}$ x $\frac{81}{36}$ =

Find the Quotients

6. $\frac{3}{4}$ x $\frac{5}{7}$ =

7. $\frac{7}{8}$ x $\frac{7}{5}$ =

8. $\dfrac{\frac{4}{9}}{\frac{8}{6}}$ =

9. $\frac{18}{24}$ ÷ $\frac{30}{20}$ =

10. $\dfrac{\frac{32}{56}}{\frac{42}{48}}$ =

Find the Sums

11. $\frac{5}{9}$ + $\frac{2}{9}$ =

12. $\frac{5}{8}$ + $\frac{3}{5}$ =

13. $\frac{7}{15}$ + $\frac{3}{20}$ =

14. $\frac{13}{48}$ + $\frac{11}{36}$ =

15. $\frac{1}{18}$ + $\frac{5}{16}$ + $\frac{7}{24}$ =

Find the Differences

16. $\frac{5}{11}$ - $\frac{2}{11}$ =

17. $\frac{3}{4}$ - $\frac{3}{5}$ =

18. $\frac{11}{18}$ - $\frac{5}{12}$ =

19. $\frac{11}{36}$ - $\frac{7}{24}$ =

20. $\frac{9}{72}$ - $\frac{5}{48}$ =

Express as Improper Fractions

1.  $6\frac{5}{7}$ =

2.  $15\frac{5}{8}$ =

$$\overline{7}$$

$$\overline{8}$$

Express as Mixed Numbers

3.  $\frac{9}{5}$ =

4.  $\frac{315}{24}$ =

Find the Products. (Lowest Terms)

5.  $2\frac{2}{5} \times 4\frac{4}{9}$ =

6.  $7\frac{1}{2} \times 3\frac{1}{5}$ =

7.  $3\frac{3}{5} \times 2\frac{1}{12} \times 1\frac{3}{5}$ =

Find the Quotients (Lowest Terms)

8.  $3\frac{1}{5} \div 5\frac{1}{3}$ =

9.  $7\frac{1}{2} \div 2\frac{1}{4}$ =

10.  $1\frac{5}{16} \div 2\frac{11}{12}$ =

Find the Sums (Lowest Terms)

11.  $5\frac{5}{9}$

$+ 3\frac{7}{9}$ =

_____

12.  $2\frac{1}{3}$

$+ 3\frac{3}{4}$

_____

13.  $5\frac{5}{16}$

$+ 3\frac{7}{24}$

_____

14.  $7\frac{7}{12}$

$+ 3\frac{3}{20}$

$+ 6\frac{2}{15}$ =

_____

Find the Difference (Lowest Terms)

15. $3\frac{5}{8}$

$-2\frac{3}{8}$ =

16. $5\frac{7}{9}$

$-2\frac{2}{3}$ =

17. $52\frac{5}{12}$

$-27\frac{13}{27}$ =

_____        _____        _____

Word Questions

18.  If a water tank is being emptied at a rate of 13 1/3 gallons per minute, how long will it take to pump out 360 gallons of water?

19.  A certain product cost $3 per ½ pound. How much would 2 4/7 pounds of the product cost?

20.  A consumer bought 2 ½ pounds of apples, 3 ¼ pounds of meat, and 5 2/3 pounds of potatoes. What is the total weight of the purchase?

# ANSWER KEY

| | Unit 1 Test | | Unit 2 Test |
|---|---|---|---|
| 1. | $7 \times 10^{1} + 4$ | 1. | $3 \times 5$ |
| 2. | $8 \times 10^{2} + 3 \times 10^{1} + 5$ | 2. | $2 \times 3^{2}$ |
| 3. | $9 \times 10^{3} + 3 \times 10^{2} + 5$ | 3. | $2^{3} \times 5$ |
| 4. | $5 \times 10^{4} + 2 \times 10^{3} + 4 \times 10^{1} + 3$ | 4. | $2^{4} \times 3$ |
| 5. | 162 | 5. | $2^{3} \times 3^{2} \times 5$ |
| 6. | 2,097 | 6. | 36 |
| 7. | 256 | 7. | 315 |
| 8. | 2,388 | 8. | 1,080 |
| 9. | 49 | 9. | 200 |
| 10. | 385 | 10. | 720 |
| 11. | 539 | 11. | 1 / 2 |
| 12. | 1,099 | 12. | 3 / 4 |
| 13. | 336 | 13. | 6 / 5 |
| 14. | 4,992 | 14. | 3 / 2 |
| 15. | 36,046 | 15. | 3 / 2 |
| 16. | 211,914 | 16. | 20 |
| 17. | 15  1 / 3 | 17. | 16 |
| 18. | 48  3 / 8 | 18. | 68 |
| 19. | 131  22 / 29 | 19. | 25 |
| 20. | 461  7 / 37 | 20. | 91 |

# ANSWER KEY

| | Unit 3 Test | | | Unit 4 Test |
|---|---|---|---|---|
| 1. | 15 / 28 | | 1. | 47 / 7 |
| 2. | 3 / 14 | | 2. | 125 / 8 |
| 3. | 1 / 6 | | 3. | 1  4 / 5 |
| 4. | 5 / 6 | | 4. | 13  1 / 8 |
| 5. | 4 / 3 | | 5. | 10  2 / 3 |
| 6. | 21 / 20  or  1 1 / 20 | | 6. | 24 |
| 7. | 5 / 8 | | 7. | 12 |
| 8. | 1 / 3 | | 8. | 3 / 5 |
| 9. | 1 / 2 | | 9. | 3  1 / 3 |
| 10. | 32 / 49 | | 10. | 9 / 20 |
| 11. | 7 / 9 | | 11. | 9 1 / 3 |
| 12. | 49 / 40  or  1 9 / 40 | | 12. | 6  1 /12 |
| 13. | 37 / 60 | | 13. | 8  29 / 48 |
| 14. | 83 / 144 | | 14. | 16  13 / 15 |
| 15. | 95 / 144 | | 15. | 1  1 / 4 |
| 16. | 3 / 11 | | 16. | 3  1 / 9 |
| 17. | 3 / 20 | | 17. | 24  101 / 108 |
| 18. | 7 / 36 | | 18. | 27 minutes |
| 19. | 1 / 72 | | 19. | $15.42 |
| 20. | 1 / 48 | | 20. | 11  5 / 12 pounds |

## Stated Problems

Verbal or word problems occur extensively in mathematics, science, business, and engineering. The aim of this section is to direct you in your understanding of the application of mathematical principles so that you will be able to set up and solve stated problems as they may occur in any field. Hopefully the sections you covered previously have given you something of the foundation necessary to work through these problems.

The following examples illustrate the format solution or word problems. Following these examples there will be a set of sample questions you can use.

**Example 1.**

If one number is 3 more than another number and their sum is 35, what are the numbers?

Let x be the smaller number and  x + 3  the larger number.
Then -

$$\{x \mid x + (x + 3) = 35\} = \{x \mid x + x + 3 = 35\}$$

$$= \{x \mid 2x + 3 + (-3) = (-3)\}$$

$$= \{x \mid 2x = 32\}$$

$$= \{x \mid x = 16\}$$

$$= \{16\}$$

Thus, the numbers are

$$X = 16 \text{ (the smaller number)},$$
$$X + 3 = 19 \text{ (the larger number )}.$$

Check:  $16 + 19 = 35$
$35 = 35$

**Example 2.**

If the length of a garden plot is 12 feet more than its width and the perimeter is 192 feet, what are the dimensions of the garden? {Hint: Remember the perimeter of a rectangle is the sum of twice the length and twice the width.)

Let w be the number of feet in the width and w +  12 be the number of feet in the length. Then, from the formula, we have:

$$2 \{w + 12) + 2 (w) = 192$$
$$2w + 24 + 2w = 192$$
$$4w + 24 + (-24) = 192 + (-24)$$
$$4w = 168$$
$$w = 42 \text{ feet (the width)}$$
$$w + 12 = 54 \text{ feet (the length)}$$

Check:  $2 (54) + 2(42) = 192$
$108 + 84 = 192$
$192 = 192$

**Example 3**

A man buys two pieces of property for which he pays $26,000. If one of them cost $1200 more than the other, what did each cost him?

Let x be the cost of the less expensive property and x + $1200 be the cost of the more expensive property. Then

$$
\begin{aligned}
\text{X} + (\text{x} + \$1200) &= \$26,000 \\
\text{X} + \text{X} + 1200 &= \$26,000 \\
2\text{x} + \$1200 + (-\$1200) &= \$26,000 + (-\$1200) \\
2\text{x} &= \$24,800 \\
\text{X} &= \$12,400 \\
&\qquad \text{(cost of the less expensive property)}, \\
\$1200 + 12,400 &= \$13,600 \\
&\qquad \text{(cost of the more expensive property)}.
\end{aligned}
$$

Check:

$$
\begin{aligned}
\$12,400 + \$13,600 &= \$26,000 \\
\$26,000 &= \$26,000
\end{aligned}
$$

**Example 4**

A purse contains 82 cents in pennies, nickels, and dimes. There are 4 more pennies than nickels and twice as many dimes as nickels. How many of each type of coin are there in the purse?

Let x be the number of nickels, x + 4 be the number of pennies, and 2x be the number of dimes. The value of each, in terms of cents, would be represented as follows:

$$
\begin{aligned}
5\,(\text{x}) &= 5\text{x} && \text{(the value of nickels)}, \\
1\,(\text{x} + 4) &= \text{x} + 4 && \text{(the value of the pennies)} \\
10\,(2\,\text{x}) &= 20\text{x} && \text{(the value of the dimes)}
\end{aligned}
$$

Then

$$
\begin{aligned}
5\,\text{x} + \text{X} + 4 + 20\text{x} &= 82 \\
26\text{x} &= 82 - 4 \\
26\text{x} &= 78 \\
\text{X} &= 3 \text{ (the number of nickels)}
\end{aligned}
$$

Stated problems vary considerably and consequently there is no uniform pattern to follow in completing their solutions. The following suggestions will be helpful in working toward the solution:

1. Read the problems carefully.

2. Learn what facts are given or stated.

3. Determine what is asked for in the problem.

4. Make a statement that some letter will be used to represent the quantity or value to be found.

5. Using that same letter, make statements representing other given facts in the problem.

6. Set up an equation in which the relationship between the unknown and the given facts is expressed.

7. Check the answer found. Observe the answer found and compare it with the facts stated in the problem. Does it appear to be a reasonable answer in terms of the facts stated in the problem?    If so, substitute that value in the original equation to see if it does check.

# SAMPLE QUESTIONS

1. The sum of two numbers is 111. If one of the numbers is 5 less than the other number, what are the two numbers?

2. If twice a certain number is increased by 26, the result is the same as if 2 were added to four times the number. What is the number?

3. A and B sit on opposite ends of a 30-foot seesaw that has a fulcrum 15 feet from either end. A weighs 175 pounds and B weighs 125 pounds. How far from the fulcrum will C, who weighs 125 pounds, have to sit if C and B are to balance A?

4. The length of a rectangle is 8 feet more than its width. If the perimeter of the rectangle is 100 feet, what is its width?

5. The length of a rectangle is 5 inches greater than its width. If the width is doubled and the length remains the same, the perimeter is increased by 8 inches. What were the dimensions of the original rectangle?

6. A man bought an automobile on which the mortgage was $285 more than twice the down payment. If, when the car is paid for, it has cost him $3585, how much was his down payment?

7. An automobile averaged 40 miles per hour for the first three hours of a trip and then increased its speed to average 45 miles per hour for the next two hours. How far did it travel during the five hours?

## ANSWERS

| | | | | |
|---|---|---|---|---|
| 1. | 58, 53 | 5. | 4 in by 9 in |
| 2. | 12 | 6. | $1100 |
| 3. | 6 ft. | 7. | 210 miles |
| 4. | 21 ft. | | |

# IMPROVE READING COMPREHENSION

Many readers are afraid of not understanding what they read quickly. But the old idea that slow readers make up for their slowness by better comprehension of what they read has been proven untrue. Your ability to comprehend what you read will keep pace with your increase in speed. You will absorb as many ideas per page as before and get many more ideas per unit of reading time.

It has been demonstrated that those who read quickly also read best. This is probably due to the fact that heavier concentration is required for rapid reading and concentration is what enables a reader to grasp important ideas contained in the reading material.

GETTING THE MAIN IDEA

A good paragraph generally has one central idea or thought - and that thought is usually· stated in one sentence. That sentence, the topic sentence, is often the first sentence of the paragraph, but it is sometimes buried in the middle, or it can be at the end. Your main task is to locate that sentence and absorb the thought it contains while reading the paragraph. The correct interpretation of the paragraph is based on that thought as it is stated, and not on your personal opinion prejudice, or preference about that thought.

Here are several examples of paragraphs. Read them quickly and see if you can pick out the topic sentence. It is the key sentence. The rest of the paragraph either supports or illustrates it. The answers follow the paragraphs.

## Example #1

Pigeon fanciers are firmly convinced that modern inventions can never replace the carrier pigeon. "A pigeon gets through when everything else fails", they say. In World War II, one pigeon flew twenty miles in twenty minutes to cancel the bombing of a town. Radios may get out of order and telephone lines may get fouled up, but the pigeon is always ready to take off with a message.

(The first sentence is the topic sentence.)

## Example #2

When a piece of paper burns, it is completely changed. The ash that is left behind does not look like the original piece of paper. When dull red rust appears on a piece of tin ware, it is quite different from the gleaming tin. The tarni that forms on silverware is a new substance unlike the silver itself. Anmil tissue is unlike the vegetable substance from which it is made. A change in which the original substance is turned into a different substance is called a chemical change.

(The last sentence is the topic sentence.)

# READING COMPREHENSION
## INTRODUCTION

Readers must be able to read the paragraphs quickly, and still be able to answer questions correctly. The more correct answers you can give the better your score will be. For example, if there are twenty paragraphs and you are able to finish only ten because you read slowly, obviously, you are going to get a score of 50 percent, even if you answer all the questions correctly. On the other hand, if you finish all the paragraphs but can only answer half of the questions correctly, you will still get only 50 percent. Your goal, then, is to build up enough speed to finish all the paragraphs, and at the same time give as many correct answers as possible.

You can upgrade your reading ability - but you must have a plan - a procedure - a method.

Let's start out with the understanding that there are two (2) aspects of success in reading interpretation:

(A) Reading Speed

and

(B) Understanding what you read

These two (2) aspects are not separate. They are totally dependent on each other. You can improve your speed by improving your comprehension - and then your comprehension will improve further because you have improved your speed. What you are improving, therefore, is your speed of comprehension. Your eyes and your mind must work together. As your mind begins to look for ideas rather than words, your eyes will begin to obey your mind. Your eyes will start to skim over words, looking for the ideas your mind is telling them to search for. Good reading is good thinking - and a good thinker will be a good reader. Remember - speed and comprehension work together.

INCREASING READING SPEED

A great many people read very slowly and with little comprehension yet are completely unaware of just how badly they do read. Some people pronounce the words to themselves as they read, saying each word almost as distinctly as though reading aloud; or they think each one separately.

The reason or this is that many people have not gone quite for enough in their "learning to read" process. When you were first taught to read, you learned that if you put letters together, they form words. But there is where many people stop. Reading to them, is reading words. But try reading a sentence out loud saying each word as though it was a separate unit. How does it sound? Pretty meaningless! A more mature reader will put words together to make phrases. And the most mature reader will put phrases together to make ideas. A writer uses words to state ideas - and that is what the reader, a good reader, looks for - those ideas.

# HOW YOUR EYES WORK IN READING

As you learn to read phrases and thoughts, you will find that your eyes are increasing their span. This means that your eyes are seeing several words at a time as you are reading, not just one.

Your eyes work as a camera does. When you want to take a picture, you hold the camera still and snap a shutter. If you move the camera, the picture will blur. When you read, your eyes take pictures of words- and like a camera, when they are "photographing", they are standing still. Each time your eyes "picture" words in a line of print, they stop - and each stop is called a fixation. Watch someone read, and you will see how his eyes make very quick stops across the line. You know he has finished a line when you see his eyes sweep back to the beginning of the next line.

## EYE SPAN AND FIXATION

The more your eyes take in with on fixation, the larger the eye span. And the larger eye span, the fewer stops your eyes will have to make across the line. Thus, you -will be reading faster.

For example, let's divide a sentence the way a slow, word by word reader would:

You/will/find/that/you/can/read/faster/if/you/per/mit/your/eyes/to/see/large/thought/units/.

The reader's eyes have made frequent stops on each line.

This is the way a fast reader would divide that same sentence: You will find that/you can read faster/if/you permit/your eyes to see/large thought/units.

This reader's eyes have stopped only a few times on each line, so of course he will be able to read much faster. Also, reading thought lines will enable him to grasp the meaning more effectively.

## VARYING YOUR READING SPEED

One should adjust his reading speed to what he is reading. Some paragraphs will be easier for you than others, possibly because you are most interested in the subject matter or know something about it. Other paragraphs, particularly those that deal with factual or technical material, may have to be read more slowly.

Flexibility should be employed so that the reader will change his speed from paragraph to· paragraph, even from sentence to sentence, just as a driver would vary his driving speed depending on where he is driving. Some passages are "open highways" while others are crowded "city streets".

## FOR EXAMPLE, READ THE FOLLOWING PASSAGES:

It was a sunny Sunday afternoon in December. Some people were at the movies; some were out walking; and some were at home listening to the radio. Suddenly an announcement was broadcast-and the United States was plunged into war.

On December 7, 1941, the Japanese Air Force attacked Pearl Harbor, destroying battleships, aircraft carriers, planes, and a strategic military base, leaving the United States without the military arsenals needed for anti-aircraft activity and civilian protection.

Which of these paragraphs is the "highway"? Which is the "crowded city street"? Where can you breeze through? Where will you need to slow down to absorb every detail? You're right! The first paragraph is a simple introduction. A glance should suffice. 'The second paragraph is fast-packed, so you will need to slow down.

# FORCE YOURSELF TO FASTER READING

Now that you know the elements that make for faster reading, you must continue to _force yourself to read as quickly as you can. Use a stopwatch to time yourself. You can figure your rate of speed by dividing the number of words on a page into the number of seconds it took you to read it, and then multiplying by 60. This will give you your rate in words-per-minute. Since no one rate of speed is possible for all reading material, your rate will vary. But an average reading speed of 350 words-per-minute should be possible for uncomplicated, interesting, straightforward material. If you are already reading that fast, then try for 500 words-per-minute. You should be able to answer correctly at least 80 percent of the questions following a reading passage.

Practice reading quickly. Move your eyes rapidly across the line of type, skimming it. Don't permit your eyes to stop for individual words. Proceed quickly through the paragraph without backtracking. If you think you don't understand what you are reading, then re-read two or three times - but always read quickly. You will be amazed to discover how much you actually do understand.

### Example #3

A child who stays up too late is often too tired to be successful in school. A child who is allowed to eat anything he wishes may have bad teeth and even suffer from malnutrition. Children who are rude and disorderly often suffer pangs of guilt. Children who are disciplined are happy children. They blossom in an atmosphere where they know exactly what is expected of them. This provides them with a sense of order, a feeling of security.

(the fourth sentence is the topic sentence)

### Example #4

The plane landed at 4 p.m. As the door opened, the crowd burst into a long, noisy demonstration. The waiting mob surged against the police guard lines. Women were screaming. Teenagers were yelling for autographs or souvenirs. The visitor smiled and waved at his fans.

You may also find the main idea is not expressed at all but can only be inferred from the selection as a whole.

The main idea in paragraph #4 is not expressed, but it is clear that some popular hero, movie, or rock star is being welcomed enthusiastically at the airport.

If a selection consists of two or more paragraphs, the correct interpretation is based on the central idea of the entire passage. The ability to grasp the central idea of a passage can be acquired by practice – practice that will also increase the speed with which you read.

# LOGIC & RESEASONING : ANALOGIES

Circle the letter in front of the answer that correctly complete each analogy.

1.  desert: rainforest :_____: ravine

a.  ocean       b. canyon       c. plateau       d. mountain

2.  tasteless : bland : auspicious : _____

a.  foreboding b. favorable      c. trepidation   d. suspicious

3.  sight : eye : _____: fingers

a.  play       b. touch       c. feel   d. move

4.  bird: nest : rabbit: _____

a.  field       b. den       c. carrot       d. burrow

5.  mobile phone : battery : human : _____

a.  food       b. clothing       c. shelter       d. brain

6.  poet : verses: _____

a.  cooper: shoes      b. cobbler : hats      c. novelist : music      d. cartographer : maps

7.  valiant : courage: _____

a.  chipper : melancholy     b. wrathful : boredom     c. tyrannical : power   d. frightened : effrontery

8.  gale : wind: _____

a.  deluge : rain       b. snow : blizzard       c. flood : tidal wave      d. frostbite : cold

# ANSWERS

## LOGIC & REASONING : ANALOGIES

1. D
2. B
3. B
4. D
5. A
6. D
7. C
8. A

# MECHANICAL APTITUDE
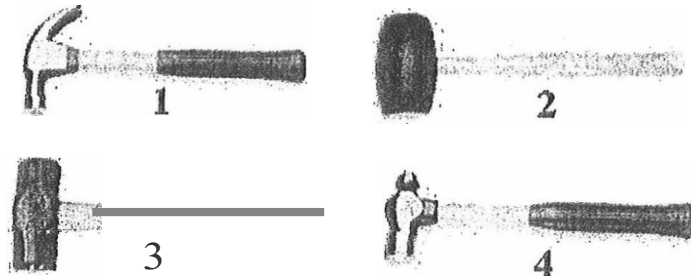


1.  Which hammer is the most suitable tool for general carpentry?

      a.  None      b. 1      c. 2      d. 3      e. 4

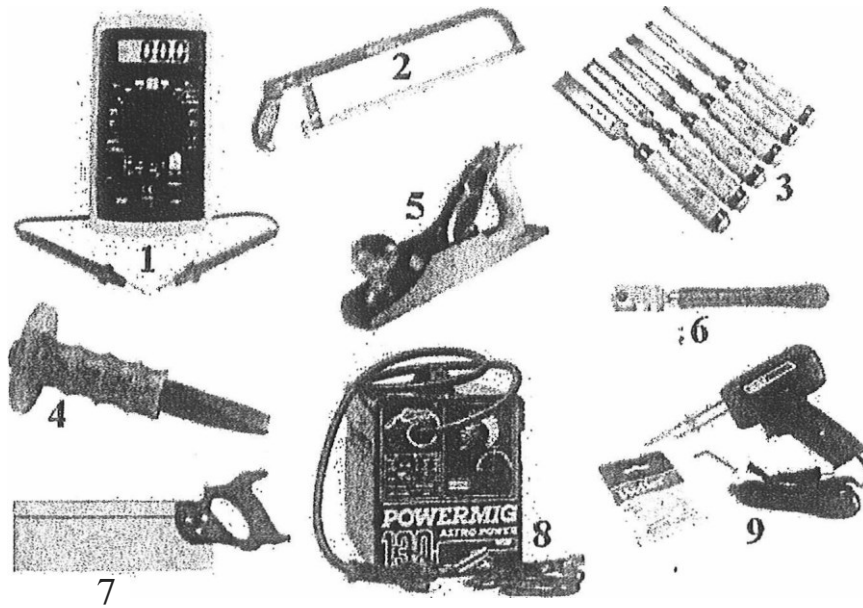2. Which hammer is the most suitable tool for general metalwork?

      a. None      b. 1      c. 2      d. 3      e. 4

3. Which is the most suitable tool for breaking up concrete?

      a. None      b. 1      c. 2      d. 3      e .4

4. Which is the most suitable tool for assembling a friction fit wooden frame?

      a. None      b. 1      c. 2      d. 3      e .4

5. Which tool or combination of tools would be most useful for general woodwork?

a. 4 & 2        b. 3, 5 & 7        c. 2, 4 & 6     d. 4 &7        e. 3 & 6

6. Which tool or combination of tools would be most useful for repairingg a broken radio?

a. 1 & 8        b. 3, 5 & 7        c. 8              d. 1 & 9        e. 3 & 6

7. Which tool or combination of tools would be most useful for working with sheet glass?

a. 4 & 2        b. 6              c. 9              d. 4              e. 3 & 6

8. Which tool or combination of tools would be most useful for auto body repair work?

a. 1 & 8        b. 3, 5 & 7        c. 8              d. 1 &9        e. 3 &6

## ANSWERS TO MECHANICAL APTITUDE

1. B - claw hammer
2. E – ball-peen hammer
3. D – sledge hammer
4. C – rubber mallet
5. B – plane, chisels, and tenon saw
6. D – soldering iron and electrical test meter
7. B – glass cutter
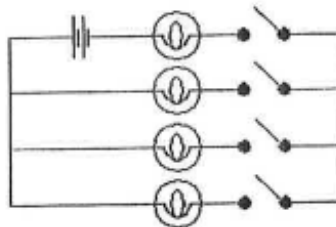8. C – mig welder

## ELECTRICAL CIRCUIT

Electrical
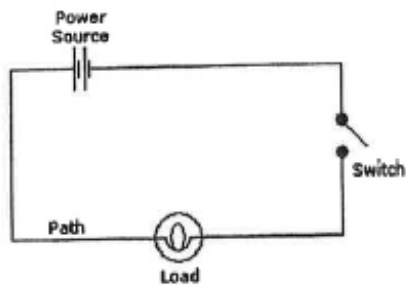


These diagrams are usually restricted to showing the power source, switches, loads (typically bulbs), and the path of the wiring. To answer these questions you need a basic understanding of how electricity flows around a circuit.
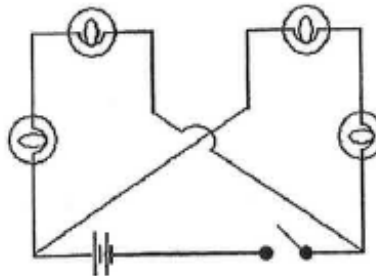
Example questions:

1. How many switches need to be closed to light up one bulb?
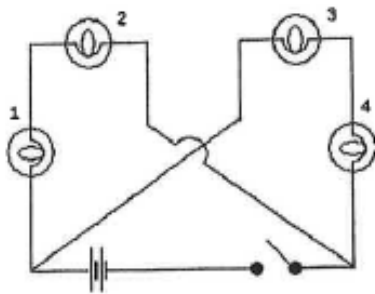


A) 1   B) 2   C) 3   D) 4

2. How many bulbs will light up when the switch is closed?



A) 1   B) 2   C) 3   D) 4

3. If bulb 1 is removed, how many bulbs will light up when the switch is closed?



A) 1    B) 2    C) 3    D) 0

ANSWER KEY – SWITCHES

1. B – Two switches need to be closed to complete a circuit.
2. D – All 4 bulbs will light up.
3. B – Only bulbs 2 and 4 will light up.

The pulleys used in this type of question are made of a grooved wheel and a block which holds it. A rope runs in the groove around the wheel and one end will usually be attached to either: a weight, a fixed object like the ceiling or to another pulley. For the purposes of these questions you can ignore the effect of friction.

Single Pulley

1) Which weight requires the least force to move?

A) A    B) B



A

B
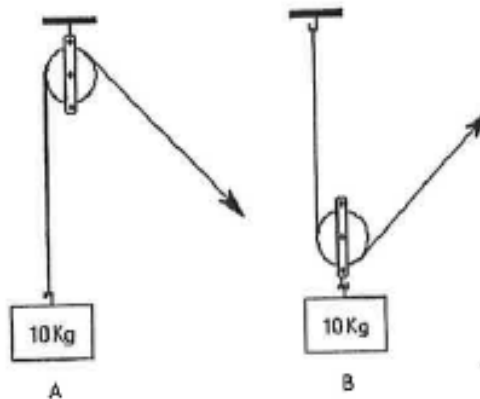
Single pulley questions are relatively straightforward. If the pulley is fixed, then the force required is equal to the weight. If the pulley moves with the weight then the force is equal to half of the weight. Another way of thinking about this is to divide the weight by the number of sections of rope supporting it to obtain the force needed to lift it. In A there is only one section of rope supporting the weight, so 10/1 = 10 Kg required to lift the weight. In B there are two sections of rope supporting the weight, so 10/2 = 5 Kg required to lift it.

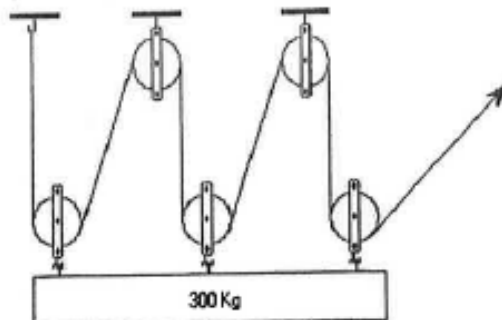Double Pulleys

2) Which weight requires the least force to move?

A) A     B) B

C) Both require the same force

10 Kg

A

10 Kg

B
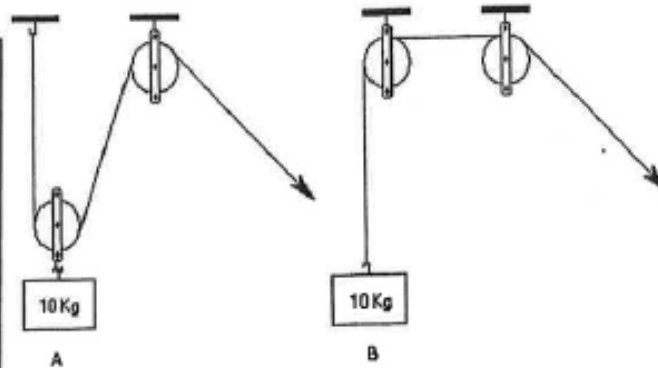
There are two possible ways that two pulleys can be used. Either one pulley can be attached to the weight or neither of them can be.

Using more than 2 Pulleys

3) How much force is required to move the weight?

300 Kg

A) 100kg    B) 150kg    C0 50kg    D) 60kg

ANSWER KEY – PULLEYS

1) B- Weight B requies a force equal to 5 Kg whereas A requires a force equal to 10 Kg.
2) A- Weight A requires a force equal to 5 Kg whereas weight B requires a force equal to 10 Kg. Remember to divide the weight by the number of sections of rope supporting it to get the force needed to lift the weight.
3) C- The weight is 300 Kg and there are 6 sections of rope supporting it. Divide 300 by 6 to get 50 Kg. in all cases, just divide the weight by the number of sections of rope supporting it to get the force needed to lift the weight.

Lever

A lever consists of a bar which pivots at a fixed point known as the fulcrum. In the example shown the fulcrum is at the center of the lever. This lever provides no mechanical advantage and the force needed to lift the weight is equal to the weight itself.

10 Kg

10 Kg

However, if you want to lift a weight that is heavier than the force applied you can move the fulcrum closer to the weight to be lifted. This affects the force required in the following way.

$$w \times d1 = f \times d2$$

Where:
  $w$ = weight
  $d1$ = distance from fulcrum to weight
  $f$ = force needed
  $d2$ = distance from fulcrum to point where force is applied

5 Kg

10 Kg

1 m          2 m
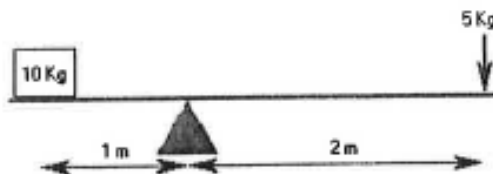
In this example the fulcrum has been moved towards the weight so that the weight is 1 meter from the fulcrum. This means that the force can now be applied 2 meters from the fulcrum.

If you needed to calculate the force needed to lift the weight then you can rearrange the formula.

$w \times d1 = f \times d2$ can be rearranged to $f = (w \times d1)/d2$

$F = (10 \times 1)/2$ (10/2 is the same as 5/1, the force required is 5 Kg)

**1) How much force is required to lift the weight?**

80 lb

? lb

9 ft    12 ft
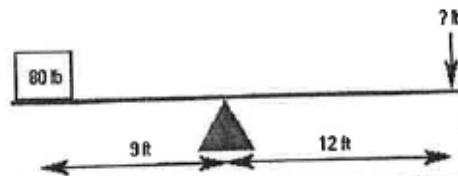
A) 40 lbs    B) 50 lbs    C) 60 lbs    D) 70 lbs

In practice, levers are used to reduce the force needed to move an object, in other words to make the task easier. However, in mechanical aptitude questions it is possible that you will see questions where the fulcrum has been placed closer to the force then the weight. This will mean that a force greater than the weight will be required to lift it.

You may see more complex questions involving levers, where there is more than one weight for example. In this case you need to work out the force required to lift each weight independently and then add them together to get the total force required.

**2) How much force is required to lift the weights?**

10 ft    10 ft

5 ft    ? lb

20 lb    30 lb
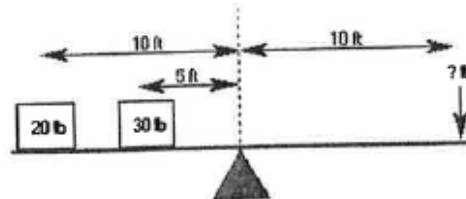
A) 25 lbs    B) 35 lbs    C) 40 lbs    D) 45 lbs

## LEVER

1.  C – 60 lbs. is needed to lift the weight. It can be calculated like this:

$$f= (w \times dl)/d2$$
$$f= (80 \times 9)/12$$
$$f= (720)/12$$
$$f= 60 \text{ lbs.}$$

2. B – 35 lbs. is needed to lift the weight. It can be calculated like this:

$$f= (wl \times dl) + (wla \times d1a)/d2$$
$$f= (20 \times 10) + (30 \times 5)/10$$
$$f= (200 + 150)10$$
$$f = 35 \text{ lbs.}$$

# ENGLISH GRAMMAR

Fill in the blanks with the correct form of the verb.

1. I waited for my friend until he _____.

    a) came  b)  had come     c)  comes     d)  will come

2. He ran as quickly as he _____.

    a)  can        b) could        c) may          d) might

3. He went where he _____ find work.

    a)  will        b) can          c) could        d) shall

4. As he was not there, I _____to his brother.

    a)  speak      b) spoke        c)  was speaking  d)  will not speak

5. He finished first though he _____late.

    a) would start  b) started      c) start          d) starts

6. Just as he _____ the room the clock struck seven.

    a) enter        b) entered      c) will enter    d) enters

7. Answer the first question before you _____ any further.

    a) proceed      b) proceeded  c) will proceed d) would proceed

8. I forgive you since you _____.

    a)  repent      b) repented     c) will repent   d) would repent

9. He _____ because he was in a hurry.

    a)  runs        b) ran          c) run            d) had run

10. He stayed at home because   he _____ feeling ill.

    a)  is          b) was          c) were          d) had

**GRAMMER**

1. came

2. could

3. could

4. spoke

5. started

6. entered

7. proceed

8. repent

9. ran

10. was

# VERBS EXERCISE

Fill in the blanks with the past or past participle form of the verb given in the brackets.

1. The country is _____ by factions. (tear)
2. Once Sydney Smith was asked his name by a servant and found
   to his dismay that he had____ his own name. (forget)
3. You couldn't have _____ a better day for a drive. (choose)
4. The old beggar was _____ by a mad dog. (bite)
5. He _____ the book on the table. (lay)
6. Walking through the jungle he ____ on a snake. (tread)
7. He _____ a hasty retreat on the arrival of a policeman. (beat)
8. You must reap what you have _____. (sow)
9. His voice _____ as he spoke. (shake)
10. His path was not _____ with flowers but he persevered. (strew)
11. The explorers were _____ to death. (freeze)
12. His voice _____ to a whisper. (sink)

# ANSWER KEY
## VERBS EXERCISE

1. torn

2. forgotten

3. chosen

4. bitten

5. laid

6. trod

7. beat

8. sown

9. shook

10. strewn

11. frozen

12. sank

**Notes:**

The past participle form is used after **be** (is / am / are /was / were) and **have** (has / have / had).

The past tense form is used in other cases.

# ADDITIONAL STUDY MATERIALS

The following books are available at some Kem County Library branches on a first come, first serve basis.

Peterson's "Master the Firefighter Exam" 18th Edition
Peterson's "Master the Firefighter Exam" 17th Edition

Kern County Library     https://www.kerncountylibrary.org/
Select Online Resources
Select Gale Peterson's Test and Career Prep (TERC)
Select Access Resource
At the library, you will need to login with your Kern County library account.
From home, you will need your Kern county library card number.

*If you do not have an account, you will need to create one with the Kern County Library

All California Residents are eligible for a FREE Kern County Library card. (Proof of identity and Residency are required.)

However, if you already have a card in Fresno, Coalinga-Huron, Kings, Madera, Mariposa, Merced, Porterville, or Tulare counties, you will not be able to receive a Kern County Library card. Your current Library Card in one of those counties will work here in Kern County, as we are all a part of the San Joaquin Valley Library System.

3/15/2022