EDITORS FOR A DAY ERROR SEARCH

This page of math problems contains many errors. Pretend you are a math editor. Your job is to find and correct the errors. In addition to math errors, there are errors in spelling, grammar, punctuation, and style. Have you already found some errors?

The answers to the problems are given in bold type. Good luck in your error search.

MULTIPLY OR DIVIDE. SIMPLIFY YOUR ANSWERS.

1. \( \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \)  
2. \( \frac{1}{3} \times \frac{3}{5} = \frac{3}{15} \)  
3. \( \frac{3}{4} \times \frac{1}{5} = \frac{4}{15} \)  
4. \( \frac{4}{7} \times \frac{2}{7} = \frac{8}{28} \)

5. \( \frac{2}{3} + \frac{2}{3} = 1 \)  
6. \( \frac{5}{4} \times \frac{3}{4} = \frac{23}{4} \)  
7. \( \frac{2}{3} + \frac{3}{4} = \frac{1}{2} \)  
8. \( \frac{1}{6} + \frac{8}{6} = \frac{1}{64} \)

9. \( \frac{5}{6} + \frac{5}{6} = \frac{1}{6} \)  
10. \( \frac{9}{10} \times \frac{5}{6} = \frac{3}{4} \)  
11. \( \frac{3}{4} + \frac{1}{8} = \frac{1}{6} \)  
12. \( 0 \times \frac{3}{5} = 0 \)

14. \( \frac{4}{3} \times 4 = 5 \frac{1}{3} \)  
15. \( \frac{3}{10} \times \frac{9}{2} = \frac{3}{5} \)  
16. \( \frac{3}{10} + 7 = 2 \frac{1}{10} \)  
17. \( 9 + 18 = 1 \frac{1}{2} \)

SOLVE EACH PROBLEM

17. The length of a track around a football field is \( \frac{1}{4} \) miles. You jog 6 times around the track. How far do you jog? \( 1 \frac{1}{2} \)

18. Arbor School invited boys to try out for its baseball team. Of the 36 boys who tried out, \( \frac{1}{3} \) made the team. How many boys did not make the team? 12 boys

19. Doug ate \( \frac{3}{4} \) of a pie. Then he ate \( \frac{1}{4} \) of what was left left. How much of the pie did he eat? \( \frac{15}{16} \) of the pie

20. Miss Smith’s class is cutting ribbon. How many \( \frac{1}{2} \)-inch strips can be cut from 20 inches of ribbon? 10 strips
EDITOR FOR A DAY ERROR SEARCH*

Teacher’s Notes

- NCTM Standards: Number and Operations
- Common Core State Standards: Number and Operations—Fractions; Make sense of problems and persevere in solving them.
- Mathematical Topics: Multiplication and division of fractions
- Grouping of Students: Work in pairs or independently. You may consider pairing a student whose strong suit is language arts with one whose strong suit is mathematics.

BACKGROUND

Ours is not to reason why; just invert and multiply.
—Rhyme often used to help students remember the algorithm for dividing fractions
(For an explanation as to why we invert and multiply, see the Background notes below.)

Through the error search, this activity lesson reinforces multiplication and division of fractions—while at the same time integrating language arts skills. Key to the purpose of the activity lesson is the notion that being mathematically literate includes the ability to apply language arts skills in a mathematical setting—and that one should not view disciplines as isolated, unrelated subjects.

Students often enjoy playing the role of a teacher, and in particular, correcting errors made by “someone else.” As such, students may become so engrossed in uncovering the errors that they may not be cognizant of the “disguised drill” nature of this activity lesson.

This activity lesson is intended to provide the following benefits to students:
- Reinforce editing and proofreading skills. (Some students may discover that editorial work might be a career that would be of interest to them.)
- Encourage students to think about what they read.
- Help students become more discriminating readers of written problems.
- Provide alternative assessment. Being able to see that something is wrong often only occurs if the basic processes have been understood.

Students often ask, “Why do we invert when we divide, but we don’t invert when we multiply?” It is interesting to note that you can divide fractions without inverting and multiplying, as shown by the examples below. In fact, we can divide fractions by dividing numerators and dividing denominators.

\[
\frac{12}{25} \div \frac{3}{5} = \frac{12 \div 3}{25 \div 5} = \frac{4}{5}
\]

\[
\frac{12}{3} \div \frac{2}{3} = \frac{12 \div 2}{3 \div 3} = \frac{6}{1} = 6
\]

*This activity lesson is based on a “Mathematics Detective” article written by David B. Spangler for the February 2005 issue of Mathematics Teaching in the Middle School, copyright 2005, National Council of Teachers of Mathematics. It is reprinted here by permission of the National Council of Teachers of Mathematics. All rights reserved.
Students can check the results with the standard algorithm to see that the quotients are indeed correct. The examples work nicely because the numerators and denominators of the fractions being divided are divisible by the respective numerators and denominators of the second fractions. Here is what we can do when that is not the case:

Find \( \frac{3}{7} ÷ \frac{2}{3} \).  

\[
\frac{3}{7} ÷ \frac{2}{3} = \frac{3}{7} × \frac{3}{2} = \frac{3}{2} ÷ \frac{2}{7} = \frac{3}{2} \]

To simplify this complex fraction, multiply the numerator and the denominator of the complex fraction by \( \frac{3}{7} \). This does not change the complex fraction's value, since multiplying its numerator and denominator by \( \frac{3}{7} \) has the effect of multiplying by 1. We choose \( \frac{3}{7} \), since \( \frac{3}{7} × \frac{7}{3} \) will give us 1 in the denominator of the complex fraction.

\[
\frac{3}{7} ÷ \frac{2}{3} = \frac{3}{7} × \frac{3}{2} = \frac{3}{2} ÷ \frac{2}{7} = \frac{3}{2} × \frac{3}{7} = \frac{9}{14}
\]

Do you notice something about this result?

As demonstrated by the above, the “invert and multiply” algorithm is really just a shortcut for finding the quotient of two fractions (and it is helpful in avoiding messy computations as shown above). Hence, “invert and multiply” is convenient—but it is not the only way to divide fractions.

For an error-search lesson similar to this one based on multiplication and division facts, see “Editor for a Day” in Math for Real Kids, published by Good Year Books (2005).

**Extension**

In the first sixteen problems of this activity lesson, there are nine wrong answers. Each wrong answer was obtained due to an incorrect computational procedure. Ask your students to try to discover the computational “error pattern” that was used in each of those problems. Possible error patterns are listed below. Other explanations are possible.

1. The answer was not simplified.
2. Cross-products were computed (4 × 1 and 3 × 5), with one cross-product written as the numerator (4) and the other as the denominator (15).
4. The whole number (4) was multiplied by both the numerator (2) and the denominator (7) of the fraction.
6. Instead of multiplying, a procedure for converting a mixed number to an improper fraction was used. The whole number (5) was multiplied by the denominator (7) and placed over the denominator (4).
7. Diagonal numerators and denominators (2 and 4; 3 and 3) were simplified prior to inverting the divisor.
9. The whole number (5) was divided by the numerator (5) of the divisor prior to inverting the divisor.
11. The dividend was inverted instead of the divisor.
15. The two numerators (3 and 9) and the two denominators (10 and 2) were simplified.
16. \( \frac{3}{10} \) was multiplied by 7 instead of being divided by 7. (The divisor, 7, was not inverted.)
**Mathematical Humor**

**Parent:** What did you study in math class today?

**Student:** Fractions.

**Parent:** What did you learn about fractions?

**Student:** A fraction of what I was supposed to.

★★★★★★★★★★★★★★★★★★★★★★

**Question:** Why did the fraction \( \frac{1}{5} \) do poorly on a math quiz?

**Answer:** Because he was *too tense.*

★★★★★★★★★★★★★★★★★★★★★★

A recent newspaper story featured examples of employee complaints in the workforce about customer ignorance. One of the examples came from an employee who works at a hamburger restaurant that displays a sign like this:

- 1/2 lb. Burger
- 1/3 lb. Burger
- 1/4 lb. Burger

The employee has had frequent arguments with customers that are similar to this:

**Customer:** I ordered the “1 slash 4 Burger.” He only ordered the “1 slash 2 Burger.” Why is his burger much bigger than mine? Isn’t 4 larger than 2?

★★★★★★★★★★★★★★★★★★★★★★

The following quote is probably more thought-provoking than it is humorous:

*A man is like a fraction whose numerator is what he is and whose denominator is what he thinks of himself. The larger the denominator, the smaller the fraction.*

—Leo Tolstoy, Russian novelist (1828–1910)
SOLUTIONS
Students should make the corrections directly on the “manuscript” as shown below.

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1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
2. $\frac{1}{3} \times \frac{3}{5} = \frac{3}{15} = \frac{1}{5}$
3. $\frac{3}{4} \times \frac{1}{5} = \frac{3}{20}$
4. $4 \times \frac{2}{7} = \frac{8}{7} = \frac{1}{\frac{1}{7}}$
5. $\frac{2}{3} + \frac{2}{3} = 1$
6. $5 \times \frac{3}{4} = \frac{15}{4} = \frac{3}{1} \frac{3}{4}$
7. $\frac{2}{3} + \frac{3}{4} = \frac{8}{9}$
8. $\frac{1}{8} + 8 = \frac{1}{64}$
9. $5 + \frac{5}{6} = \frac{30}{6} = \frac{5}{6}$
10. $\frac{9}{6} \times \frac{5}{6} = \frac{3}{4}$
11. $\frac{3}{4} + \frac{1}{8} = \frac{7}{8}$
12. $0 \times \frac{3}{5} = 0$
13. $\frac{4}{3} \times 4 = 5 \frac{1}{3}$
14. $\frac{3}{10} \times 2 = \frac{3}{5} \frac{3}{10}$
15. $\frac{3}{10} + \frac{7}{3} = \frac{2\frac{1}{2}}{2}$
16. $\frac{3}{10} - \frac{3}{70}$
17. $9 + 18 = \frac{1}{2}$

SOLVE EACH PROBLEM

17. The length of a track around a football field is $1 \frac{1}{2}$ miles. You jog 6 times around the track. How far do you jog?

18. Arbor School invited boys to try out for its basketball team. Of the 36 boys who tried out, $\frac{1}{3}$ made the team. How many boys did not make their team?

19. Doug ate $\frac{3}{4}$ of a pie. Then he ate $\frac{1}{4}$ of what was left. How much of the pie did he eat?

20. Miss Smith’s class is cutting ribbon. How many $\frac{1}{2}$-inch strips can be cut from 20 inches of ribbon?
Uncovering Humorous Mathematical Blunders

The following mathematical blunders actually took place in the real world. Some are rather humorous in nature. The names of the people and companies guilty of the blunders have been omitted to “protect their identities.”

1. **Museum Docent:** “These dinosaur bones are exactly 70,000,006 years old.”
   **Museum Visitor:** “How do you know that they are exactly that old?”
   **Museum Docent:** “Well, 6 years ago when I got this job, they told me they were 70,000,000 years old. So, 6 + 70,000,000 = 70,000,006.”

   a. Uncover the docent’s mathematical blunder.
      ____________________________________________________________

   b. What should the museum docent have said?
      ____________________________________________________________

2. **Try our new 2-liter size. It contains 50% more than the 1-liter size.**

   a. Uncover the mathematical blunder in this ad.
      ____________________________________________________________

   b. Why do you suppose this is such a common error?
      ____________________________________________________________
3. Basketball Player: “Now that I’m joining the Mavericks, we’re going to turn around the program 360 degrees.”
   a. Uncover the basketball player’s mathematical blunder.
      ____________________________________________________________
   b. What do you think the basketball player meant to say?
      ____________________________________________________________

4. Uncovering Humorous Mathematical Blunders
   Uncover the mathematical blunder in this ad.
      ____________________________________________________________

5. Job Opportunities
   Mathematics Research Assistant
   This is a $\frac{3}{4}$ research and $\frac{1}{3}$ teaching position.

   a. This sign was probably created in jest. What mathematical “blunder” is being illustrated here?
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________

   b. Find the sum of these measurements: 49 mm + 8 cm + 20 m. ________
   c. What did you do in order to find the sum?
      ____________________________________________________________

6. Baseball Player: “With my leg almost healed, I am about three-quarters to 75 percent ready to play.”
   a. Uncover the baseball player’s mathematical blunder.
      ____________________________________________________________
   b. Circle all pairs of numbers below that name the same amount.
      $\frac{1}{2}$ and 50%    $\frac{1}{3}$ and $33\frac{1}{3}$%    $\frac{1}{8}$ and 8%    $\frac{2}{5}$ and 25%
7. **School Board Member A** (commenting on local test results): “Within three years, I expect every child in the district to be above the district median test score.”
   **School Board Member B:** “Well, I guess we’re already halfway toward your goal.”
   a. Uncover the mathematical blunder committed by School Board Member A.

   ________________________________________________________________

   b. Was the comment made by School Board Member B accurate? Explain.

   ________________________________________________________________

8. Item on a multiple-choice test:

   a. The answer given in the answer key for this item was D, 6.17. Uncover the mathematical blunder committed by the writer of this test item.

   ________________________________________________________________

   ________________________________________________________________

   b. How would you rewrite this test item? Include the answer for your test item.

   ________________________________________________________________

9. **Weather Forecaster:** “There’s a 50% chance for rain on Saturday, and a 50% chance for rain on Sunday. Well, I guess we’re certain to have rain this weekend.”
   a. What is the probability for no rain on Saturday?  ___________

   b. What is the probability for no rain on Sunday?  ___________

   c. What is the probability for no rain on both days?

   **Hint:** \( P(\text{no rain on both days}) = P(\text{no rain on Sat.}) \times P(\text{no rain on Sun.}) \)

   ___________

   d. What is the probability that there will be rain on at least one of the two days?

   **Hint:** \( P(\text{rain on at least one day}) = 1 - P(\text{no rain on both days}) \)

   ___________

   e. Describe the weather forecaster’s mathematical blunder.

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________
Uncovering Humorous Mathematical Blunders

Teacher’s Notes

- **NCTM Standards:** Number and Operations; Geometry; Algebra; Data Analysis and Probability
- **Common Core State Standards:** Operations and Algebraic Thinking; Measurement and Data; Attend to precision.
- **Mathematical Topics:** Estimation; finding the percent increase; fraction/percent conversions; addition of fractions; ordering numbers; sum of the degree measures of the central angles of a circle; combining like terms; median; probability of compound events
- **Grouping of Students:** Work in pairs or small groups or individually

Background

Unfortunately, despite years of study and life experience in an environment immersed in quantitative data, many educated adults remain functionally innumerate.


For many years the author has been collecting mathematical blunders such as those in this activity lesson. The author has used such material in his classes, mathematics presentations at conferences, and after-dinner appearances to draw attention to mathematics illiteracy in the real world—and to the ridiculous conclusions that result. Essentially, the use of this material illustrates the fact that the kinds of errors students make in the classroom are often repeated by the same people—as adults—in the real world of work. If students observe how foolish some people appear in the real world due to their mathematical illiteracy, perhaps this will provide some incentive for them to improve their performance as students in the classroom.
**Mathematical Humor**

Sign at a grocery store: “Stock up and Save. Limit 1.”

Sign at grocery store: “Open 24 hours on Labor Day: 9:00 A.M.–9:00 P.M.”

Sign on road leading to tunnel: “When this sign is under water, the tunnel is impassable.”

Baseball player: “We just beat the Braves four games out of three.”

Youngster at restaurant: “Do you give free refills?”

Waitress: “Yes, but you have to pay for them.”

Sign in a subway car: “Illiterate? Write today for free help.”

TV football announcer discussing cleat sizes during a nationally televised game: “Which is more, one-half inch or five-eighths inch?”

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**Solutions**

1. a. The age of the dinosaur bones should be given as an estimate, not as an exact amount.
   
   b. The dinosaur bones are about 70 million years old.

2. a. The new 2-liter size contains 100% more than the 1-liter size.
   
   b. When some people see a 1 and a 2, they think “1 1/2,” or 50%. Others think twice the size means 50%.

3. a. Turning something around 360° gets you back to where you started.
   
   b. The player meant to say 180°. This would result in the opposite effect of the current situation.

4. Since \( \frac{3}{4} + \frac{1}{3} = \frac{13}{12} \), a value greater than 1, this is an impossible situation. The whole cannot be greater than 100%.

5. a. The sign attempts to find a sum of unrelated data involving different units of measure.
   
   b. Students may solve the problem in any of these ways:

      \[
      49 \text{ mm } + 8 \text{ cm } + 20 \text{ m } = 0.049 \text{ m } + 0.08 \text{ m } + 20 \text{ m } , \text{ or } 20.129 \text{ m}
      \]

      \[
      49 \text{ mm } + 8 \text{ cm } + 20 \text{ m } = 4.9 \text{ cm } + 8 \text{ cm } + 2,000 \text{ cm } , \text{ or } 2,012.9 \text{ cm}
      \]

      \[
      49 \text{ mm } + 8 \text{ cm } + 20 \text{ m } = 49 \text{ mm } + 80 \text{ mm } + 20,000 \text{ mm } , \text{ or } 20,129 \text{ mm}
      \]

   c. Convert all measurements so that they are expressed in the same unit.

6. a. The “interval” between three-quarters and 75% is 0. So the baseball player was redundant in saying that he was about three-quarters to 75% ready to play. (Comedian David Letterman once said: “There is a new survey—apparently three out of every four people make up 75% of the population.”)
   
   b. \( \frac{1}{2} \) and 50% name the same amount. Also, \( \frac{1}{3} \) and 33 \( \frac{1}{3} \)% name the same amount.
7a. By definition, 50% of students are above the median and 50% are below the median. So it is impossible for every child in the district to ever be above the district median.

b. Yes. Since, by definition, 50% of the students are above the district median test score, the district is halfway toward the 100% goal of School Board Member B. Unfortunately, the district will remain being halfway toward that goal.

8a. The answer choice “Not here” could potentially be any number—including those that are larger than the largest number in the list, 6.17. The question, “Which is the largest number?” considered together with the answer choice “Not here” might suggest that the question is getting at the fact that there is no largest number. The “correct” answer given by the answer key for this most confusing test item was 6.17.

b. Answers will vary. Answer choice E could be changed to a specific value. Another option is to change the question to “Which is the largest number listed below?”

9a. 0.50
b. 0.50

c. \[ P(\text{no rain on both days}) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \] (or 25%)

d. \[ P(\text{rain on at least on day}) = 1 - P(\text{no rain on both days}) = 1 - \frac{1}{4} = \frac{3}{4} \] (or 75%)

e. The situation involves compound probabilities that need to be multiplied—along with consideration given to the various possible cases (rain on one day but not on the other, and rain on both days). The weather forecaster added the probabilities to conclude that rain was certain over the weekend. This, of course, is incorrect because it was certainly possible for no rain to occur on either day.

**Extension**

Ask students to search for mathematical blunders that may appear in newspapers, magazines, store advertisements, newscasts, and more. Have them present the blunders to the class. Have students suggest ways to fix the blunders.
MAKE NO BONES ABOUT IT

Materials: centimeter tape measure

Forensic science is the study of science as it applies to criminal and civil investigations. When the bones of a victim are discovered at a crime scene, investigators need to determine the victim’s identity. One way to help identify the victim is to use the bones to estimate the victim’s height when he or she was living. Generally, the longest bones in the body are the best ones to use.

The formulas provided in the table below can be used to estimate the height \( H \) of a victim based on the lengths of the femur \( f \), tibia \( t \), humerus \( h \), or radius \( r \). All measurements are given in centimeters.

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H = 69.089 + 2.238 \cdot f )</td>
<td>( H = 61.412 + 2.317 \cdot f )</td>
</tr>
<tr>
<td>( H = 81.688 + 2.392 \cdot t )</td>
<td>( H = 72.572 + 2.533 \cdot t )</td>
</tr>
<tr>
<td>( H = 73.570 + 2.970 \cdot h )</td>
<td>( H = 64.977 + 3.144 \cdot h )</td>
</tr>
<tr>
<td>( H = 80.405 + 3.650 \cdot r )</td>
<td>( H = 73.502 + 3.876 \cdot r )</td>
</tr>
</tbody>
</table>

If the age of the victim is known, an additional calculation needs to be made. In general, after the age of 30, a person’s height decreases at the rate of about 0.06 cm per year. So, for a 45-year-old person, if the above formula suggests that he or she is 154.5 cm tall, you would have to subtract 15 years’ worth of “shrinkage.” This would amount to 15 \( \times \) 0.06, or 0.9 cm. The bones would suggest that the person currently is 154.5 – 0.9, or 153.6 cm tall. (Note that although the person shrinks, the bones do not.)
**A FORENSIC INVESTIGATION**

As a result of a tragic plane crash, the remains of five unidentified victims are recovered at the crash site. However, eight people who were on the plane are reported missing. Your task, as a forensics investigator, is to do a preliminary matching of each victim's bones to the identity of a missing person. Note that such a matching will only suggest that the bones could be those of the missing person.

**QUESTIONS**

1. Draw a line to match each victim found at the crash site with a reported missing person. Three missing people will not be matched. (When you match victims to missing people, be sure to take the ages of the missing people into account.)

<table>
<thead>
<tr>
<th>Victim Found at Crash Site</th>
<th>Reported Missing Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Includes sex of victim found at crash site and length of one of the bones)</td>
<td>(Includes sex, approximate current height, and current age of missing person)</td>
</tr>
</tbody>
</table>

- **a.** Victim A (female)  
  length of humerus: 32.8 cm  
  Missing Person S  
  female, 183 cm tall, 24 years old
- **b.** Victim B (male)  
  length of tibia: 43.5 cm  
  Missing Person T  
  female, 168 cm tall, 19 years old
- **c.** Victim C (female)  
  length of femur: 40.1 cm  
  Missing Person U  
  male, 177 cm, 25 years old
- **d.** Victim D (male)  
  length of femur: 46.5 cm  
  Missing Person V  
  female, 153 cm tall, 55 years old
- **e.** Victim E (female)  
  length of radius: 26.5 cm  
  Missing Person W  
  male, 171 cm, 70 years old
  Missing Person X  
  female, 176 cm, 20 years old
  Missing Person Y  
  female, 155 cm, 55 years old
  Missing Person Z  
  male, 186 cm, 28 years old
2. Use a centimeter tape measure to measure your height to the nearest millimeter. Then use the appropriate formula on page 139 and solve for \( f, t, h, \) or \( r \) to estimate the length of each of these bones in your body to the nearest tenth of a centimeter.

   a. femur ____________  b. tibia ____________  
   c. humerus __________  d. radius ____________

**EXTENSION**

**STOPPING DISTANCE OF A CAR—SOMETHING YOU AUTO KNOW!**

Al Lert is traveling in his car at 55 mi/h. All of a sudden he sees an accident ahead of him—so he slams on his brakes. Al is an alert driver, and the road is dry and clear. Still, how far do you think his car traveled from the time he spotted the accident to the time the car skidded to a halt?

The formula below can be used to find the Total Stopping Distance of a car in dry, clear conditions. The stopping distances are much greater in wet, unclear conditions. Trucks require much more stopping distance. Investigators can measure the skid marks left by a car and use a formula such as this to estimate the car’s speed. In the formula, \( s = \) speed in mi/h.

\[
2.2 \cdot s + 0.05 \cdot s^2 = D
\]

1. Use the formula to compute the Total Stopping Distance for each speed.
   
a. 55 mi/h __________  b. 20 mi/h __________  c. 80 mi/h __________  
(For reference, the length of a football field from goal line to goal line is 300 ft.)

2a. About how many times as great is the total stopping distance of a car traveling at 80 mi/h than a car traveling at 20 mi/h? __________

b. How would you describe the relationship between the speed of a car and how long it takes for it to stop?

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
You may want pairs of students to explain to the class how they used the formulas to make the identifications.

The context for this activity lesson is of high interest to many students—especially due to some popular television programs that deal with this subject matter. One is *NUMB3RS*, a CBS program about the mathematical-genius brother of an FBI agent who uses mathematics to help the FBI solve cases. See the following Web site for mathematics activities for grades 7–12 based on this program and written by mathematics teachers: http://www.cbs.com/primetime/numb3rs/ti/activities.shtml.

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**Mathematical Humor**

*Did You Know?* Your funny bone is not a bone. Rather, it is the ulnar nerve located near your humerus. (And there is nothing humorous about it.)

* * * * * * * * * * * * * * * * * *

The following story is adapted from the work of Danish humorist Victor Borge (1909–2000).

A 4-engine airplane is traveling at 480 mi/h on a 3-hour, 1,440-mile trip. All of a sudden the pilot makes an announcement.

**Pilot:** “One of our engines has just given out, but don’t worry. This plane can be safely flown with just 3 engines. Our speed is being reduced to 360 mi/h, so the trip will take about a third longer than expected—about 4 hours in all.”

A few minutes later, the pilot makes another announcement.

**Pilot:** “I regret to inform you that another engine just gave out. But we can safely fly with just 2 engines. We will travel at 240 mi/h, and it will now take twice as long as originally planned, or 6 hours. But don’t worry about anything.”

But then the pilot makes yet another announcement.

**Pilot:** “A third engine has just given out. We’re now safely flying with just 1 engine. We’re traveling at 120 mi/h, and the trip will now take 12 hours.”

An alarmed passenger then whispers to another passenger, “If we have any more trouble, we’re likely to be up here all night!”
**SOLUTIONS**

1a. Victim A—Missing Person T  
b. Victim B—Missing Person Z  
c. Victim C—Missing Person V  
d. Victim D—Missing Person W  
e. Victim E—Missing Person X

2. Answers will vary. Suppose a 14-year-old male student’s height is 162.6 cm. The length of the student’s femur is found as follows, where \( H \) is the student’s height and \( f \) is the length of the student’s femur:

\[
H = 69.089 + 2.238 \cdot f
\]

Replace \( H \) with 162.6.

\[
162.6 = 69.089 + 2.238 \cdot f
\]

Subtract 69.089 from both sides of the equation.

\[
93.511 = 2.238 \cdot f
\]

Divide both sides of the equation by 2.238.

\[
41.8 \approx f
\]

Round to the nearest tenth.

The boy’s femur is about 41.8 cm long.

**EXTENSION**

The Extension addresses the need for drivers and passengers to be cognizant of how the stopping distance of a car greatly increases as the speed of the car increases. The formula used is one of many used by investigators. It should be noted that the formula is a simplification of the variables associated with stopping a car. Factors not addressed by the formula include the condition of brakes, the pressure applied to the brake pedal, the condition and type of tires, the type of surface, the temperature, moisture on the surface, and more.

**ANSWERS:**

1a. 272.25 ft  
b. 64 ft  
c. 496 ft

2a. about 8 times as great

b. Answers will vary. Doubling the speed far more than doubles the stopping distance.

As a further extension, you may want students to estimate the speed of a car based on a car’s skid marks by using the following formula, where \( s \) is the speed of the car in mi/h:

\[
\text{Length of skid marks} = 0.05s^2
\]

For example, suppose a car’s skid marks are measured to be 180 feet long. Using the formula, and dividing both sides of the equation by 0.05, you obtain 3,600 = \( s^2 \). Students could then use any combination of mental math, trial-and-error, and a calculator to determine that the speed was 60 mi/h. Have students compute the speed of a car where the skid marks measure 320 ft in length (80 mi/h).