

**Dick Schaff Math Superbowl XLIII**  
**2016 Junior High School Bomb Exam – Page 1 of 5**

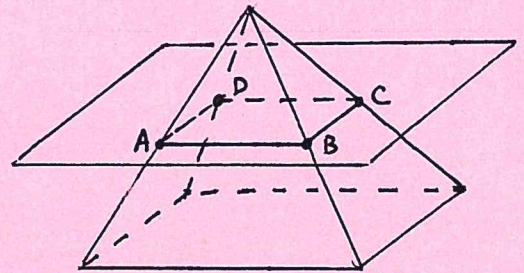
School: \_\_\_\_\_ Team: \_\_\_\_\_

- Directions:** (1) Label all answers with appropriate units.  
(2) Give exact answers: do not round or approximate answers.  
(3) Write student names and fully simplified answers on the lines provided.

1. The price of a share of a company is \$50 before trading opens on Monday. The price of the stock falls 10% on Monday and then rises 10% on Tuesday. What is the price of the stock when trading closes on Tuesday?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

2. A pyramid below has a base in the shape of a rectangle with length 12 cm and width 6.5 cm. The height of the pyramid is 7 cm. A geometric shape  $ABCD$  is formed by intersecting the pyramid with a plane parallel to the base. The distance between the base of the pyramid and the parallel plane is equal to half of the pyramid's height. What is the area of  $ABCD$ ?



Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

3. How many fours are there in the page numbers of a book that starts at page 1 and ends at page 82?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

4. If all multiples of 5 and all multiples of 7 are removed from the list of integers from 1 to 1,000, how many integers remain?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

5. If  $2 \leq a \leq 6$  and  $-12 \leq b \leq 10$ , then what is the largest possible value of the quotient  $\frac{b^2}{a}$ ?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

Dick Schaff Math Superbowl XLIII  
2016 Junior High School Bomb Exam – Page 2 of 5

School: \_\_\_\_\_ Team: \_\_\_\_\_

- Directions:** (1) Label all answers with appropriate units.  
(2) Give exact answers: do not round or approximate answers.  
(3) Write student names and fully simplified answers on the lines provided.

1. You have an unlimited supply of \$1, \$2, and \$5 bills. Using only these bills and not necessarily each type of bill, in how many ways can you form exactly \$10?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

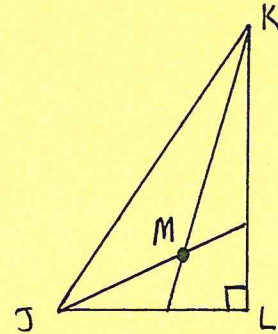
2. Half a pound of flour is poured into a jar. If the flour occupies two-fifths of the jar, what is the maximum number of pounds of flour that could be stored in the jar?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

3. Julianna has some M&Ms. She gives one third of her M&Ms to Jonathan. She then eats four M&Ms, after which she gives one-half of her remaining M&Ms to Emily. If Julianna has 16 M&Ms left, how many M&Ms did she start with?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

4. In the right triangle  $\triangle JKL$ , angle  $\angle KJL$  measures  $60^\circ$ . When drawn, the angle bisectors of  $\angle KJL$  and  $\angle JKL$  intersect at point  $M$ . What is the measure of the obtuse angle  $\angle JMK$ ?



Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

5. The average of 5 consecutive integers is 13. One of the integers is removed and the sum of the remaining integers is 53. What is the value of the integer that was removed?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

**Dick Schaff Math Superbowl XLIII**  
**2016 Junior High School Bomb Exam – Page 3 of 5**

School: \_\_\_\_\_ Team: \_\_\_\_\_

- Directions:** (1) Label all answers with appropriate units.  
(2) Give exact answers: do not round or approximate answers.  
(3) Write student names and fully simplified answers on the lines provided.

1. A box of 48 baseballs contains four different colors of baseballs mixed together. Twelve of each color of baseball are found in the box. You reach into the box without looking, and you pull out baseballs until you have removed five baseballs of one color. What is the smallest number of baseballs that you must take out to guarantee that five baseballs of the same color have been removed?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

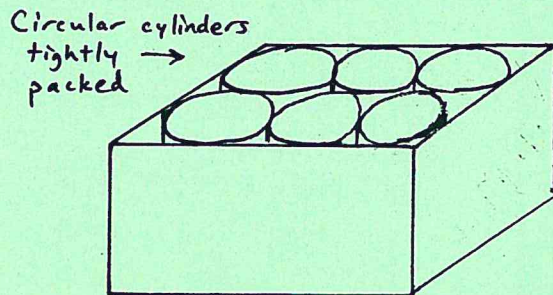
2. A positive integer has the form  $n = 73961a$ , where  $a$  is an unknown digit. If  $n$  divided by 3 has a remainder of 0, and  $n$  divided by 5 has a remainder of 4, what is the value of the unknown digit  $a$ ?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

3. A train is leaving a local station in 11 minutes. You are 1 mile from the station. You can walk at 4 mph and run at 8 mph. How many minutes can you afford to walk before you must run to the station to catch the train?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

4. A company builds cylinders for auto manufacturers. Its Model A cylinder has a radius of 10 cm and height of 16 cm. The company makes a rectangular box that holds six Model A cylinders tightly packed so they cannot move around. If the cylinders fit into the box as shown in the figure, determine the volume of the box.



Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

5. If a hen and a half can lay an egg and a half in a day and a half, how long will three hens take to lay 12 eggs?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

**Dick Schaff Math Superbowl XLIII**  
**2016 Junior High School Bomb Exam – Page 4 of 5**

School: \_\_\_\_\_ Team: \_\_\_\_\_

- Directions:** (1) Label all answers with appropriate units.  
(2) Give exact answers: do not round or approximate answers.  
(3) Write student names and fully simplified answers on the lines provided.

1. If  $r + \frac{1}{r} = 2016 + \frac{1}{2016}$  and  $w + \frac{1}{w} = 2016 + \frac{1}{2016}$ , and if  $r < w$ , what is the value of  $r \times w$ ?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

2. If the radius of a ball is tripled, by what factor does the volume of the ball increase?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

3. Sarah has three ordinary six-sided fair dice in different colors the first die is purple, the second is pink, and the third is yellow. She rolls the three dice. As a fraction, what is the probability that the sum of the numbers facing up on the dice is 16?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

4. The sum of four consecutive even integers is 148. What is the sum of the digits of the smallest of these four integers?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

5. Suzanne can mow a lawn in 3 hours. Cheyenne can mow the same lawn in 5 hours, while Peter can mow the same lawn in 7 hours. If all three people work together, what fraction of the lawn can they mow in one hour?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

**Dick Schaff Math Superbowl XLIII**  
**2016 Junior High School Bomb Exam – Page 5 of 5**

School: \_\_\_\_\_ Team: \_\_\_\_\_

- Directions:** (1) Label all answers with appropriate units.  
(2) Give exact answers: do not round or approximate answers.  
(3) Write student names and fully simplified answers on the lines provided.

1. Compute the product  $\left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{4}\right) \left(1 - \frac{1}{5}\right) \left(1 - \frac{1}{6}\right) \cdots \left(1 - \frac{1}{20}\right)$ .

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

2. What is the largest two digit prime number each of whose digits is also a prime number?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

3. If  $k$  is between 2 and 3, which of the following is the smallest?

$k$        $k - 2$        $k + 3$        $-k$        $6 - k$

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

4. How many three-letter arrangements can be made if the 1<sup>st</sup> and 3<sup>rd</sup> letters each must be one of the 21 consonants, the 2<sup>nd</sup> letter must be a vowel, and no letter can be repeated?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_

5. A full tank of oil weighs 30 ounces, but a half-full tank of oil weighs 18 ounces. What is the weight of the tank when it is empty?

Student Name: \_\_\_\_\_ Answer: \_\_\_\_\_