

THE HARDEST MATH PROBLEM STUDENT CONTEST

Congrats on making it to the final round of the contest! Ready to show off your math and writing skills? You could win a laptop, plus \$5,000 for college!

Find the story problem for your grade on the separate Challenge 2 Question Sheet and provide your answer below.



QUACK!
Entries due
March 1,
2019

My Grade Grade 6 7 8 **My Answer** _____

My Reasoning Explain how you arrived at your answer as if you are writing to someone who does not understand the math. Be clear, detailed, and precise. For more space, continue on additional paper.

CONTACT INFORMATION

Student's Name _____ School Name _____

Grade _____ School Address _____

Teacher's Name _____ City _____

Teacher's Email _____ State _____ Zip Code _____

School Phone _____

NO PURCHASE NECESSARY. Open to grs. 6-8 students who submitted a correct answer to Challenge 1, 50 US, DC, and US territories. Entries must be submitted by the student's teacher, 18+. Entry period: 12:01 a.m. ET on 1/4/19 to 11:59 p.m. ET on 3/1/19. By mail: postmarked by 3/1/19, and rec'd by 3/15/19. Three (3) Grand Prize winning students, one from each of sixth, seventh, and eighth grades, will each receive a laptop computer with Microsoft Office Home and Student Office products (ARV \$550) and a \$5,000 contribution to a 529 plan (a college savings account) (ARV \$5,000). The three teachers who submitted the entries of the Grand-Prize Winners will each receive a \$500 gift card for classroom use (ARV \$500). Three (3) Runner-Up winning students, one from each of sixth, seventh, and eighth grades, will each receive a tablet computer, not including a data plan (ARV \$125). Official Rules: scholastic.com/hardestmathcontest/rules. Void where prohibited.

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"One more day!" Sonia thought, stretching after a run. Her smartwatch had shown she'd steadily improved in her triathlon training. (A triathlon is like a marathon with three parts: swimming, biking, and running.)

The sprint triathlon in which she is competing consists of a 750-meter swim, a 20-kilometer bike, and a 5-kilometer run. In her most recent training, Sonia finished the swim in 13 minutes and 45

seconds, the bike ride in 45 minutes, and the run in 19 minutes, each at its own consistent speed.

The next morning, Sonia arrived at the triathlon to find the organizers in a bit of a disarray. "What's going on?!" Baby ducklings were invading the first part of the course. To avoid these cute but ferocious creatures, the organizers set a new starting point farther along the shore, but now the swim consisted of only 425 meters.

GRADE 6



"Hmm...actually this duckling detour is awesome," Sonia thought. She wondered how the change would affect her overall triathlon time. After finishing both her swim and bike ride at her training rate for each, she was amazed to see her overall time. Maybe those ducklings were enough help that she could complete the race at her dream time—if she could manage to speed up her run. **With the duckling detour, she would need to finish her run in _____% of the time of her training run in order to finish the entire race in exactly 70 minutes.** (Give the answer that correctly fills in the blank, rounding to the nearest tenth of a percent.)

GRADE 7

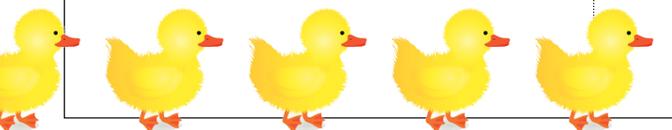


While Sonia dove right into the water after hearing about the duckling detour, her best friend Stephen was very confused and went to get his questions answered by the organizers. He finally jumped into the water 7 minutes and 23 seconds after Sonia. Stephen's training swim time had been 16 min and 15 seconds, his training bike time had taken 40 minutes, and his training run time was 15 minutes. In training, Stephen had always fallen behind Sonia during their swim and caught back up later in the race. **How many meters into the competition will it take before Stephen catches up to Sonia, assuming they both maintain their training times exactly?**

GRADE 8



Sonia's family cheered for her from the side, except for her younger brother, who cheered wildly for the ducklings. Sonia's brother noticed that when the last competitor jumped in, there were five times as many swimmers as ducklings in the lake (no competitors had finished yet). When Sonia finished swimming, she was the 126th person to leave the water (it was a long race to watch, and his phone had died, so all he could do was count...). There were now twice as many ducklings as swimmers, although the number of ducklings in the lake had not changed during the triathlon. **How many swimmers were in the lake when that last competitor jumped in?**



EXAMPLE MATH ARGUMENT

You're craving some really cheesy, crunchy snacks. You're trying to decide between two bags of chips: Cheesy-Os and Super Cheesies. Cheesy-Os are \$4.08 for 12 oz. and Super Cheesies are \$2.45 for 7 oz. One chip weighs about 0.2 oz. **You want to spend as little per ounce of cheesy goodness as possible, so which bag should you buy? In that bag, how many chips will you receive?**

Your argument about the solution has to relate to the real-world problem itself, not just computation.

To solve this problem and find the better deal, I need to compare the price per ounce for each bag. This is a unit rate. A unit rate is a rate that has been simplified to show the amount of something per one single unit of measurement. This one unit of measurement is usually in the denominator position, and when a denominator is 1, it does not need to be shown.

First, I write a ratio of cost/oz. for each bag. Next, I simplify each ratio to find the unit rate. These unit rates will tell me the price for each single ounce of chips.

Include definitions of the key term(s) in your explanation.

Organize and label each part of your work.

CHEESY-OS

The ratio of cost to ounces is \$4.08/12 oz. A fraction is a division problem, so I divide the numerator by the denominator to find the unit rate: .

$$\frac{\$4.08}{12 \text{ oz.}} = \$0.34/\text{oz.}$$

Cheesy-Os cost 34 cents for each ounce.

Show work in detail step by step.

SUPER CHEESIES

The ratio of cost to ounces is \$2.45/7 oz. I divide the fraction to find the unit rate:

$$\frac{\$2.45}{7 \text{ oz.}} = \$0.35/\text{oz.}$$

Super Cheesies cost 35 cents for each ounce.

Looking at both, Cheesy-Os is the better buy!

Now I need to answer the second part of the problem. I must determine how many chips I will receive in the bag. I am told that one chip weighs about 0.2 oz. If the Cheesy-Os are in a 12 oz. bag, then to find the number of chips I have to divide 12 oz. by 0.2 oz.

$$12 \text{ oz.} \div 0.2 \text{ oz.} = 60$$

There will be 60 chips in the 12 oz. bag of Cheesy-Os.

Explain work in words, not just with computation.

Write in complete sentences. Point out your conclusions.

Answer each part of the problem. Your problem could have multistep procedures.