palette of problems

Joel Amidon and Matt Roscoe

1. Joel is making 2 boxes of Cheesy Mac for 6 children. One box of Cheesy Mac provides 2.5 servings. One child is hungry and will eat 3/5 of a box. Two children snacked all afternoon, and each will eat 30% of 1 serving. Two children are toddlers and will eat 3/4 of 1 serving. The final child will eat 60% of what the hungry child will eat. Did Joel make enough?

2. Jim, Tim, and Kim are anglers (people who enjoy fishing). Their fishing boat has a 440-pound weight limit. The average weight of the two lighter anglers is 115 pounds. The average weight of the two heavier anglers is 200 pounds. If the median weight of the anglers is 160 pounds, will they be over or under the boat's weight limit?

3. Find this number: 9 times a two-digit number is 3 greater than 5 times the same number with the digits reversed.

4. What is the 315th letter in the sequence THE IDES OF MARCH THE IDES OF MARCH THE IDES OF MARCH. . . . (Note: Disregard the blank spaces between words.)

5. On January 1, Dakota decides to drink 1 bottle of Costlee Calorick Cola every day of the year. Each day, he drinks 12 ounces. After noticing that he is still thirsty at the end of the day, he switches to drinking 20 ounces each day. At the end of the year, he found that he drank the same amount of cola from 12-ounce bottles as he drank from 20-ounce bottles. Which day did he make the switch? (Note: Assume that there are 365 days in the year.)

6. Montavius can read a book in 6 days. The first day, he reads a lot; every day after that, he reads 1/2 as much as the day before. If the book is 189 pages, how many pages did he read on the first day?

7. The Math Club Pi(e) Challenge is raising awareness of the benefits of solving challenging math problems. If a person is nominated, he or she has 3 days to memorize 10 digits of pi or donate $100 to the local school. After completing the challenge, the nominated person needs to nominate 2 others. If a person is three times as likely to donate $100 than memorize 10 digits of pi, how much money can a school expect on April 30 if 4 people are nominated on April 1?

8. Matt and Joel are taking a 60-mile bike ride in the mountains together. Halfway on the route, Joel crashes his bike. To go back to the start of the trail, they decide to share Matt's bike. Matt will ride the bike first, park it, then finish the route by running. When Joel reaches the bike, he will get on and start riding the rest of the route. They can both ride at 15 mph and run at 6 mph. If Matt and Joel return to the trailhead at the same time, for what portion of the time spent traveling back is the bike being used?

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9. Montana Silversmiths is having a sale, and all merchandise is 50% off. Jenny uses a coupon for 1/2 off any one sale item, and she buys 4 identical bracelets. If she pays \$136.50 for the 4 bracelets, how much does Jenny save by shopping during the sale?

10. A collection of 5 positive integers has a mean of 4.4, a unique mode of 3, and a median of 4. If an 8 is added to the collection, what is the new median of the 6 integers?

11. Jeremy is bored while traveling on a family vacation and uses his stopwatch to time how long it takes to travel between mileposts on the highway. The cruise control is set in the car. It takes 2 minutes 24 seconds for the family car to travel 3 miles. Moving forward at this same constant speed, how far will the car travel in the 8 minutes 24 seconds it takes to drive between 2 towns?

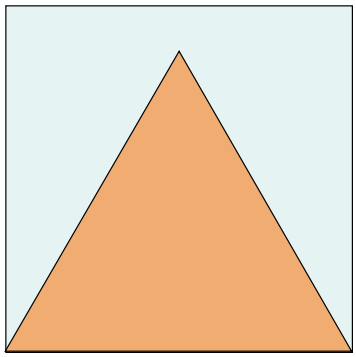
12. Let a, b, c, and d be positive integers. Find the greatest common factor of $16ab^2c$ and $24a^2bc^2$.

13. The measures of the interior angles of a particular triangle are in a 5:6:7 ratio. What is the measure, in degrees, of the smallest interior angle?

14. How many positive integer values of x are solutions to the inequality $10 < -x + 18$?

15. Let $A = 1$, $B = 2$, $C = 3$, . . . , $Z = 26$. The product value of a word is equal to the product of the values of its letters. For example, *BAD* has a product value of $2 \times 1 \times 4 = 8$. What common English word has a product value of 715? (*Source:* MATHCOUNTS)

16. What percentage of a square's area is occupied by an equilateral triangle that is inside the square and sharing a side? The length of the side of the square is 2 units.



(Answers on page 446)

(*Ed. note*. Online solutions are available to NCTM members only.)

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