



palette of problems

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1. The number x is an integer with the property that $x^2 > x^3$. What can you conclude about the value of x ?

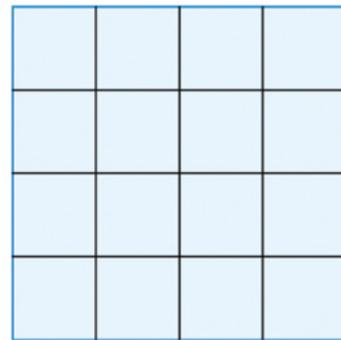
2. True or False: It is possible to create a quadrilateral with exactly 2 right angles.

3. A lake has a population of salmon that doubles in size every day. If the lake is full after 21 days, when was the lake half full?

4. Without doing any written calculations, will 18×0.05 be greater than, less than, or equal to 2?

5. Middletown Middle School offered 3 lunch options on Monday: a chicken sandwich, the salad bar, or a PB&J sandwich (peanut butter and jelly). When students came through the lunch line, 4 students took a PB&J for every 3 students who had the salad bar. For every 2 who chose the salad bar, 1 student got a chicken sandwich. The cafeteria served 48 PB&Js. How many students had school lunch that day?

6. How many squares can you count in the figure below?



7. Danica and Chyron live on the same street, 1 mile away from each other. Danica can walk 1 mile every 15 minutes, and Chyron can walk 1 mile every 20 minutes. If Danica and Chyron leave their houses at the same time and start walking toward one another, will it take them more than or less than 10 minutes to meet?

8. What is the smallest fraction that can be written as a ratio of 2 two-digit numbers using the digits 2, 4, 5, and 9 each exactly once?

9. The number n^2 has a remainder of 4 when divided by 5, and n^3 has a remainder of 2 when divided by 5. What is the remainder when n is divided by 5?

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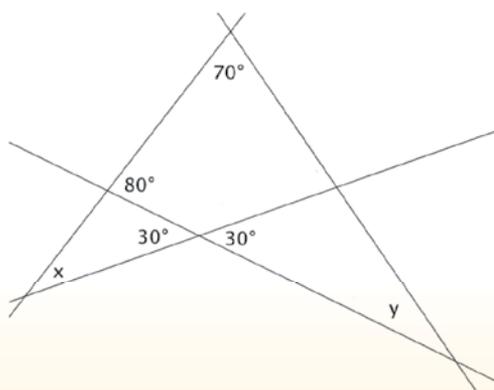
10. If $x/y = 3/4$ and $y/z = 7/5$, is $(x + z)/y$ larger than 1 or smaller than 1?
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11. Exactly 48 tiles, each 1 inch square, fill the inside of a rectangle without overlapping. How small can the perimeter of the rectangle be?
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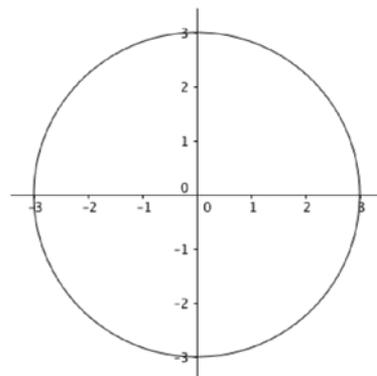
12. Three integers a, b, c are related such that decreasing a by 5, increasing b by 5, or multiplying c by 5 all result in the same integer N . If the product of $a, b,$ and c is 150, what could N be?
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13. Let a & $b = 2a - 3b$. What is the value of $(4 \& 1)$ & $(1 \& 4)$?
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14. Find the value of x and y .



15. A bug starts at $(3, 0)$ and crawls counterclockwise around this circle. It takes the bug 24 seconds to crawl around the circle 1 time. Where is the bug after 5 minutes?
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16. A unit fraction is of the form $1/n$; $1/4$ and $1/5$ are both examples of unit fractions. Show how to write the fraction $4/5$ as the sum of three different unit fractions in two different ways.

(Answers on page 125)



The solutions to the Palette of Problems, found online with this department at <http://www.nctm.org/mtms>, are available to NCTM members only.