

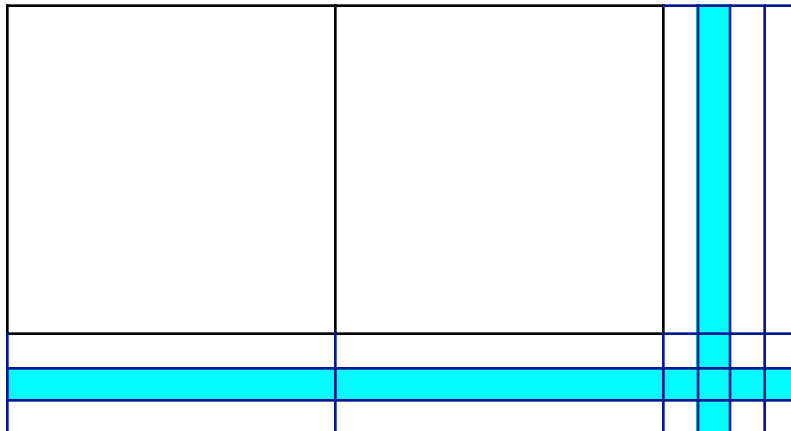
2004 Washington State Math Championship

Unless a particular problem directs otherwise, give an exact answer or one rounded to the nearest thousandth.

Individual Test - Grade 5

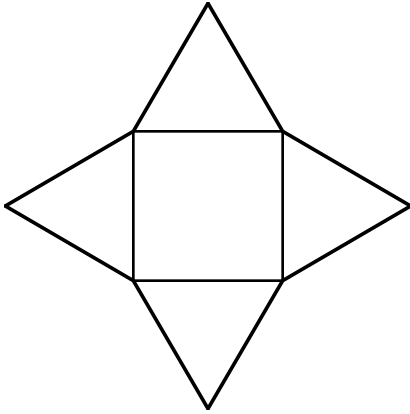
The first 10 problems are multiple choice and will count toward your team score. Answer by putting the appropriate letter in the blank on the answer sheet.

1. The sheet of paper on which this question is printed is approximately ____ meters by ____ centimeters.
a. 2.2, 28 b. 0.22, 2.8 c. 0.22, 28 d. 22, 0.28 e. 2.2, 280
2. The sum of the numbers that are prime factors of 2004 is
a. 172 b. 174 c. 503 d. 505 e. 508
3. What percent of the first 20 positive integers are prime?
a. 30 b. 35 c. 40 d. 45 e. 50
4. Which number is the median of this set : $\{\pi, 3.14, 3\overline{14}, 3.\overline{14}, 3.1416\}$?
a. π b. 3.14 c. $3\overline{14}$ d. $3.\overline{14}$ e. 3.1416
5. If the largest rectangle represents 1.3×2.4 , then what is represented by the shaded area?



- a. 3.6 b. 3.06 c. 0.36 d. 0.306 e. 3.12

6. The figure is composed of only regular polygons. If the area of the square is 36, then what is the perimeter of the entire figure?



- a. 12 b. 24 c. 36 d. 48 e. 72

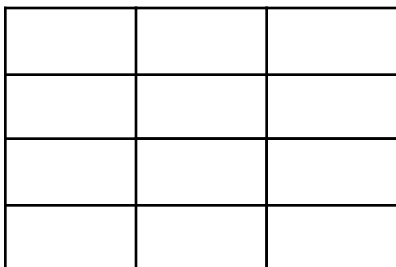
7. If a picture is worth 1000 words, how many words will be needed to replace $16\frac{1}{2}$ words and $20\frac{11}{16}$ pictures?

- a. 37,188 b. 37,187 c. 20,704 d. 20,688 e. 20,687

8. If you add the quotient and the remainder of 20,004 divided by 2004 and interpret this number as a calendar year, how many years ago is this?

- a. 23 b. 24 c. 25 d. 26 e. 27

9. How many rectangles are in this figure?



- a. 12 b. 24 c. 36 d. 48 e. 60

10. On the number line at the right, $-(A \times B) - B$ is approximately

- a. P b. Q c. R d. S e. T

Problems 11-30 will count toward your individual score but not your team score.

11. Chiquita bought 2 pounds of bananas at \$0.77 per pound. If there is no sales tax on food items and she paid with a ten-dollar bill, how much change will she receive?

12. Evaluate: $(5 - 8)^2 - 2 \cdot 6$

13. Led Foote bought gasoline at \$1.73 per gallon the other day. He had \$32.85 in his wallet. How many whole gallons could he buy?

14. How many yards are in 249 inches? (Answer in the form of a reduced mixed number.)

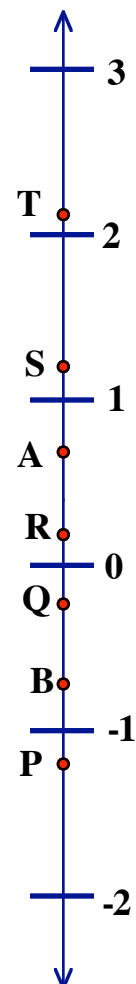
15. Find y if the average of 93, 82, 79, and y is 87.

16. 1 is the smallest number that is both a perfect square and a perfect cube. What is the next smallest number?

17. On a map it is 14 inches from Blaine to Spokane. The actual distance is 383 miles. If the distance from Blaine to Seattle on the map is 5.5 inches, how far is the actual distance? (Round your answer to the nearest hundredth.)

18. For a biology field trip, a few classes are combined to create a group large enough to go. On the trip, the leaders were going to split the students up into 3, 4, or 6 groups of equal size, but they would have ended up with one extra student. Instead, they ended up splitting the students into seven equal-sized groups with no students left over. What is the square root of the smallest possible number of total students?

19. If using a standard 52-card deck, what is the probability of drawing a red card or an ace? (Answer as a reduced fraction.)



20. The population of the United States is about 275 million. If birthdays were spread evenly throughout the year, how many people would have a birthday on March 27 of a leap year? (Round your answer to the nearest person.)
21. There are 4 members on a bobsled team. How many different ways are there to arrange the bobsledders in the bobsled?
22. Goldilocks the goldfish shares an aquarium with other goldfish, turtles, and snails. There are 17 legs, 11 shells, and 38 eyes in the aquarium. How many turtles are in the aquarium? (Snails have two eyes, one shell, and one leg.)
23. Ethan walked 35 miles beginning on Monday morning and finishing Sunday evening. Each day, he walked a half of a mile more than the day before. How many miles did he walk on Saturday?
24. A lobster's age in years is approximately its weight in pounds multiplied by 4, plus 3 years. How much will an 11-year-old lobster weigh in ounces?
25. You unexpectedly find a quarter, a nickel, and 3 pennies in your pocket after forgetting to empty your pockets before the last time you washed your pants. For how many amounts would you be able to make exact change?
26. If $208 = 12 + \frac{3}{4}p$, then what is the value of p ? (Answer to the nearest hundredth.)
27. If the numbers 2, 4, 6, and 8 are used to replace the letters h , i , j , and k , what is the maximum value of the expression? (Answer in the form of a reduced mixed number.)

$$\frac{h + i}{j + k}$$

28. What is 0.001% of 2004?
29. I am the ratio of the fourth power of three to the sixth power of two. In my lowest terms, what number am I? (Write your answer as a fraction.)

30. Simplify $\frac{\frac{2}{3} - \frac{1}{2}}{\frac{1}{6} + \frac{1}{4} + \frac{2}{3}}$

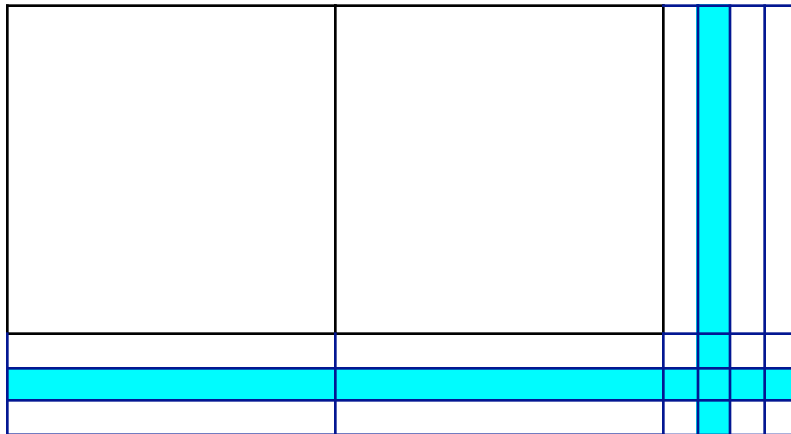
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Individual Test - Grade 6

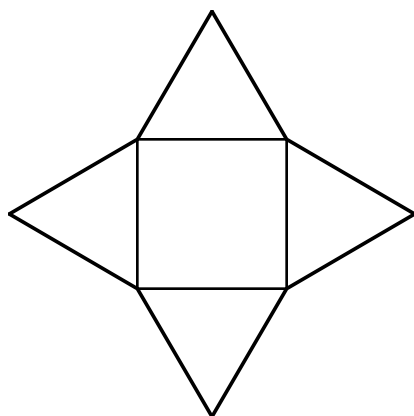
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2. If the largest rectangle represents 1.3×2.4 , then what is represented by the shaded area?

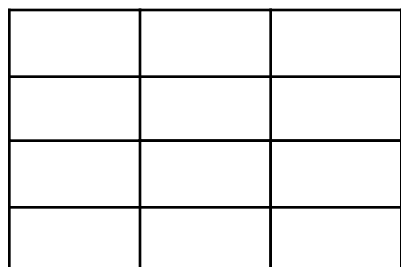


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3. The figure is composed of only regular polygons. If the area of the square is 36, then what is the perimeter of the entire figure?



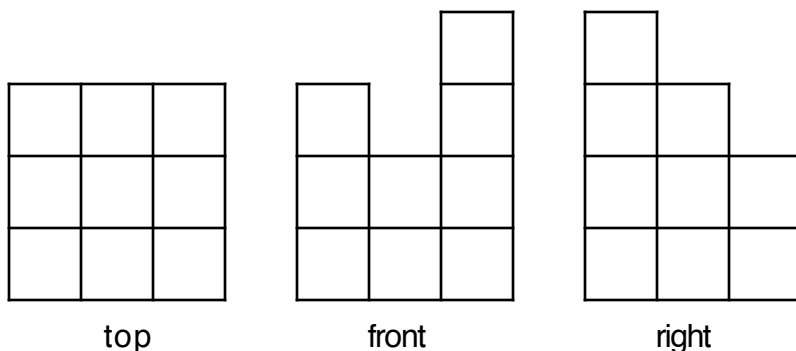
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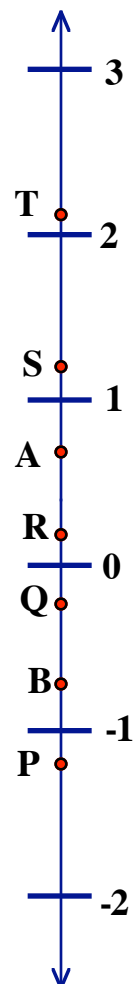
8. Below are three views of the same block structure. In which location is the highest part of the structure?



- a. left front b. right front
- c. left back d. right back e. center
9. What is the remainder when 6^{2004} is divided by 5?
- a. 4 b. 3 c. 2 d. 1 e. 0
10. In the additions shown below P, Q, R, and S represent four different digits. What is the value of Q?

$$\begin{array}{r} P \\ +Q \\ \hline R \end{array} \qquad \begin{array}{r} Q \\ +R \\ \hline SP \end{array}$$

- a. 5 b. 6 c. 7 d. 8 e. 9



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25. Simplify $\frac{\frac{2}{3} - \frac{1}{2}}{\frac{1}{6} + \frac{1}{4} + \frac{2}{3}}$
26. What percent of the first 30 positive integers are prime? (Round your answer to the nearest percent.)
27. The original stack of paper is 6.656 cm tall. A single sheet of paper is 0.026 cm thick. How many doublings of the single sheet will it take to generate a stack as high as the original one?
28. The sum of five consecutive positive integers is 4335. What is the median of the five numbers?
29. The White House fence encloses 18 acres of land. The White House is 168 feet long and 85 feet 6 inches wide. Without taking into account pavement for walking and driving surfaces, how much acreage available for grass is on the White House property? One acre is 43,560 square feet. Give your answers in acres to the nearest hundredth.
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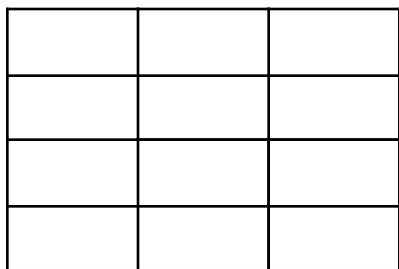
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Individual Test - Grade 7

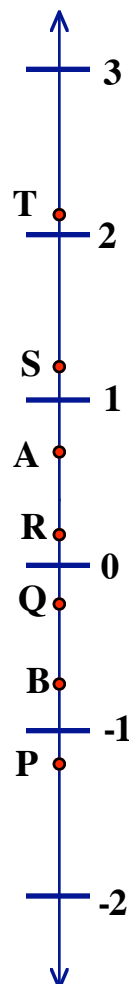
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2. If you add the quotient and the remainder of 20,004 divided by 2004 and interpret this number as a calendar year, how many years ago is this?
 - a. 23 b. 24 c. 25 d. 26 e. 27

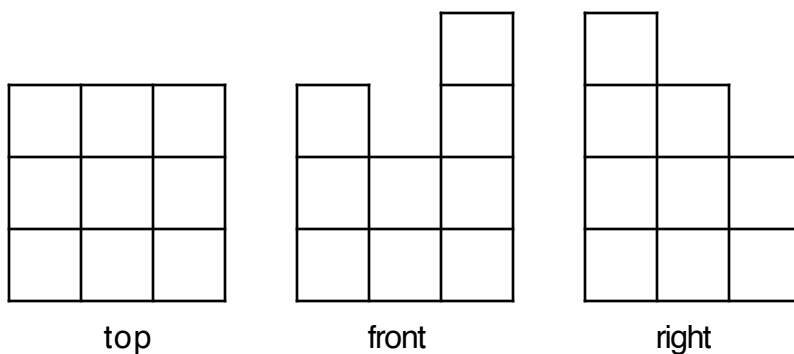
3. How many rectangles are in this figure?



- a. 12 b. 24 c. 36 d. 48 e. 60
4. On the number line at the right, $-(A \times B) - B$ is approximately
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5. Below are three views of the same block structure. In which location is the highest part of the structure?



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6. What is the remainder when 6^{2004} is divided by 5?
- a. 4 b. 3 c. 2 d. 1 e. 0
7. In the additions shown below P, Q, R, and S represent four different digits. What is the value of Q?
- $$\begin{array}{r} P \\ +Q \\ \hline R \end{array} \qquad \begin{array}{r} Q \\ +R \\ \hline SP \end{array}$$
- a. 5 b. 6 c. 7 d. 8 e. 9
8. How many diagonals does a cube have?
- a. 6 b. 12 c. 16 d. 24 e. 28
9. The prime factorization of a number is $2^3 \times 3^2 \times 5$. How many of this number's positive whole number factors are perfect squares?
- a. 4 b. 3 c. 2 d. 1 e. 0
10. Five scores have the same median and mean. The four highest scores are 23, 18, 49, and 22. What is the lowest score?
- a. 4 b. 3 c. 2 d. 0 e. -2

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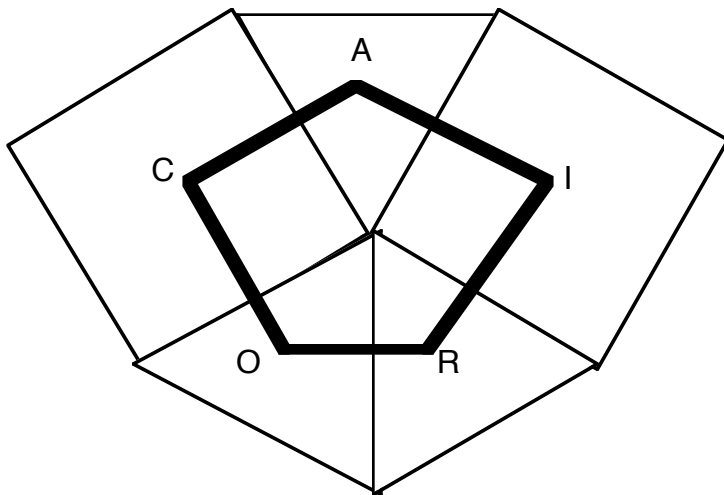
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25. Teddy Roosevelt as well as Woodrow Wilson's wife grazed sheep on the White House lawn. Two acres will support 7 sheep. What is the maximum number of sheep that should be grazed on the White House lawn? (Round your answer to the nearest sheep.)
26. A Cairo pentagon (used to pave many streets and walks in Cairo, Egypt) can be formed by connecting the centers of two squares and three equilateral triangles. What is the supplement to the difference of angles C and A?



27. How many of the smallest triangles are in the 9th figure?

figure 1

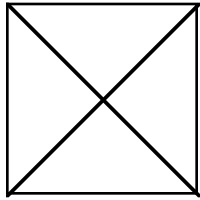


figure 2

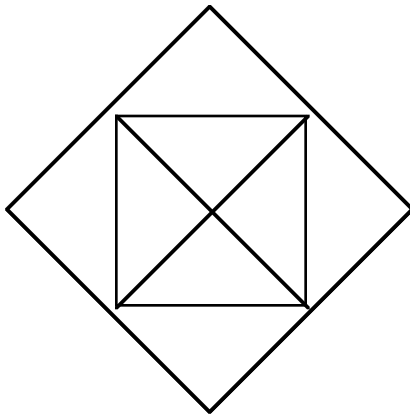
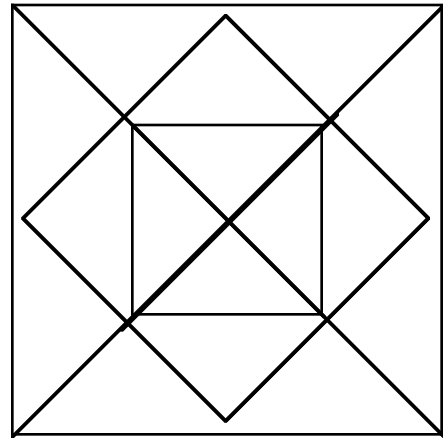


figure 3



27. If $(w,x) \circ (y,z) = (wy^2 + xz^2, xy)$ then find $(1,3) \circ (3,4)$

28. A certain solution is 30% acid. If 50mL of water is added to 100mL of that solution, what percent of the new solution is acid?

29. What is the surface area of a pyramid with a square base 16 cm on a side and a height of 6 cm?

30. A city that has a population of 12,000 triples its population every 4 years. If this trend continues, what will its population be 16 years from now?

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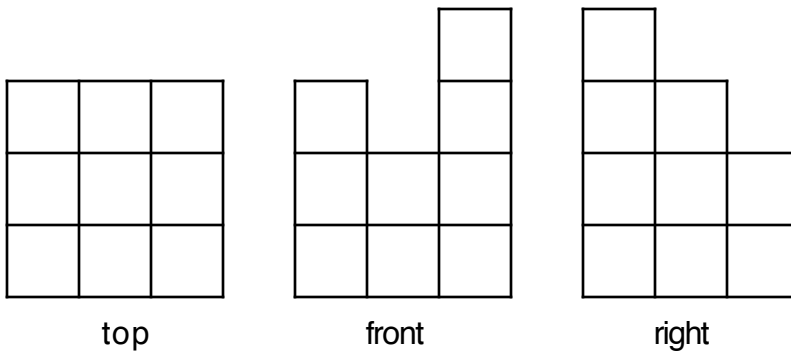
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Individual Test - Grade 8

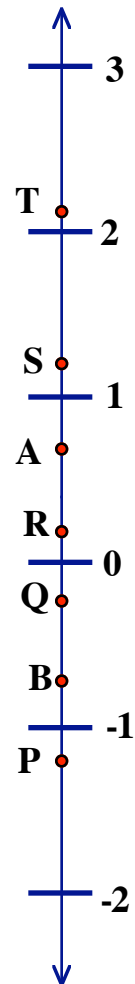
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- a. 4 b. 3 c. 2 d. 1 e. 0
7. Five scores have the same median and mean. The four highest scores are 23, 18, 49, and 22. What is the lowest score?
- a. 4 b. 3 c. 2 d. 0 e. -2
8. Today is March 27, 2004. What month was it 2004 days ago? [Remember that 2004 and 2000 were leap years.]
- a. September b. October c. November
- d. December e. January
9. If the largest possible square is cut from a circle, to the nearest whole percent how much of the original circle is part of the square?
- a. 60 b. 61 c. 62 d. 63 e. 64
10. Four different coins are flipped. How many different possible outcomes are there?
- a. 2 b. 4 c. 8 d. 16 e. 24

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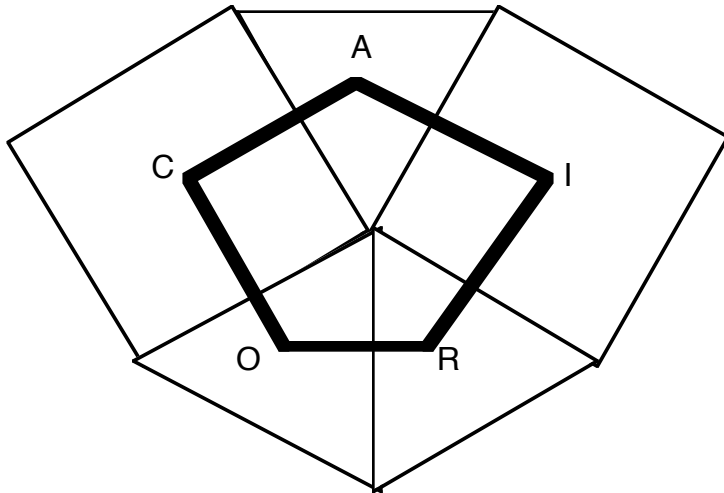
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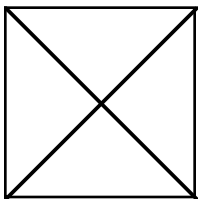


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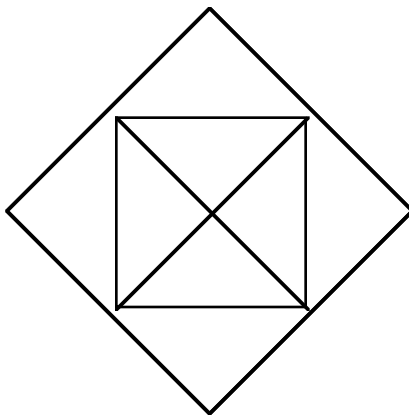
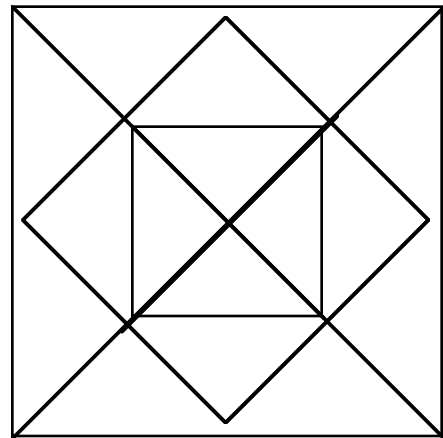


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26. A city that has a population of 12,000 triples its population every 4 years. If this trend continues, what will its population be 16 years from now?
27. Each time Mr. Vaughn doubles the number of his employees, his yearly expenses increase by a factor of three halves. Currently he has two employees and yearly expenses of \$80,000. What will his yearly expenses be if he were to have eight employees?
28. The combined perimeter of 2 different-sized squares is 1560. If the area of the larger square is 144 times the smaller, what is the area of the smaller square?
29. What are the coordinates of the point of intersection of the graphs of $2x - 3y = -21$ and $x = 7 - 2y$?
30. Jeff can trace his family tree back 4 generations. His great-great grandparents had five children. Those five children each had three children. Every member of that generation (Jeff's grandparents') had seven children. Every member of that generation (Jeff's parents') had two children. What is the sum of Jeff's brothers, sisters, and cousins?