

2023 Mini-Mathlete Ciphering Test Solutions and Explanations

1. The problem asks for those who only play basketball or football. Therefore examine each respective side of the venn diagram ignoring the overlap. 17 people play only basketball and 15 people play only football. When considering the total number of people who play only basketball or football you add $17 + 15$ to get 32 people.
2. Make a common denominator of 14 by multiplying $\frac{5}{2}$ by $\frac{7}{7}$ and $\frac{13}{7}$ by $\frac{2}{2}$. This will leave you with $\frac{35}{14} + \frac{26}{14}$, which equals $\frac{61}{14}$
3. Make a fraction of shaded squares over the total number of squares, which gives you $\frac{4}{9}$.
4. First, to get Albert's answer round all numbers ($1.3 + 4.2 + 4.8$) to the nearest whole numbers ($1+4+5$) respectively, and then add them, which equals 10. Then, to get Brian's number, add all decimals (from the original set of numbers) together, which equals 10.3. Finally, round 10.3 to the nearest whole number, to get 10. Therefore the difference between both numbers is 0.
5. 90 degrees makes the polygon a quadrilateral, and because it is a "regular" polygon, all sides must be equal. Therefore, you will have 2 lines of symmetry across the diagonals and 2 lines of symmetry across the center of each side. As a result, the answer is 4.
6. $(A)(B) = 45$ can be factored into $45*1$, $15*3$, or $9*5$. The largest sum of factors multiplying to 45 is 46.
7. Rearrange the function to $5x = -4y + 20$ to isolate the x.
Divide both sides by 5 to get $x = -\frac{4}{5}y + 4$. Recall that finding the x intercept requires plugging in y to be 0. Therefore, the x intercept is 4. An alternate method comes from an understanding of what the x-intercept is, which is the x-value a function has when $y=0$. As a result, you can plug in 0 for y to get $5x=20$. Then divide by 5 and get the x-intercept as 4.
8. There are three main rectangles that, when overlapping, form 9 more rectangles that total to 12 rectangles. The three main ones are the slanted rectangle, the tall vertical rectangle, and the long horizontal rectangle. 4 of the rectangles come from the five boxes formed by the tall rectangle and the wide rectangle overlapping (one in each of the cardinal directions: North, East, South, West. The fifth one is the center box). The last five rectangles come from the same two main rectangles overlapping. They are the rectangles that can be formed by attaching the previous five rectangles together adjacently. For example, the the West rectangle can be connected to the center rectangle to form a larger wide rectangle (with a line through it that can be ignored). This can be repeated for the last four boxes (each cardinal facing rectangle combined with the center rectangle). The three main rectangles plus the 5 small boxes plus the four rectangles formed by the combination of the five small boxes sum to 12 total rectangles. (Rule of thumb, squares can be rectangles)
9. Converting 300 silver coins to bronze coins results in $3*140$ which equals 420. Converting 420 bronze coins to gold coins results in $2*80$, which results in a final answer of 160.
10. It is easiest to start at the arrival time in Turkey and work your way back to the original time in the US. First, 11:45 p.m. arrival time can be converted to military time 23:45. Then, subtract the time the flight took to figure out the time Shreya's flight departed in Turkey time, so 23:45 minus 11:30 equals 12:15. Now, the last step is to convert from Turkey to US time, so subtract 8 hours to get back to the US departure time, so 12:15 minus 8:00 equals 4:15. 4:15 in regular time (not military) is just 4:15 a.m..

- P. 13
- 1. 32
- 2. $61/14$
- 3. $4/9$
- 4. 0
- 5. 4
- 6. 46
- 7. 4
- 8. 12
- 9. 160
- 10. 4:15 a.m.

Name: _____

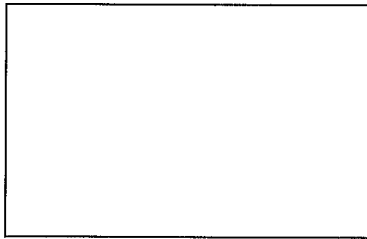
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Practice Problem (No points)

Practice Problem

Four ducks and three pigs are in a barn. How many more legs than heads are there?



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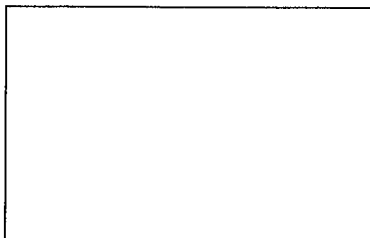
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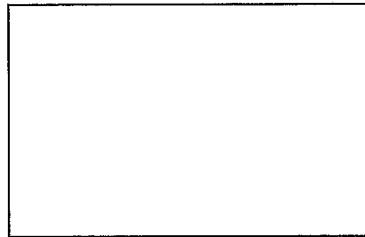
11 points

5 points

0 points

Problem 4

Albert and Brian want to add $1.3 + 4.2 + 4.8$. Albert rounds each number to the nearest whole number and then adds them, and Brian adds the numbers and then rounds the answer to the nearest whole number. How much bigger is Brian's answer than Albert's answer?



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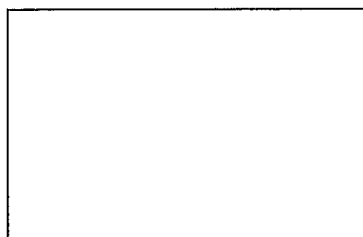
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Problem 9

Maria has 300 silver coins, but she wants to exchange them for gold coins. Based on these exchange rates, how many gold coins should she receive?

100 silver coins = 140 bronze coins

210 bronze coins = 80 gold coins



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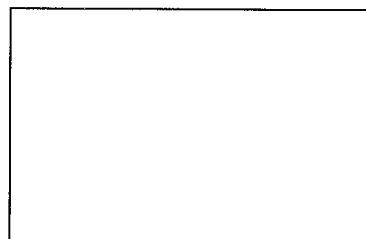
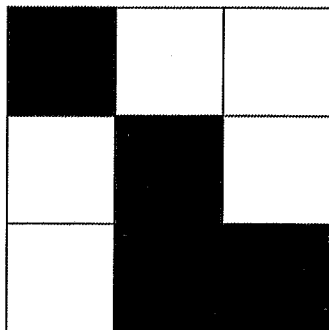
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Problem 3

Sam randomly throws a dart at the square above. What is the chance that it hits a shaded area? Write your answer as a common fraction.



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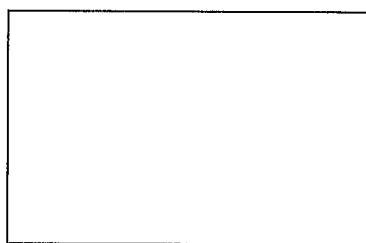
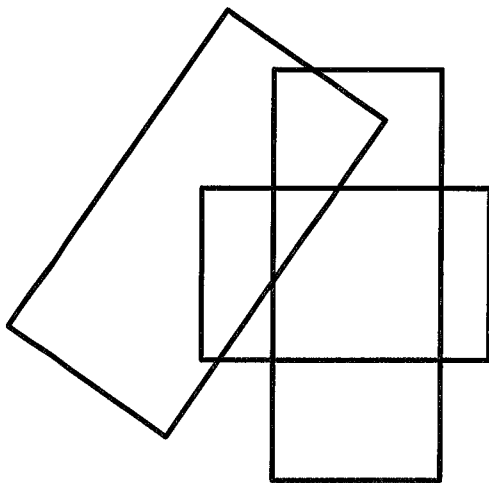
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Problem 8

How many rectangles are there in the following picture?



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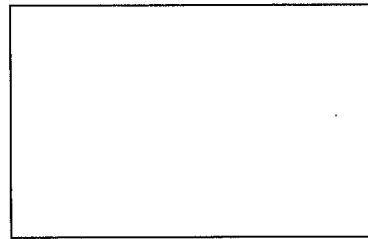
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Problem 2

What is $\frac{5}{2} + \frac{13}{7}$? Write your answer as a simplified improper fraction



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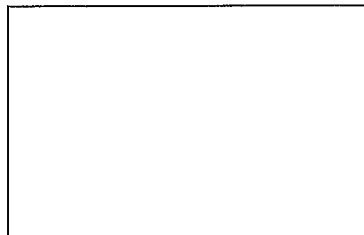
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Problem 7

What is the value of the x-intercept of the line

$$5x + 4y = 20?$$



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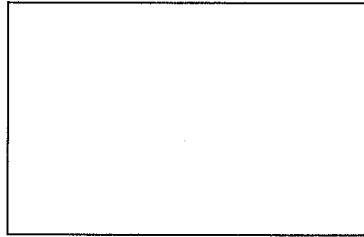
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Problem 10

Shreya is taking a flight from the US to Turkey. Turkey's time zone is 8 hours ahead of the US time zone. It took Shreya 11 hours and 30 minutes to reach Turkey, and her arrival time in Turkey was 11:45 pm. What was the time in the US when she left? (include am/pm in your answer)



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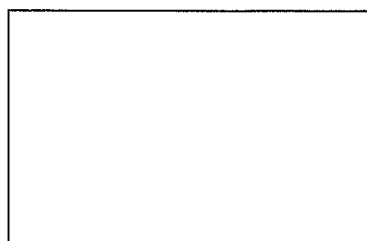
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Problem 5

I am a regular polygon with 90 degrees in each angle. How many lines of symmetry do I have?



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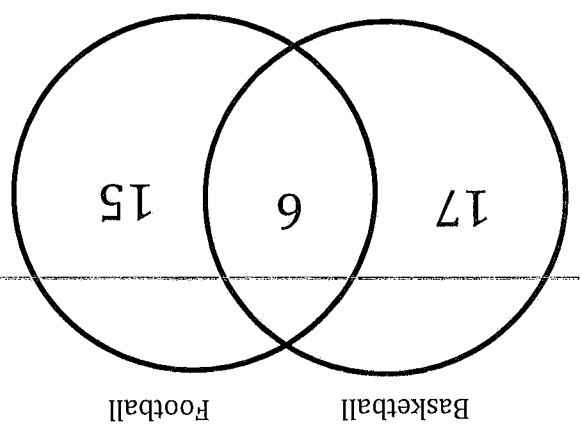
11 points

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How many people in the Venn-diagram play only basketball or only football?

Problem 1



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11 points

5 points

0 points

There are two whole numbers A and B, and their product is 45. What is the largest possible sum of A and B?

Problem 6