WinMaC 2017

Team Round

Name: _____ Score: _____ / 60

PLEASE DO NOT FILL IN ABOVE! (the SCORE blank)

Grade: _____ Team: _____

This is a round consisting of 10 challenging problems to be done in 30 minutes. You may communicate and discuss problems with people on your team. Problems are in roughly ascending difficulty, and each problem is worth 6 points. Any figures in the test may not be to scale.

No aids are permitted aside from pencils, pens, and provided scratch paper. In particular, no calculators or other computers are permitted. Communication with other people on your own team is allowed.

Record your answers in the box corresponding to the correct problem. Only answers printed in the boxes below will be scored.

Your Answers

1.	3.	5.	7.	9.
2.	4.	6.	8.	10.

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1. Jason have a collection of antique and modern coins. Half of his modern coins got soaked in heavy rain and rusted away to a point where they lost 50% of their value, while all of his antique coins gained 25% increase in value. If the overall value of all his coins decreased by 10%, what is the ratio of antique to modern coins in his collection.

2. Michael is the fastest runner in the grade. He runs at a rate of 20 feet per second but slows down by five feet per second after each 60 feet that he runs. For example, Michael slows down to 15 feet per second after running 60 feet and 10 feet per second after running 120 feet. Danny is not as fast, but he never slows down. Danny runs at a rate of 15 feet per second. If the are running away from each other in opposite directions, how long will it take before they are 415 feet apart?

3. Triangle ABC has a line that divides $\angle A$ in half. This line segment intersects $\overline{BC}$ at D. M is the midpoint of $\overline{AC}$. $\overline{AD}$ and $\overline{BM}$ intersect at P such that the ratio of BP to PM is $3:2$. If AC is 9, find AB.

4. Kevin and Jason were trading Pokemon cards, but accidentally mixed them up. Kevin remembered that half of his cards are legendaries. Jason remembers that he had 15 legendaries. If $\frac{1}{4}$ of all the total cards are legendaries, how many more cards did Jason have?

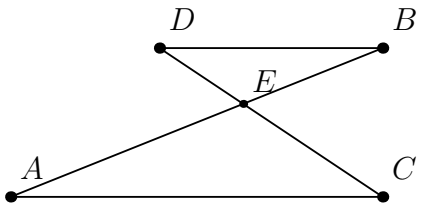
5. Cynthia has a very old cat that hasn't seen Robert in a fairly long time. Given that the greatest common divisor of the cat's current age and its age when it first met Robert is 4, and the least common multiple of the cat's current age and the number of years it has been since it first met Robert is 48, what is the minimum possible age of the cat?

6. There are 5 boxes in a line and they can either be colored green or red. If no two red boxes can be next to each other, how many different combinations of red and green boxes are there?

7. There are six fruits on the table: an apple, a banana, a pear, a mango, a pineapple, and a watermelon. I dislike any fruit that has the word apple in it. If I randomly remove two fruits from the table and choose a fruit from the remaining four, what is the probability I get a fruit that I like?

8. A four-digit number is multiplied by 4, and the result consists of the same digits in reverse order. Find the number.

9. In the following diagram, $\overline{AC}$ and $\overline{BD}$ are parallel and all lengths have an integer value. If $BE = CE$ and $AB + CD = 98$, find the largest possible value of any of these four segments: $\overline{AE}$, $\overline{BE}$, $\overline{CE}$, and $\overline{DE}$.



10. $ABCD$ with area and perimeter of 32 is inscribed in a circle. It is given that $m\angle A = 150°$, $m\angle B = 30°$, and $BC > AD$. If the circumcenter of $ABCD$ is at O, find the area of triangle ACO.