

# $\beta$ Beta Round

AMSA-MAMS Pi Day Mathematics Tournament

March 11, 2017

30 minutes

- [2] Grigori and Perelman plan to serve dinner to Leonhard and Euler. If Grigori prepares three bowls of noodles per hour and Perelman prepares one bowl of noodles per hour, how many hours will they need to prepare 16 bowls of noodles?
- [3] Aditya, Rishi, and Charan shared a pizza at math team practice on Friday. If Aditya ate  $\frac{1}{5}$  of the pizza, Rishi ate  $\frac{3}{8}$  of the pizza, and Charan ate  $\frac{1}{2}$  of what remained, what fraction of the pizza was left at the end of practice?
- [4] Sathwik and Danush are standing next to each other outside in the afternoon, facing towards the sun. Sathwik is 4 feet tall. Danush is 2 feet taller than Sathwik, and Danush's shadow is 6 feet longer than Sathwik's shadow. How long is Sathwik's shadow?
- [4] Compute the value of  $\sqrt{314 + 11 \cdot 2017} - 1$ .
- [5] In rectangle  $ABCD$ , let  $M$  be the midpoint of  $CD$ . Let  $BM = 5$  and  $BC + CM = 7$ . Find the area of rectangle  $ABCD$ .
- [5] Aditya finally got his driver's license and can finally drive to school. His new car has 4 tires and comes with an extra spare tire. He does not want to wear down the tread on his new tires, so he decides to use each tire for an equal amount of distance. If his school is 14 miles away, for how many miles will each tire be used for? Express your answer as a common fraction.
- [6] April and Patrick want to meet along a river at a point  $O$ , which is a line segment running from point  $B$  to point  $Q$ . They both live on the same side of the river. Find the value of  $m\angle AOB - m\angle POQ$  in degrees that minimizes the sum of the distances between their homes  $A$  and  $P$  and the rendezvous location  $O$ .
- [6] The New York Yankees are facing the Boston Red Sox in a 5 game series, where they play all 5 games regardless of the outcomes of the previous games. The Red Sox pitchers for each of the five games are Sale, Porcello, Price, Wright, and Rodriguez. The Yankees have a 10% chance of beating Sale, a 20% chance of beating Porcello, a 30% chance of beating Price, a 40% chance of beating Wright, and a 50% chance of beating Rodriguez. What is the probability that the Yankees win at least one game? Express your answer as a common fraction.
- [7] In how many ways can ways a  $2 \times 12$  chessboard be filled by twelve identical  $2 \times 1$  dominoes? Rotating and reflecting the dominoes does not change the configuration. For example, one such way is by lying all 12 dominoes vertically.
- [8] Anusha is hosting a  $\Pi$  party for 5 guests. Each of the 6 people bring either a blueberry pie, an apple pie, or a pumpkin pie. If there must be at least one of each type of pie at the party, how many ways are there for the 6 people to bring pies to the party?