Activity Sheet for the September, 2012, MATHCOUNTS Mini

Warm-Up!

Try these problems before watching the lesson.

1. Armond the Ant crawls one foot every 10 seconds when not carrying anything, and he crawls one foot every 15 seconds when he's carrying a crumb. He carries nothing as he walks 10 feet from a wall to the place on the floor where you dropped a cookie. He picks up a crumb and then walks back to the wall. How many minutes does this entire trip take? Express your answer as a mixed number.

2. It takes 80 seconds for a 1-mile-long train to pass a signpost. If the train keeps moving at this rate, then how far will the train travel in one hour?

3. If I drive 30 miles an hour from work to home, then my trip will take 24 minutes. How fast do I have to drive to make the trip in 12 minutes?

4. Fleet Fred can run the 400 yard dash in 50 seconds. If he runs at the same rate for 6 minutes, then how many miles will he run? Express your answer as a mixed number. (There are 1760 yards in a mile.)

The Problem

First Problem: Jack and Jill drove in separate cars to their favorite hill, leaving from the same place at the same time. Jill drove 20% faster than Jack and arrived half an hour earlier. How many hours did Jack drive?

Second Problem: A hot-air balloon will slowly start to descend toward the ground at a constant rate of 15 ft per minute from an initial height of 1200 ft above ground at the same time a small helium-filled balloon, being released at an initial height of 10 ft above ground, will start to ascend toward the sky at a constant rate of 5 ft per second. In how many minutes will the two balloons be at the same height above the ground? Express your answer as a decimal to the nearest hundredth.

Follow-up Problems

5. Jayne rides her bike for an hour. She rides at 12 miles an hour for the first 30 minutes, and then increases her speed by 50% to ride for the final 30 minutes. How far does she ride?

6. After climbing the hill, Jack and Jill drove home. Again, they started from the same place at the same time, and ended at the same place. Jill drove 10 miles per hour faster than Jack, and she drove for 80% of the amount of time that Jack drove. What was Jack's average speed on his drive home?

7. Tirunesh and Sally start at the same point on a 400-meter circular track. They start running at the same in *the same* direction around the track. Tirunesh runs at a rate of 8 meters per second, while Sally runs 7 meters per second. How many seconds will pass before the two of them are again at the same point on the track?

8. Tirunesh and Sally start at the same point on a 400-meter circular track. They start running at the same time, but in *opposite* directions around the track. Tirunesh runs at a rate of 8 meters per second, while Sally runs 7 meters per second. After they start, they give each other a high-five each time they meet on the track. How many high-fives will they give each other in the first 5 minutes they run?

Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).