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Tricky Times and Subtle Speeds

These puzzles include clock puzzles and stories that involve speeds and distances covered. It's often useful to remember the distance formula $D=S \times T$ where D is distance, S is speed, and T is time. For example, if you run 10 miles per hour for 15 minutes, then you've run for $1/4$ hour so you cover a total of $10 \times 1/4 = 2.5$ miles.

Some puzzles also use average speed calculations. Even if your speed isn't constant, if you cover distance D during time T , then your average speed is $S=D/T$.

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THREE BIRDS



Puzzle: Suppose three birds leave their home in New York to be nestmates at the University of Pennsylvania in Philadelphia. The first flies 20 mph, the second flies 40 mph, and the third flies 50 mph.

Any time that the second or third bird reaches the new nest or reaches one of the other birds, it immediately reverses direction. They end up ricocheting back and forth between each other and the campus nest until they all arrive at the new nest where they stop and order pizza.

If the dorm nest is 100 miles from the old nest, what is the total distance traveled by all three birds?

If you think about it, this situation is remarkably complex, with the fastest bird bouncing back and forth between the second bird and the dorm nest, and the second bird ricocheting madly between the fastest and slowest birds.

Fortunately all that matters is the total elapsed time and the speed of the birds whose distances we want to know.

The whole frenetic performance ends when the slowest bird reaches the new dorm nest. At 20 mph that takes $100/20=5$ hours.

Now you can calculate the distances traveled by all of the birds. The slowest bird flies $5 \times 20 = 100$ miles, the second bird flies $5 \times 40 = 200$ miles, and the fastest bird flies $5 \times 50 = 250$ miles. The total distance traveled by all three birds is therefore $100 + 200 + 250 = 550$ miles.

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