

Some of Paul's favorite problems...

1. Two towns, A and B, are connected by a road. At sunrise, Pat begins biking from A to B along this road, while simultaneously Dana begins biking from B to A. Each person bikes at a constant speed, and they cross paths at noon. Pat reaches B at 5 p.m. while Dana reaches A at 11:15 p.m. When was sunrise?
2. A bug is crawling on the coordinate plane from $(7, 11)$ to $(-17, -3)$. The bug travels at constant speed one unit per second everywhere but quadrant II (negative x -and positive y -coordinates), where it travels at $\frac{1}{2}$ unit per second. What path should the bug take to complete its journey in minimal time? Generalize.
3. What is the first time after 12 o'clock at which the hour and minute hands meet?
4. Sonia walks up an escalator which is going up. When she walks at one step per second, it takes her 20 steps to get to the top. If she walks at two steps per second, it takes her 32 steps to get to the top. She skips over any steps. How many steps does the escalator have?