Logic: Information, PLEASE!!

Some details will seem to be missing from the following teasers. But NO. The needed info is all there. What is needed is, in Hercule Poirot's terms, "the exercising of the little gray cells."

1. **Train Tunnel**. Two children, Freda and Max entered an express train tunnel. They knew they shouldn't. They were unaware that they were two-fifths of the way through when they heard the train whistle. In a panic they ran — in opposite directions — at 15 miles per hour. By a split second each escaped being killed. How fast was the train going?

2. **2. The Hiker.** A hiker set out at 8 a.m. climbing a mountain at the rate of one-and-a-half miles per hour. He then spent 12 hours camping at the top. After that stay he went down the same trail at four-and-one-half miles per hour, reaching the bottom at noon the next day. How long was the trail?

3. Book Price. A book costs $10.00 plus half of its price. What does it cost?

4. Clock Bears Watching. A clock repairman, being ill, sent his apprentice on a house call to fix a 12-hour wall clock. The apprentice was quite thorough, even removing the clock hands to keep them safe during the process which turned out to be extensive. He finished the job well after sundown. Eager to get home, our man quickly replaced the clock hands to match his watch which read 6 pm.

The apprentice reached home but in a short while got a call from the customer saying that the clock showed the wrong time. Our man returned to the home, showed the owner his watch and the clock which both read the correct time, and he returned home, shaking his head.

Early the next morning, the owner called again complaining that the clock was behaving nuttily. The apprentice made yet another visit, and … the clock and watch both read the same correct time. Both men were honest. What was going on?

5. Party Shakes. A party was attended by ten people: the hosts Mr. and Mrs. Smith and four other couples. During the course of the evening some, but not all, pairs of people shook hands. No one shook hands with the same person twice, and no couples shook hands with one another. Both hosts shook some hands. At party's end Mrs. Smith asked each person (other than herself) how many hands they shook. They all reported accurately a different number.

How many hands did Mr. Smith shake? Note well that one host took the poll, but we ask about the other host.

6. Crowded Field. Reported in the Athens Times: In yesterday's mile run, Danny placed exactly in the middle of all finishers. Kevin placed lower — in eleventh place, and Kurt finished eighteenth. How many were in the race and where did Danny place?
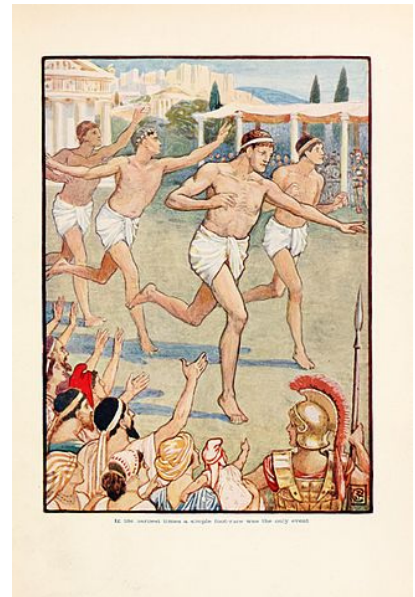

Sources:
Richard Guy, et.al. The Inquisitive Problem Solver
Steven Krantz, Techniques of Problem Solving
Boris Kordemsky, The Moscow Puzzle Book
Raymond Smullyan, The Riddle of Scheherazade

Hints

1. Train Tunnel. Don't worry about the train at first. Draw pictures of where the kids are at the three key moments.

2. The Hiker. A person walking three times faster will cover the same distance in one-third the time. Apportion accordingly.

Solutions

1. Train Tunnel. As one child exited the tunnel the train entered and the second child had one-fifth of the tunnel to traverse. The train almost caught up because it was going five times as fast at 75 mph.

2. The Hiker. A person walking three times faster will cover the same distance in one-third the time. The hiker returned in 28 hours after camping 12 hours at the top. He spent 16 hours walking or 12 hours going up and four coming down. Either rate multiplied by the time walked yields 18 miles for the distance.

3. Book Price. $20.00

4. Clock Bears Watching. In the darkened room the apprentice mixed up the mounting of the hands, The long hand pointed correctly to 12 at 6 pm, but it was mounted on the hour drive gear. In about two hours and ten minutes after 6 p.m., the long hand had moved from the 12 to the 2. The short hand, having counted 130 minutes, made two revolutions from the 6 and ten minutes more to just past the 8 on the dial. So at about 8:10 the clock was correct.

At 7:05 the next morning, that is, 13 hours and 5 minutes past 6 p.m., the long hand made one revolution from 12 plus one hour to 1 on the dial. The short hand made 13 complete revolutions from the 6 plus 5 minutes to end at the 7. Both the clock and the watch read 7:05.

5. Party Shakes. No one shook more than 8 hands, since no one shook their spouse's hand. But nine people, all but Mrs. Smith, responded with different numbers, so those numbers were 0, 1, 2, …, 8. Let S stand for the Smith couple, and let A, B, C, and D represent the other couples. Who shook no hands at all? We are told both hosts shook some, so let's say Mr. A shook no hands. Then the four other couples had at most 7 hands available — not their spouses, not Mrs. Smith, and not Mr. A. Who then shook 8 hands? It has to be Mrs. A.

Leaving the A's and their extreme social postures, we ask who shook 7 hands. Let it be Mr. B. The couples C, D, and the Smiths are now known to have shaken at least two hands, those of Mr. B and Mrs. A. But someone shook just one hand, and that must be Mrs. B. Continuing this line of reasoning we arrive at pairs of numbers for the Couples A, B, C, and D, and those pairs are zero and 8, 1 and 7, 2 and 6, and 3 and 5. That leaves the number 4 which is the number of hands that Mr. Smith shook.

6. Crowded Field. If Danny finished in the middle of the pack, then there were an odd number of runners. Since Kurt finished eighteenth there must have been at least 19 runners; however, if the field were 21 or more contestants, Kevin's eleventh place finish would put him in the middle or even higher than Danny. So there were exactly 19 runners and Danny finished tenth.