## Challenge Exercises for Further Study

B-1: $\quad$ Marian admires a new dress in a department store dressing room mirror. If Marian stands as shown, making an angle of $70^{\circ}$ with the center mirror, at what angle will the light be reflected from the mirror on the right?


B-2:

B-4:

Your friend is stranded 10.0 m high in a tall tree with a hungry tiger beneath, while you lie on the beach a distance away. He has only a mirror, which he uses to signal you by holding it perpendicular to the horizon as shown. If the sun hits the mirror at a $30.0^{\circ}$ angle to the normal and reflects back in your eye, how far away are you from the tree?


B-3: $\quad$ As you are walking toward a swimming pool on a hot summer day, you suddenly notice a glare of sunlight off the water's surface that is so bright it makes you close your eyes. If the angle of incidence of the incoming sunlight is $70.0^{\circ}$ and you stand 1.80 m tall, how far (horizontally) are you standing from the point where the incident ray hits the water?

The deepest section of ocean in the world is the Marianas Trench, located in the Pacific Ocean. Here, the ocean floor is as low as 10918 m below the surface. If the index of refraction of water is 1.33 , how long would it take a laser beam to reach the bottom of the trench?

