Challenge Exercises for Further Study

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



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B-2: 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° angle to the normal and reflects back in your eye, how far away are you from the tree?



- **B-3:** 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° and you stand 1.80 m tall, how far (horizontally) are you standing from the point where the incident ray hits the water?
- **B-4:** 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 10 918 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?