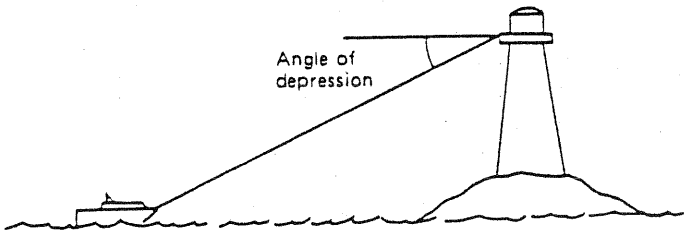
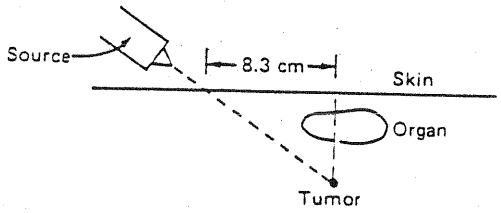
Problem #1: An observer 80 feet above the surface of the water measures an angle of depression of 0.7° to a distant ship. How many miles is the ship from the base of the lighthouse? (A mile is 5280 feet.)



Problem #2: A beam of gamma rays is to be used to treat a tumor known to be 5.7 centimeters beneath the patient's skin. To avoid damaging a vital organ, the radiologist moves the source over 8.3 centimeters.

(a) At what angle to the patient's skin must the radiologist aim the gamma ray source to hit the tumor?

(b) How far will the beam have to travel through the patient's body before reaching the tumor?



Problem #3: A 96-ft tree casts a shadow that is 120 ft long. What is the angle of elevation of the sun?

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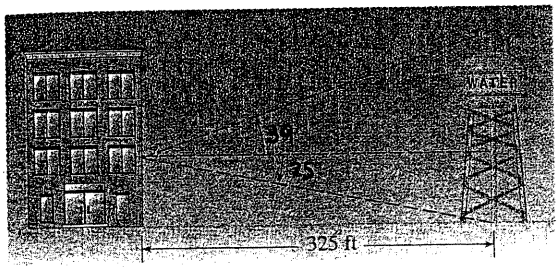
Problem #4: A water tower is located 325 ft from a building. From a window in the building it is observed that the angle of elevation to the top of the tower is 39° and the angle of depression to the bottom of the tower is 25°. How tall is the tower? How high is the window?



Problem #5: A laser beam is to be directed toward the center of the moon, but the beam strays 0.5° from its intended path.

(a) How far has the beam diverged from its assigned target when it reaches the moon? (The distance from the earth to the moon is 240,000 miles.)

(b) The radius of the moon is about 1000 miles. Will the beam strike the moon?

Problem #6: When the moon is exactly half full, the earth, moon and sun form a right angle. At that time the angle formed by the sun, earth and moon is measured to be 89.85°. If the distance from the earth to the moon is 240,000 miles, estimate the distance from the earth to the sun.