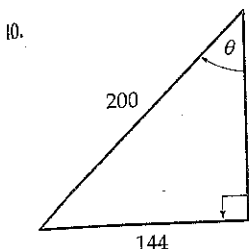
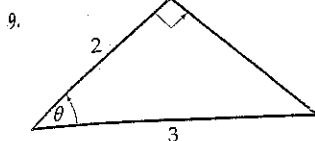


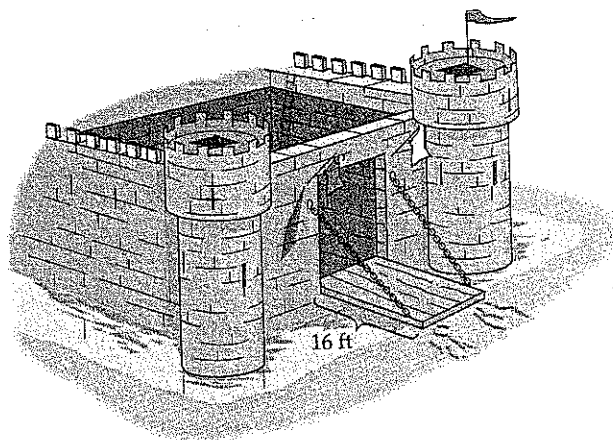
HW #8 due Thursday 4/17  
Also, create your own applied trigonometry problem and solve it.

# Section 7.1 Right Triangle Trigonometry

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in order for the end of it to be 8 feet off the ground?



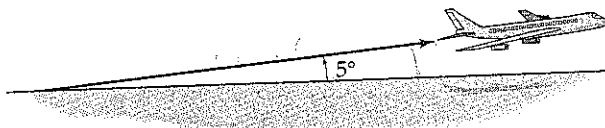
In Exercises 41–48, use the figure for Exercises 25–28 to find angles  $A$  and  $C$  under the given conditions.

41.  $a = 4$  and  $c = 6$
42.  $b = 14$  and  $c = 5$
43.  $a = 7$  and  $b = 10$
44.  $a = 5$  and  $c = 3$
45.  $b = 18$  and  $c = 12$
46.  $a = 4$  and  $b = 9$
47.  $a = 2.5$  and  $c = 1.4$
48.  $b = 3.7$  and  $c = 2.2$

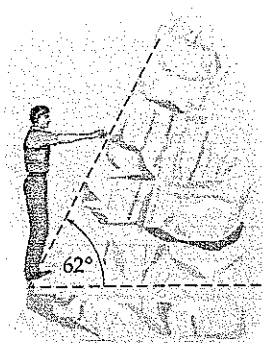
49. A 20-foot-long ladder leans on a wall of a building. The foot of the ladder makes an angle of  $50^\circ$  with the ground. How far above the ground does the top of the ladder touch the wall?
50. A guy wire stretches from the top of an antenna tower to a point on level ground 18 feet from the base of the tower. The angle between the wire and the ground is  $63^\circ$ . How high is the tower?
51. A 150-foot-long ramp connects a ground-level parking lot with the entrance of a building. If the entrance is 8 feet above the ground, what angle does the ramp make with the ground?
52. For maximum safety, the distance from the base of a ladder to the building wall should be one fourth of the length of the ladder. If a ladder is in this position, what angle does it make with the ground?

53. Consider a 16-foot-long drawbridge on a medieval castle, as shown in the figure. The royal army is engaged in ignominious retreat. The king would like to raise the end of the drawbridge 8 feet off the ground so that Sir Rodney can jump onto the drawbridge and scramble into the castle, while the enemy's cavalry are held at bay. Through how much of an angle must the drawbridge be raised

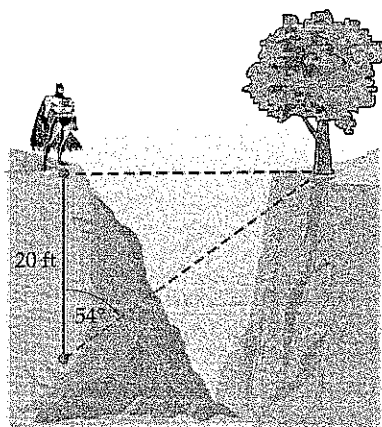
54. Through what angle must the drawbridge in Exercise 53 be raised in order that its end be directly above the center of the moat?
55. A plane takes off at an angle of  $5^\circ$ . After traveling one mile along this flight path, how high (in feet) is the plane above the ground?



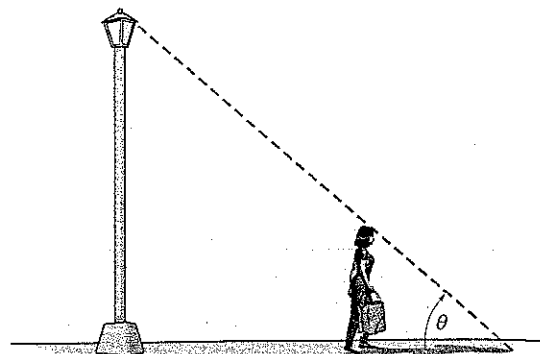
56. A plane takes off at an angle of  $6^\circ$  traveling at the rate of 200 feet/second. If it continues on this flight path at the same speed, how many minutes will it take to reach an altitude of 8000 feet?
57. It is claimed that the Ohio Turnpike never has an uphill grade of more than  $3^\circ$ . How long must a straight uphill segment of the road be in order to allow a vertical rise of 450 feet?
58. Ruth is flying a kite. Her hand is 3 feet above ground level and is holding the end of a 300-foot-long kite string, which makes an angle of  $57^\circ$  with the horizontal. How high is the kite above the ground?
59. If you stand upright on a mountainside that makes a  $62^\circ$  angle with the horizontal and stretch your arm straight out at shoulder height, you may be able to touch the mountain (as shown in the figure on the next page). Can a person with an arm reach of 27 inches, whose shoulder is 5 feet above the ground, touch the mountain?



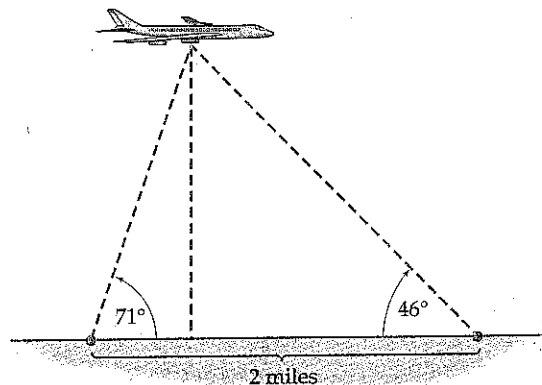
60. A swimming pool is 3 feet deep in the shallow end. The bottom of the pool has a steady downward drop of  $12^\circ$ . If the pool is 50 feet long, how deep is it at the deep end?
61. Batman is on the edge of a 200-foot-deep chasm and wants to jump to the other side. A tree on the edge of the chasm is directly across from him. He walks 20 feet to his right and notes that the angle to the tree is  $54^\circ$ . His jet belt enables him to jump a maximum of 24 feet. How wide is the chasm and is it safe for Batman to jump?



62. A wire from the top of a TV tower to the ground makes an angle of  $49.5^\circ$  with the ground and touches ground 225 feet from the base of the tower. How high is the tower?
63. A woman 5.5 feet tall stands 10 feet from a streetlight and casts a 4-foot-long shadow. How tall is the streetlight? What is angle  $\theta$ ?



64. A plane flies a straight course. On the ground directly below the flight path, observers 2 miles apart spot the plane at the same time. The plane's angle of elevation is  $46^\circ$  from one observation point and  $71^\circ$  from the other. How high is the plane?



65. A buoy in the ocean is observed from the top of a 40-meter-high radar tower on shore. The angle of depression from the top of the tower to the base of the buoy is  $6.5^\circ$ . How far is the buoy from the base of the radar tower?
66. A plane passes directly over your head at an altitude of 500 feet. Two seconds later you observe that its angle of elevation is  $42^\circ$ . How far did the plane travel during those 2 seconds?
67. A man stands 12 feet from a statue. The angle of elevation from eye level to the top of the statue is  $30^\circ$ , and the angle of depression to the base of the statue is  $15^\circ$ . How tall is the statue?
68. Two boats lie on a straight line with the base of a lighthouse. From the top of the lighthouse (21 meters above water level) it is observed that the