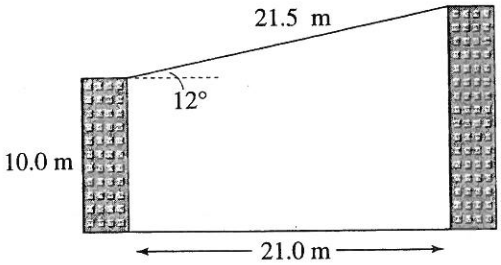
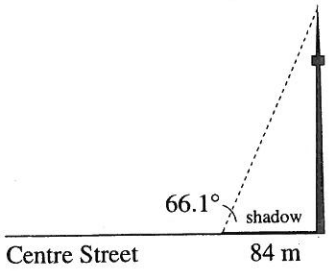
FMP10 ~~8X/8XXXXXXXXX~~ (show all work on seperate paper)

Part E

1.1/1.2 Extra

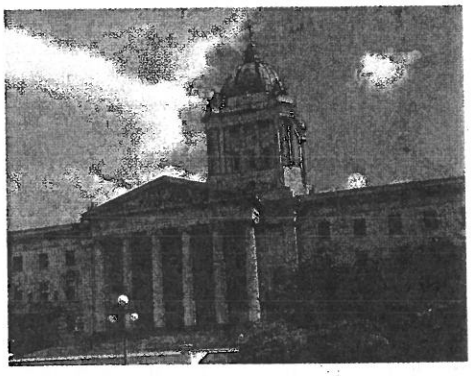
9. A tightrope walker attaches a cable to the roofs of two adjacent buildings (below left). The cable is 21.5 m long. The angle of inclination of the cable is 12°. The buildings are 21.0 m apart. The shorter building is 10.0 m high. What is the height of the taller building?



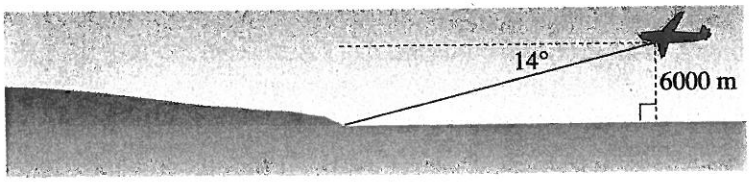


10. Around noon each day, the shadow of the Calgary Tower is aligned along Centre Street, which runs directly north from the tower (above right). One day, at noon, Syd paced the shadow and estimated its length to be approximately 84 m. Using a clinometer, he determined that the angle of elevation from the tip of the shadow to the top of the tower was 66.1°. Assume the clinometer is 1.5 m above the ground. Calculate the height of the tower to the nearest metre.

11. Suppose you are 133 m from the base of the Manitoba Legislative Building. The Golden Boy statue, on top of the building, has its highest point at the top of the hand holding the torch. The angle of elevation to this highest point is 30°. Calculate how high the top of the statue is above the base of the building. Identify your assumptions.



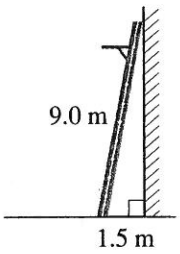
12. An airplane is flying at an altitude of 6000 m over the ocean directly toward a coastline. At a certain time, the angle of depression to the coastline from the airplane is 14°. How much farther does the airplane have to fly before it reaches the coastline?

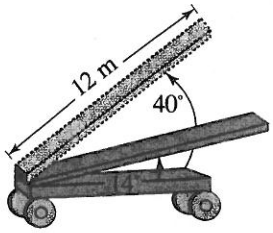


13. From a horizontal distance of 80.0 m, the angle of elevation to the top of a flagpole is 18°. Calculate the height of the flagpole.

Part II

8. A 9.0-m ladder rests against the side of a wall (below left). The bottom of the ladder is 1.5 m from the base of the wall. Determine the measure of the angle between the ladder and the ground.





9. The inclination of a warehouse conveyor belt can be set between 14° and 40° (above right). The length of the conveyor is 12 m. What are the minimum and maximum heights the conveyor can reach?

10. The angle of inclination of a conveyor belt is 5°. The belt rises 0.75 m. What is the length of the conveyor?

11. A guy wire is fastened to the ground 40 m from the base of a TV tower. The wire makes an angle of 60° with the ground.
    a) How high up the tower does the guy wire reach?
    b) How long is the guy wire?
    c) Suppose the same length of wire were attached, with a 45° angle of elevation. How high up the tower would the guy wire reach?

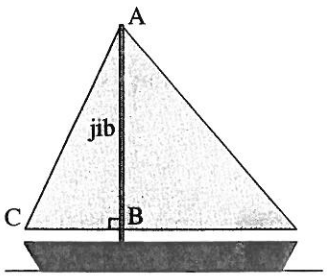
12. Rectangle ABCD measures 6 cm by 3 cm. Calculate the measures of the two acute angles formed at A by the diagonal AC.

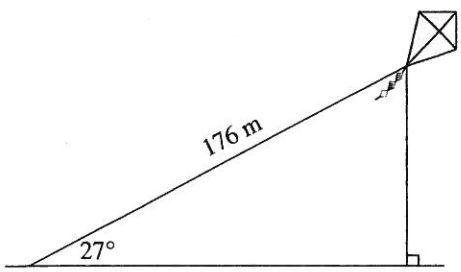
13. In isosceles ΔABC, AB = AC, $\angle C = 70°$, and BC = 4.0 cm. Calculate the height of the triangle to the nearest millimetre.

14. A wheelchair ramp is 8.2 m long. It rises 94 cm. Determine the angle of inclination of the ramp to 1 decimal place.

15. The angle of elevation of the sun is 68° when a tree casts a shadow 14.3 m long. How tall is the tree?

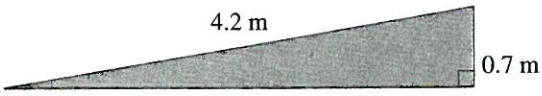
16. a) The guy wire for a jib sail ABC is 3.7 m long (below left). It is attached to the mast at point A. The foot of the guy wire is 1.1 m from the foot of the mast. What is the angle of inclination of the guy wire?
    b) The mast AB is 3.5 m long. The boom BC is 3.2 m long. Determine $\angle C$ to 1 decimal place.





17. A person flying a kite has released 176 m of string (prev. page). The string makes an angle of 27° with the ground. How high is the kite?

18. A wheelchair ramp is 4.2 m long. It rises 0.7 m. What is its angle of inclination to the nearest degree?



19. A surveyor, 31 m from a building, uses a transit to measure the angle of elevation to the top of the building. The angle of elevation is 37°. The transit is set at a height of 1.5 m.

a) Calculate the distance from the transit to the top of the building.

b) Calculate the height of the building.

20. At a point 28 m from a building, the angle of elevation to the top of the building is 65°. The observer's eyes are 1.5 m above the ground.

a) How tall is the building?

b) How far is the observer's eye from the top of the building?

KEY

Part I

9. 14.5 m **10.** 191 m

11. Assumptions may vary. 77 m, with eyes at ground level

12. 24 km **13.** 26.0 m

Part II

8. 80° **9.** 2.9 m; 7.7 m **10.** 8.6 m

11. a) 69 m **b)** 80 m **c)** 57 m

12. 63°, 27° **13.** 5.5 cm **14.** 6.6° **15.** 35.4 m

16. a) 73° **b)** 47.6°

17. 80 m **18.** 10°

19. a) 39 m **b)** 25 m

20. a) 61.5 m **b)** 66.2 m