Indirect Measurement Using Similar Triangles

Monday – 2/28/11

Page 491

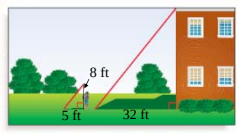
12.4.5

Indirect Measurement

- Similar triangles can be used to measure distances or heights that are difficult to measure in a traditional way:
  1. Distances across rivers or canyons, or
  2. Heights of tall objects that are awkward to measure.
- One method uses shadows to create similar triangles.
- Another method uses a reflection in a mirror to create similar triangles.

12.4.5

Shadow Method



In the picture the angle of the sun is the same in both triangles and both triangles have a right angle so they are similar by AA Sim.

You can use the lengths of the shadows and the height of the pole to find the height of the building.

$$\frac{\text{shadow of pole}}{\text{shadow of bldg}} = \frac{\text{height of pole}}{\text{height of bldg}}$$

$$\frac{5}{32} = \frac{8}{x}$$

$$256 = 5x$$

$$51.20 = x$$

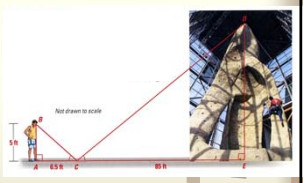
The building is about 51.2 feet tall.

12.4.5

Mirror Method

The angles of the reflection in the mirror are the same so the triangles are similar by AA Sim.

You can use the distances on the ground and the height of the person to find the height of the climbing wall.



$$\frac{\text{height of person}}{\text{height of wall}} = \frac{\text{distance from mirror to person}}{\text{distance from mirror to wall}}$$

$$\frac{5}{x} = \frac{6.5}{85}$$

$$425 = 6.5x$$

$$65.38\,ft. = x$$

The wall is about 65.38 feet tall.

12.4.5

Assignment #8

Indirect Measurement Problems &
Pg. 494: 29, 32 – 34
Due Wednesday, 3/2/11

12.4.5