

Course: MFM2P Gr. 10 AppliedLesson: 1 - 5Unit: Measurement Systems and Similar TrianglesTopic: Problems using Similar Triangles

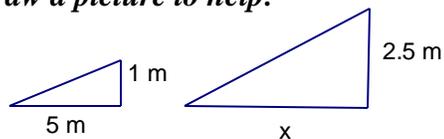
✚ *homework check:* Lesson 1 - 4

✚ *note:* Using Similar Triangles to Solve Problems

We can use the proportions established by similar triangles to solve problems where heights or distances are hard to measure. For example,

- a) **David has a dog house that is 1m high that casts a shadow 5m long in the early morning sun. If his nearby house is 2.5m high, how long can we expect the shadow?**

Draw a picture to help:



Set up the proportions and solve using similar triangles:

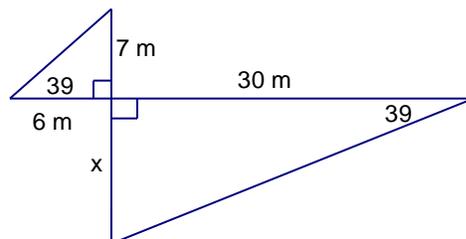
$$\frac{1}{5} = \frac{2.5}{x} \text{ and cross multiply}$$

$$1x = 5 \times 2.5$$

$$x = 12.5m$$

David's house casts a shadow that is 12.5 m long.

- b) **A mining company has found a gold deposit and records the important measurements on the diagram provided. How deep is the gold below the ground?**



Set up the proportions and solve using similar triangles:

$$\frac{6}{7} = \frac{30}{x} \text{ and cross multiply}$$

$$6x = 30 \times 7$$

$$6x = 210$$

$$\frac{6x}{6} = \frac{210}{6}$$

$$x = 35m$$

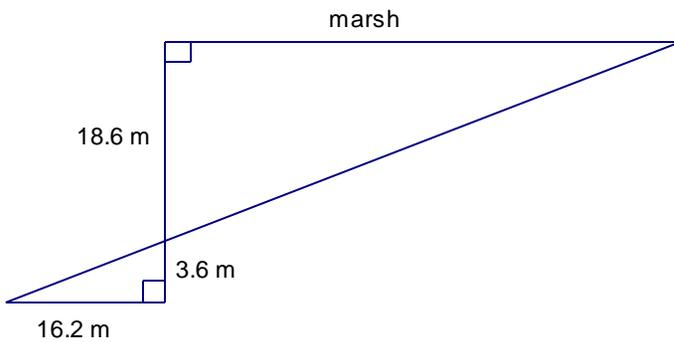
The gold is 35 m below the ground.

✚ homework assignment: Lesson 1 - 5

Lesson 1 – 5: using similar triangles

1. On a sunny day, Josie's shadow is 2.9 m long, while the shadow of a nearby tower is 11.3m long. If Josie is 1.8 m tall, calculate the height of the tower.

2. A surveyor produces a scale diagram to help find the length of a marsh. Find the length of the marsh to the nearest tenth.



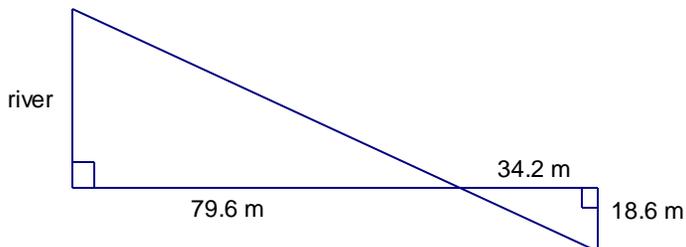
3. A hiker, whose eye level is 2 m above the ground, wants to find the height of a tree. He places a mirror horizontally on the ground 20 m from the base of a tree, and finds that if he stands 4 m from the mirror, he can see the reflection of the top of the tree. How tall is the tree? Sketch a diagram and solve.

4. Two ladders are leaned against a wall so that they make the same angle with the ground. The 10' ladder reaches 8' up the wall. How far up the wall will the 18' ladder reach? Sketch a diagram and solve.

5. At a certain time of day, the shadow of your friend who is 5' tall measures 8'. At the same time, the shadow of a tree measures 28'. How tall is the tree? Sketch a diagram and solve.

6. Darren measure the shadow of a metre stick to be 90 cm and the shadow of a tree to be 3.2m. How tall is the tree? Sketch a diagram and solve.

7. Jordan uses the following survey to calculate the width of a river. What is this measure?



8. Logan places a mirror on the floor 220 cm from the base of a wall. He holds a flashlight 130 cm above the ground and shines the light onto the mirror. How far must Logan stand back from the mirror so that the height that the light shines on the wall is 100 cm? Sketch a diagram and solve.