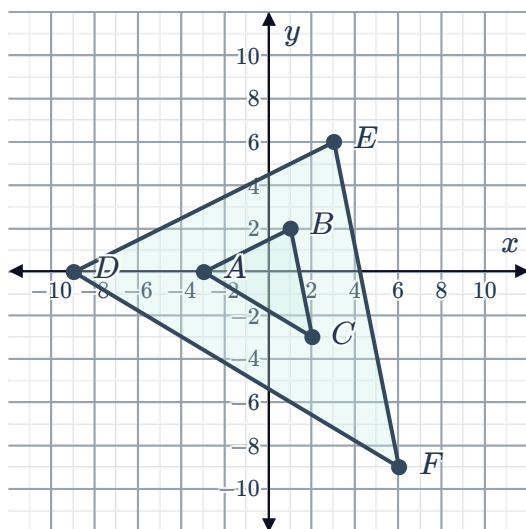


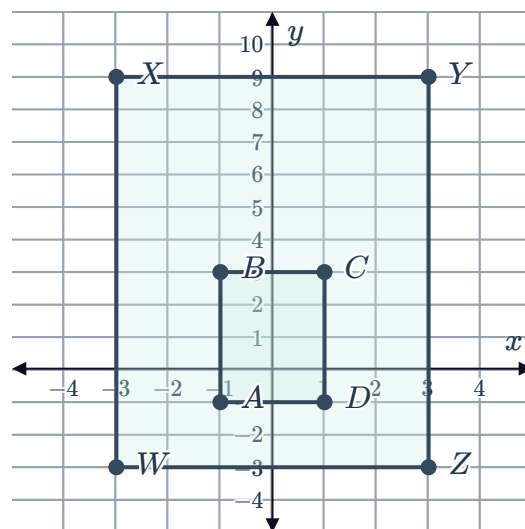
Scale factor

1 Find the scale factor for each of the following similar shapes:

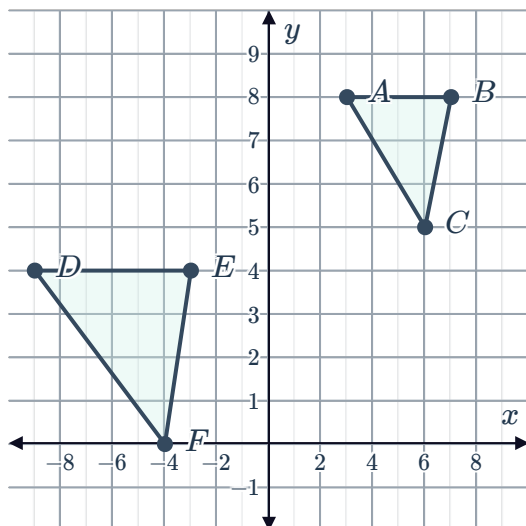
a



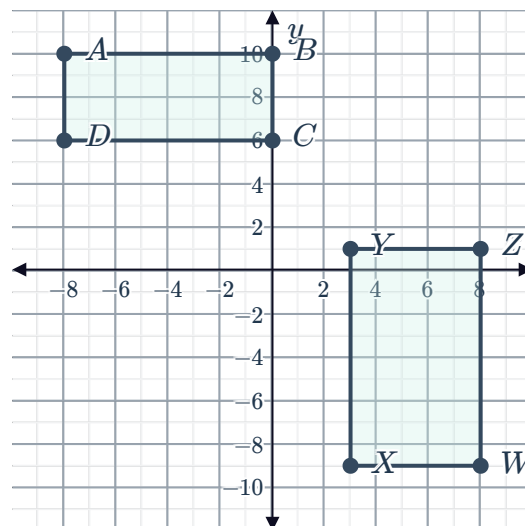
b



c



d

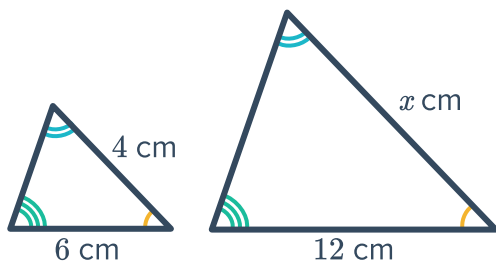


2 For each of the following similar triangles:

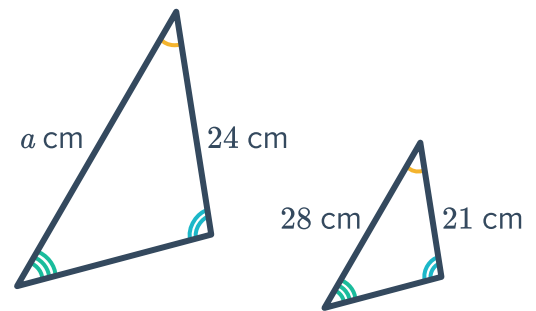
i Find the scale factor.

ii Find the value of the pronumeral.

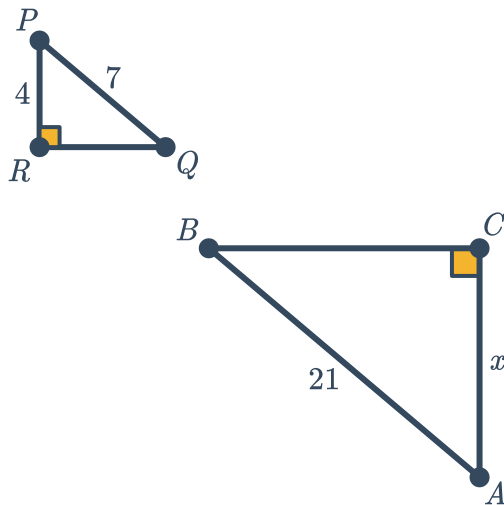
a



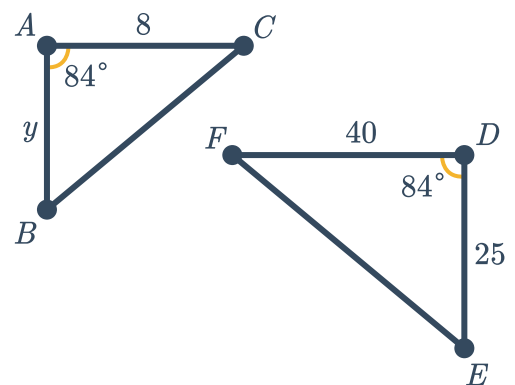
b



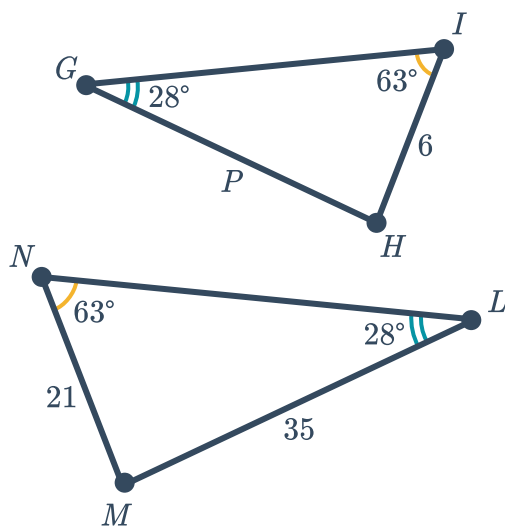
c



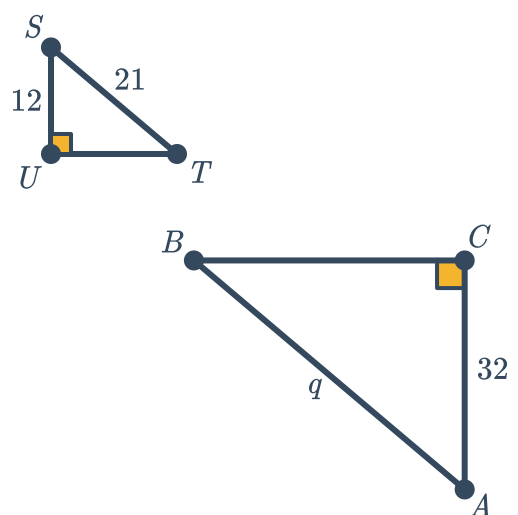
d



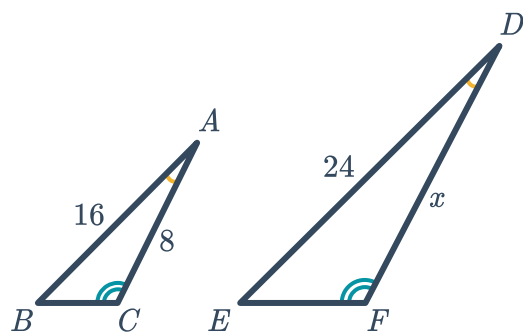
e



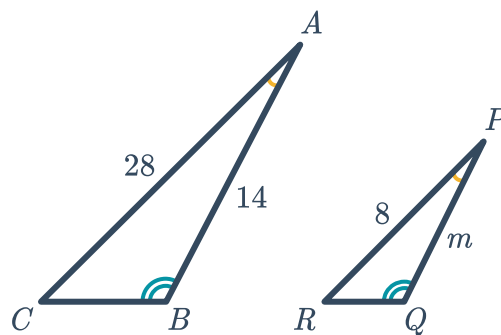
f



g



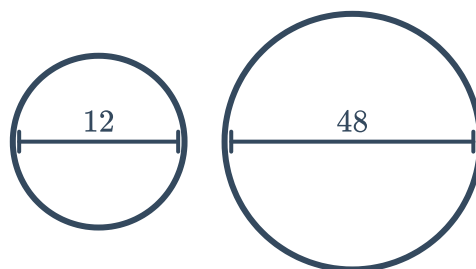
h



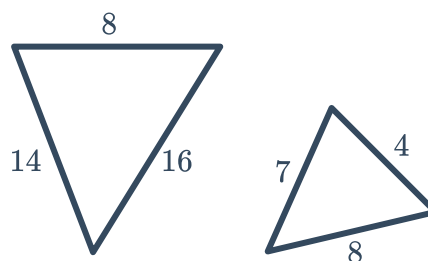
3 Determine whether each statement is true or false:

- a All circles are similar.
- b All squares are similar.
- c All isosceles triangles are similar.
- d All equilateral triangles are similar.
- e All right-angled isosceles triangles are similar.

4 Determine the scale factor between the following two circles:

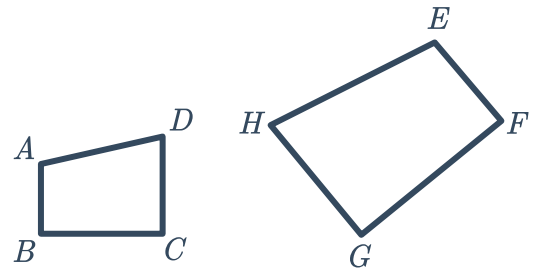


5 Show that the following shapes are similar:



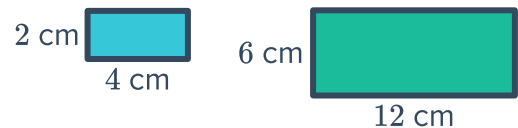
6 These two quadrilaterals are similar.

- a Which side in the larger shape corresponds to side AB ?
- b Which angle in the larger shape corresponds to $\angle ADC$?



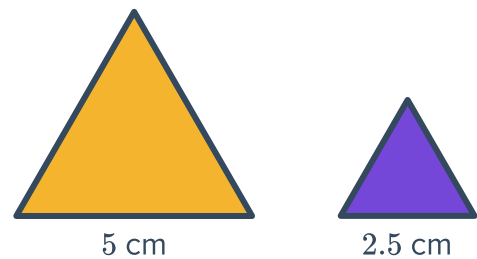
7 The rectangle on the right is an enlargement of the rectangle on the left:

- a What is the enlargement factor?
- b Write the scale of the blue rectangle to the green rectangle.



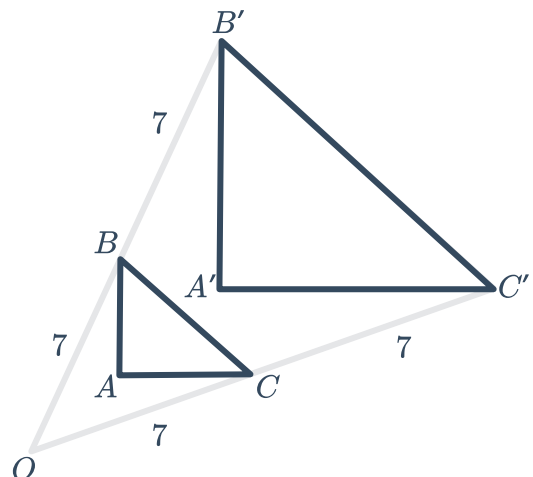
8 The triangle on the right is a reduction of the triangle on the left.

- a What is the reduction factor?
- b Write the scale of the yellow triangle to the purple triangle.

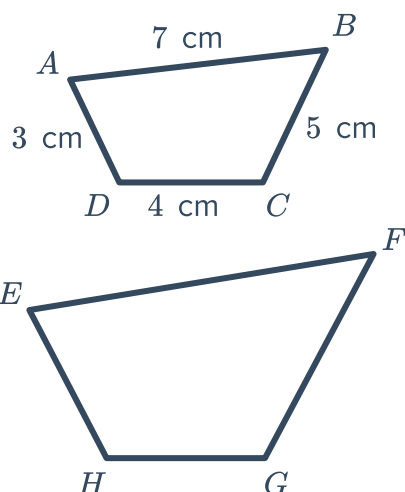


Enlargements and reductions

- 9 $\triangle ABC$ has been enlarged to form $\triangle A'B'C'$. What is the scale factor?

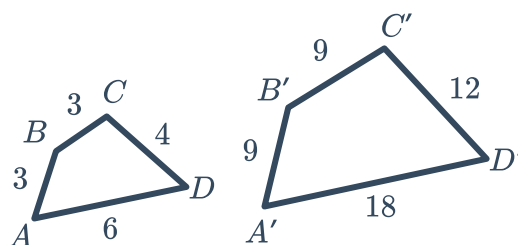


- 10 The scale factor used to enlarge the smaller quadrilateral, $ABCD$, to form the larger quadrilateral, $EFGH$, is 4.5. Find the length of side FG .

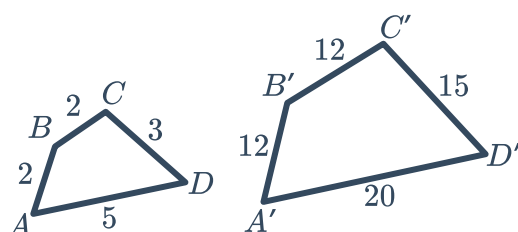


- 11 Consider the following quadrilaterals:

- a Is quadrilateral $A'B'C'D'$ an enlargement of quadrilateral $ABCD$? Explain your answer.
- b What is the scale factor?

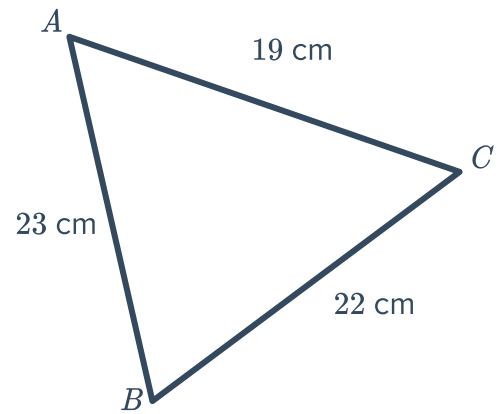


- 12 Consider the following quadrilaterals:
Is quadrilateral $A'B'C'D'$ an enlargement of quadrilateral $ABCD$? Explain your answer.



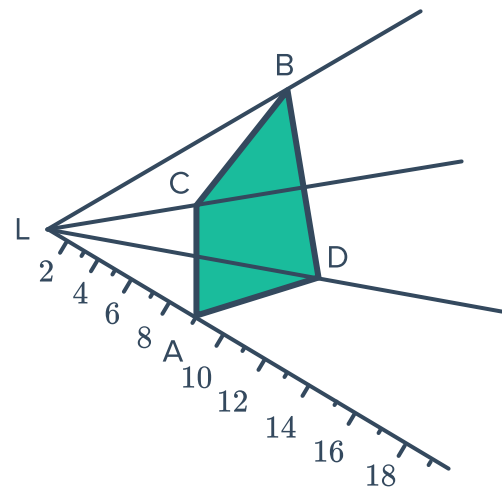
- 13** The dimensions of the triangle shown are enlarged using a scale factor of 3.1:
Find the new length of:

a AB **b** BC **c** CA



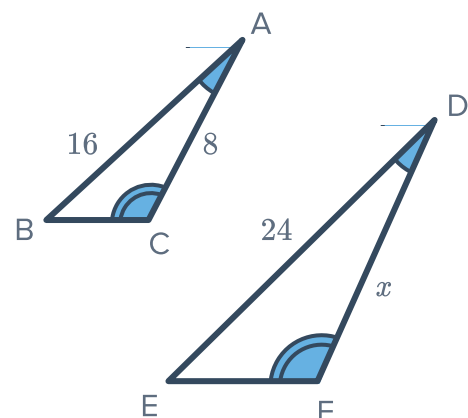
- 14** Quadrilateral $ACBD$ is to be enlarged. For each scale factor below, determine the new position of point A :

- a** Scale factor of $\frac{1}{3}$.
b Scale factor of 2.



- 15** Consider the following similar triangles:

- a** Find the enlargement factor.
b Find the value of x .



- 16** Explain why we do not use a unit when writing the value of a scale factor.

- 17** If an image is enlarged by 250%, what is the scale factor as a decimal value?

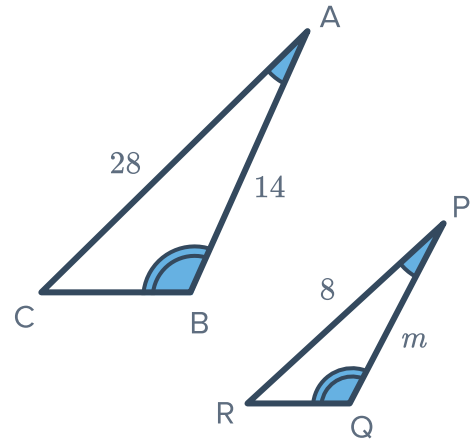
18 An equilateral triangle of side length 6 cm is to be enlarged by a factor of 5.

- a** What will be the side length of the resulting triangle?
- b** What will be the size of each angle in the resulting triangle?

19 Glass in the shape of a circle has a radius of 12 cm. When it is enlarged, the radius becomes 48 cm. What is the enlargement factor?

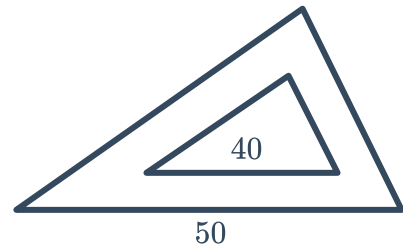
20 Consider the following similar triangles:

- a** Find the reduction factor.
- b** Find the value of m .



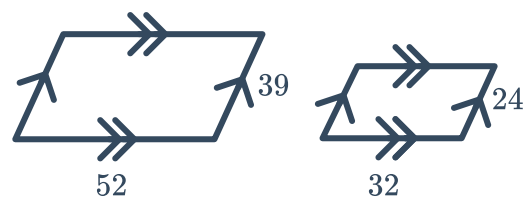
21 The scale factor of these similar figures is 40 : 50. Find:

- a** The reduction factor.
- b** The enlargement factor.



22 The scale factor of these similar figures is 52 : 32. Find:

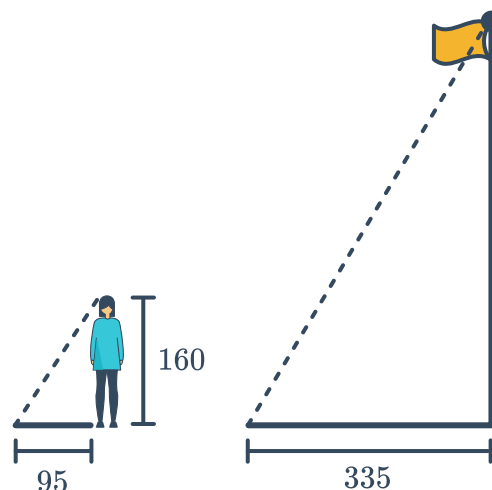
- a** The reduction factor.
- b** The enlargement factor.



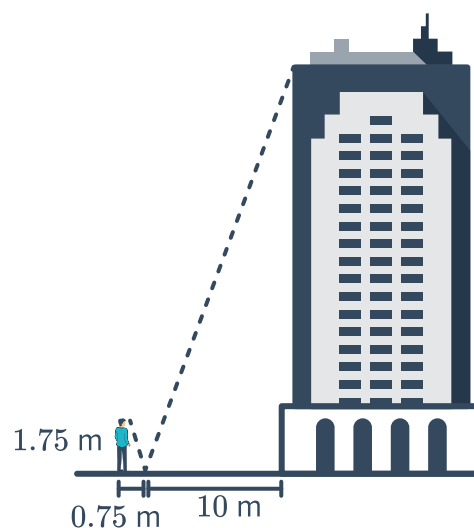
- 23** If a scale factor of $\frac{2}{3}$ is applied to a shape, will the new shape be larger or smaller than the original?

Applications

- 24** Jenny wants to find the height of her school's flag pole. During recess, she measures the length of the flag pole's shadow to be 335 cm. Her friend then measures her own shadow which turns out to be 95 cm. The triangles formed by casting these shadows are similar. If Jenny is 160 cm tall, what is the height of the flag pole? Round your answer to the nearest whole centimetre.

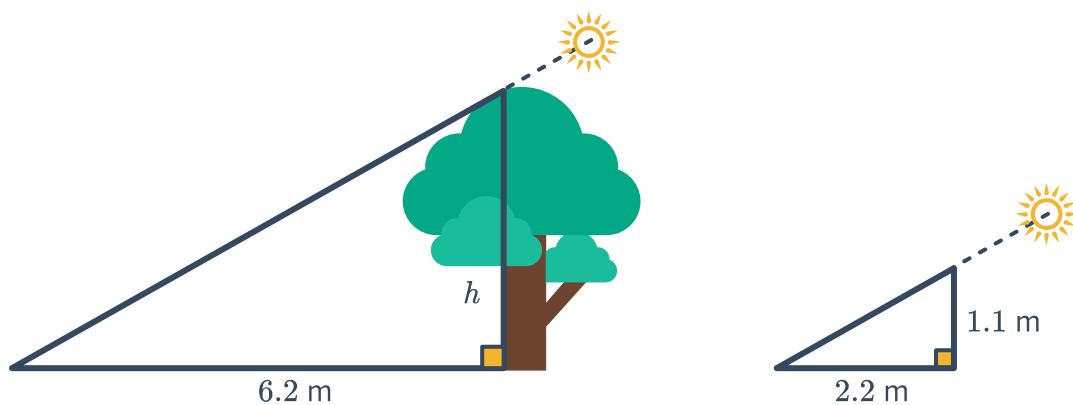


- 25** James wants to find the height of his office building. To do this, he places a mirror flat on the ground 10 m from the base of the building. If he stands exactly 0.75 m away from the mirror, he can just see the top of the building when he looks directly into it. The triangles formed by reflections in the mirror are similar. If James's eye-level is 1.75 m from the ground, what is the height of the building? Round your answer to the nearest whole metre.



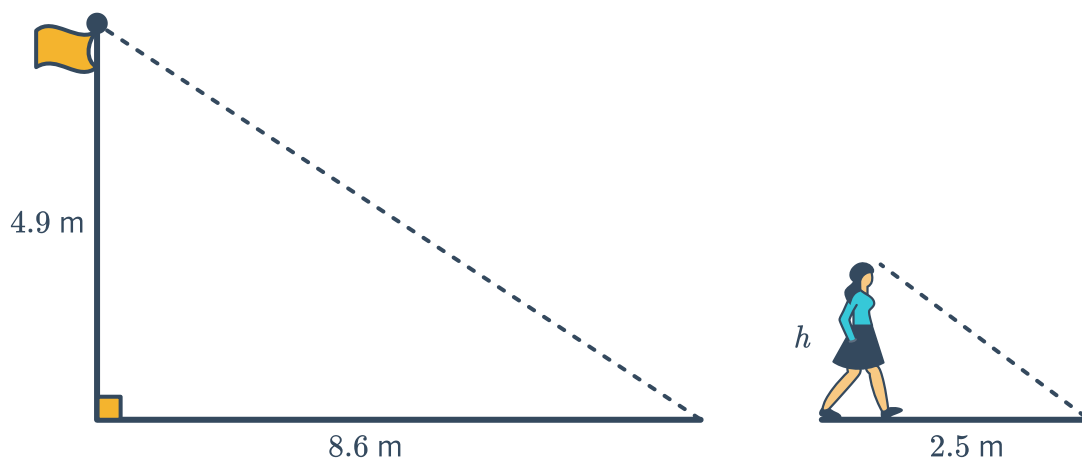
- 26** A school building reaching h metres high casts a shadow of 30 m while a 3 m high tree casts a shadow of 6 m. Solve for h .

- 27** A stick of height 1.1 m casts a shadow of length 2.2 m. At the same time, a tree casts a shadow of 6.2 m.

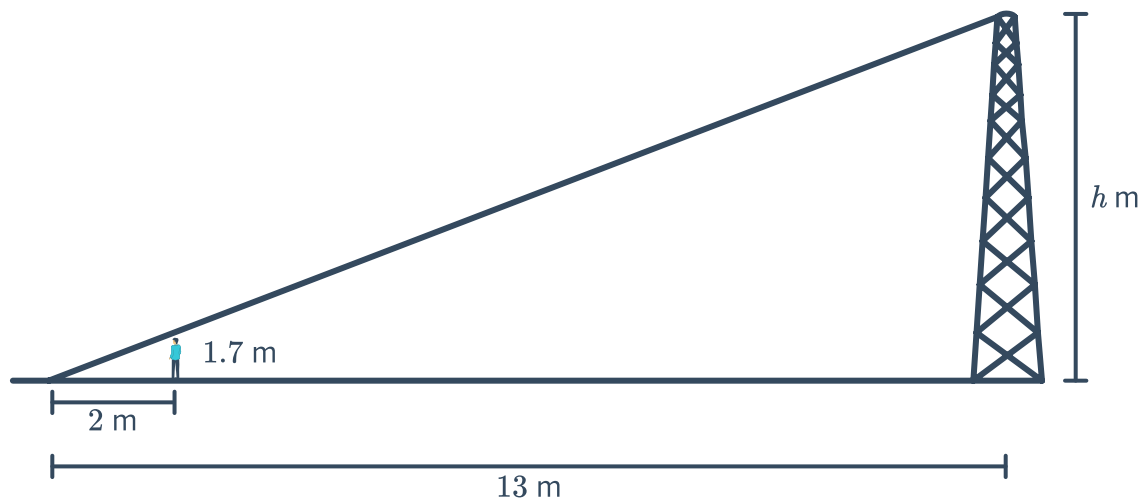


If the tree has a height of h metres, solve for h .

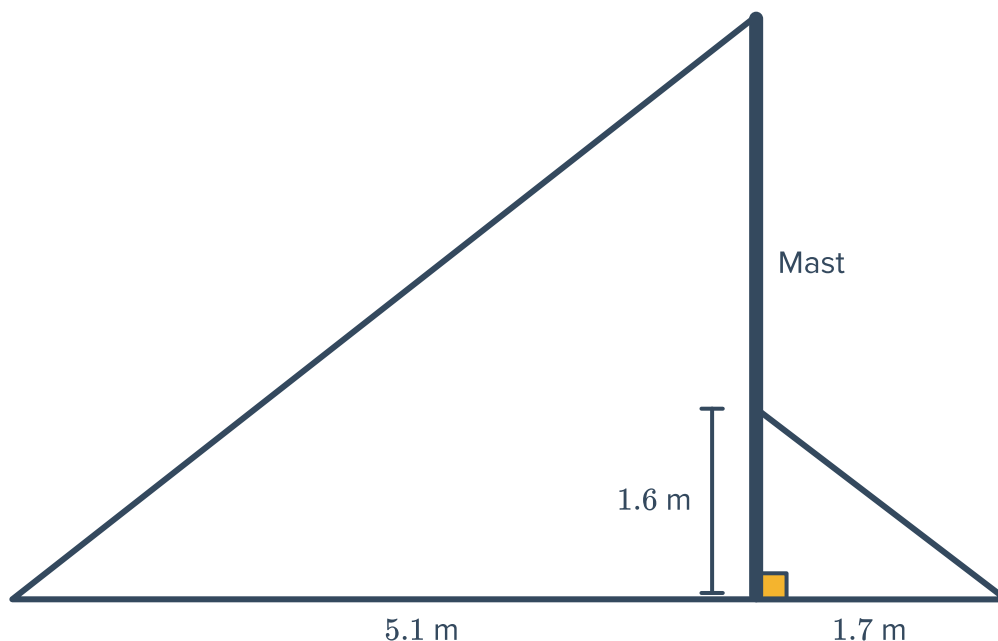
- 28** A 4.9 m flagpole casts a shadow of 8.6 m. Amelia casts a shadow of 2.5 m. If Amelia is h metres tall, solve for h correct to one decimal place.



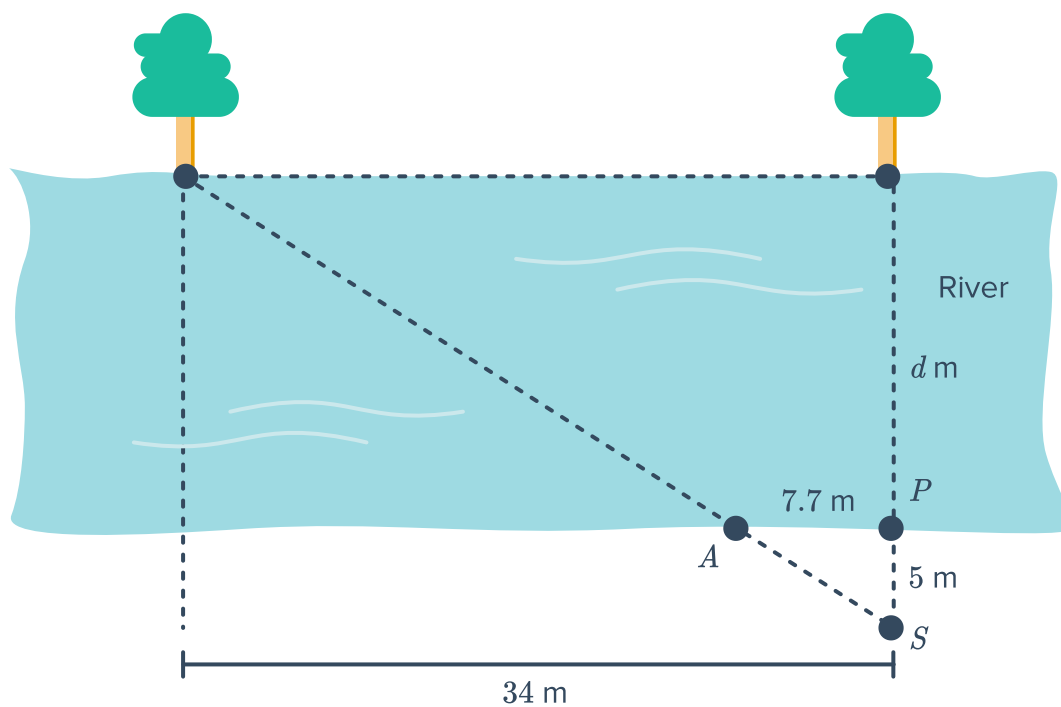
- 29** James is 1.7 m tall and casts a shadow 2 m long. At the same time, a tower casts a shadow 13 m long. If the tower is h metres high, solve for h correct to one decimal place.



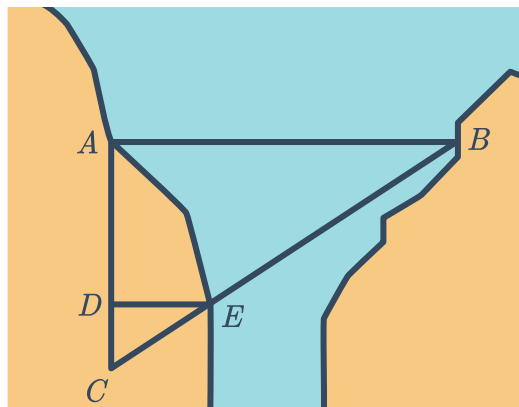
- 30** Two similar triangles are created by cables supporting a yacht's mast. Solve for h , the height of the mast.



- 31** A surveyor needs to measure the distance across a river. There are two trees on the opposite bank that are 34 m apart. She stands 5 m from the bank, directly opposite the first tree. Her assistant has to move 7.7 m along the bank to place a stick directly in her line of sight to the second tree. Find the width d of the river correct to the nearest metres.



- 32** Engineers want to determine the distance for a bridge to be built between points A and B . The diagram is an aerial view of their measurements. Point C is chosen so that AC is perpendicular to AB , and point E is chosen so that DE is perpendicular to AC . The following measurements are taken: $CA = 332$ metres, $CD = 103$ metres and $DE = 119$ metres. Calculate the distance AB to the nearest metre.



- 33** James stands at point A , as shown in the adjacent figure, so that he is in line with the pier and the tree on the other side of the canal. He then measures the direct distance to the edge of the water to be 14 m, and the distance along the canal to be 25 m as shown. The distance of the tree from the jetty is known to be 137 m. If the width of the canal is w metres, solve for w . Round your answer to the nearest metre.

