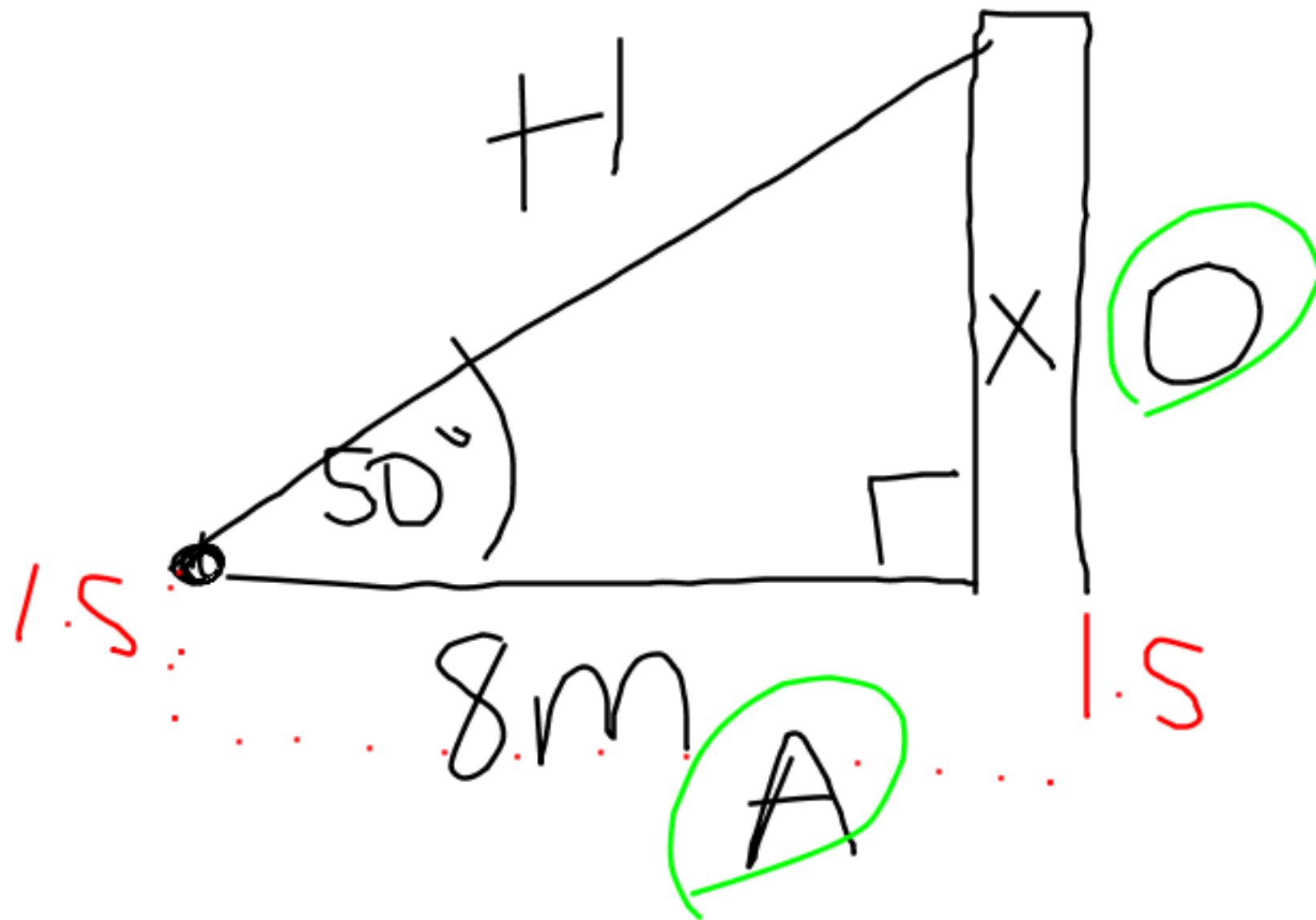From a point 8m from the base of a building, Olaf measures the angle of elevation to top of the using a 1.5m tall transit instrument. The angle of elevation is 50 degrees. How tall is the building?

SOHCAHTOA

$$\tan\theta = \frac{O}{A}$$

$$\tan 50° = \frac{X}{8}$$

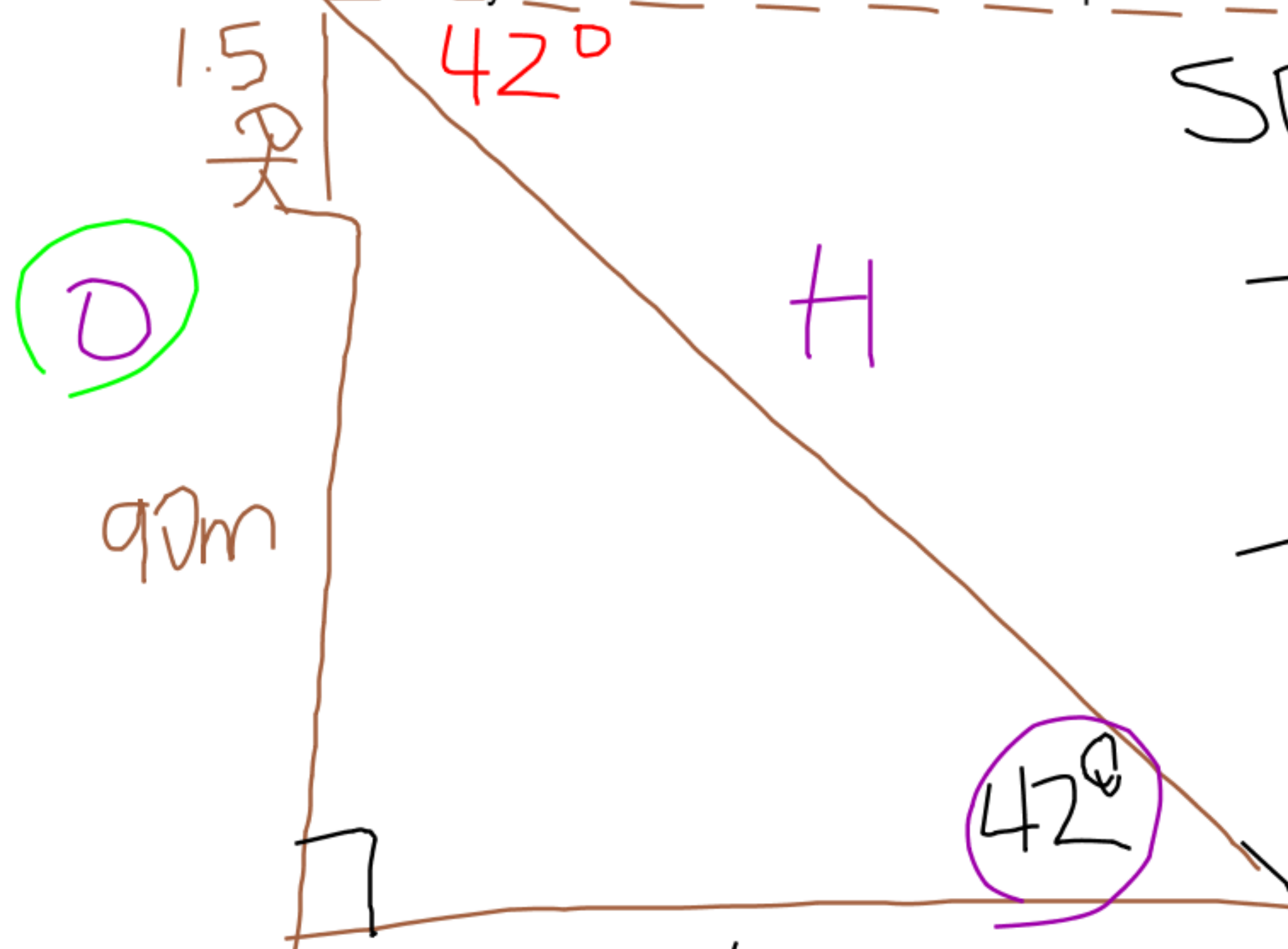$$8(\tan 50) = X$$

$$9.5 = X$$

$$9.5 + 1.5 = 11m$$

+1

X O

50°

1.5

8m A 1.5

∴ The height of the building is 11m

The Cathedral Fluffs in Toronto, Ontario are the result of wind and water erosion from Lake Ontario. The highest point along the cliffs is 90m above the shore. From the top of the cliffs, a surveyor using a 1.5m tall trasit instrument spots a boat out in the lake at an angle of depression of 42 degrees. How far is the boat from the shore? Round your answer to one decimal place.
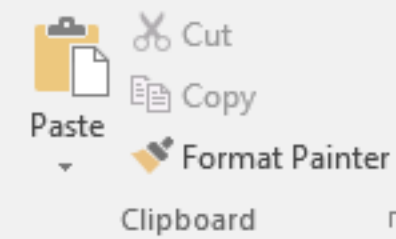
1.5

$42°$

$90m$

H

$42°$

X

D

A

SOHCAHTOA

$$\tan\theta = \frac{O}{A}$$

$$\tan 42 = \frac{91.5}{X}$$

$$X(\tan 42) = 91.5$$

$$\frac{X(\tan 42)}{\tan 42} = \frac{91.5}{\tan 42}$$

$$X = 101.6\ m$$

∴ The boat is 101.6m away from the shore

1. A nursery plants a new tree and attaches a guy wire to help support the tree while its roots take hold. An 8 meter wire is attached to the tree and to a stake in the ground. From the stake in the ground the angle of elevation of the connection with the tree is 42º. Find to the *nearest tenth of a meter*, the height of the connection point on the tree.
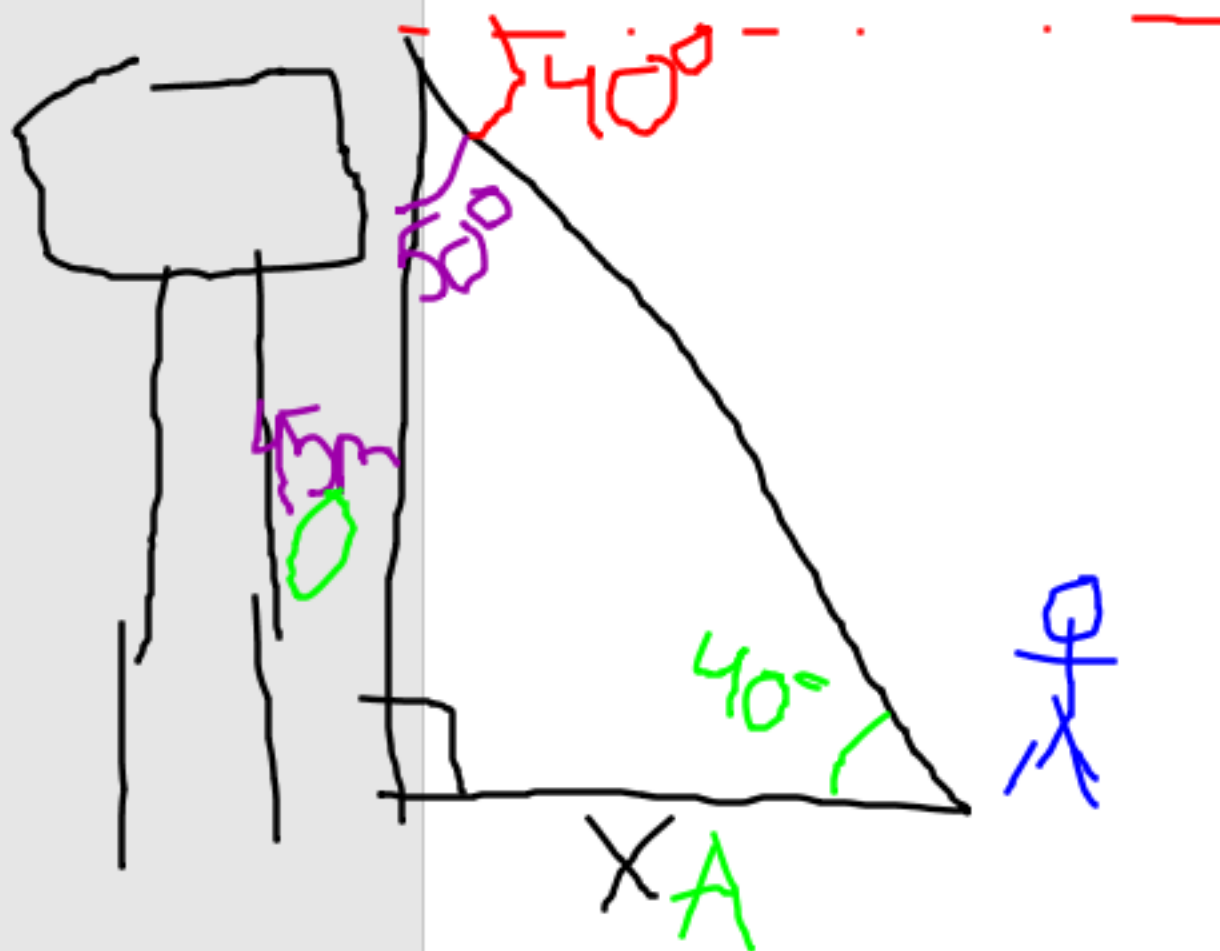
8m H

42°

x

A

$$\sin \theta = \frac{O}{H}$$

$$\frac{\sin 42}{1} = \frac{x}{8}$$

$$(\sin 42)(8) = x$$

$$5.4 = x$$

∴ The height of the connection point is 5.4m.

2. From the top of a fire tower, a forest ranger sees his partner on the ground at an angle of depression of 40º. If the tower is 45 meter in height, how far is the partner from the base of the tower, to the *nearest tenth of a meter*?

$$\tan \theta = \frac{O}{A}$$

$$\tan 40 = \frac{45}{X}$$