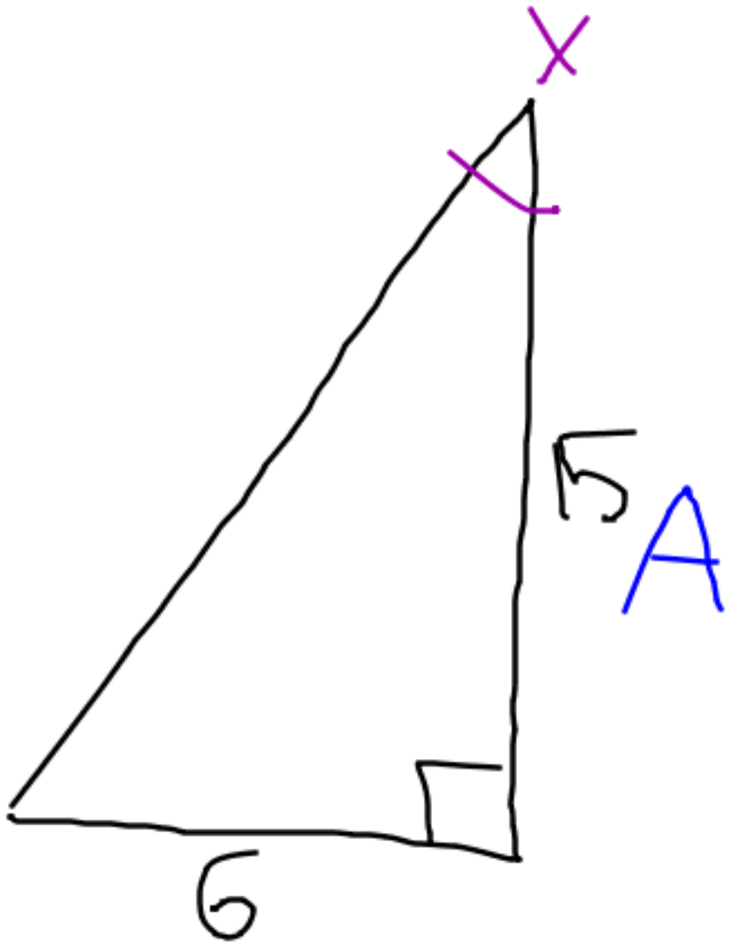

$$\tan X = \frac{O}{A} \quad \checkmark$$

$$\tan X = \frac{6}{15} \quad \checkmark$$

$$\tan X^{-1} = 0.400^{-1} \quad \checkmark$$

$$X = 22^{\circ}$$

7.4 Apply Trigonometry

We have now learned the 3 ratios in trigonometry: sine, cosine, and tangent.

In real life scenarios we must choose the appropriate ratio to use based on which angle we are using, which side we know, and which side we are trying to find.

Example 1 - Angle of Elevation

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

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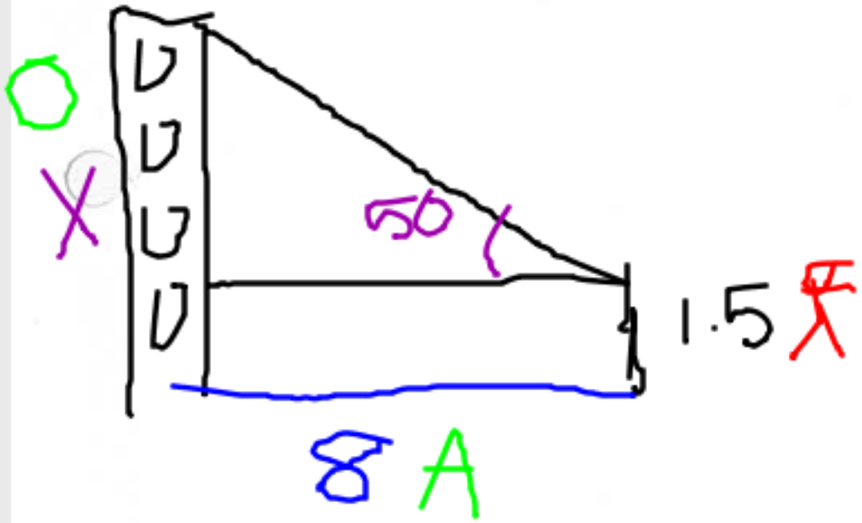
$$\tan\theta = \frac{O}{A}$$

$$\frac{\tan 50}{1} = \frac{X}{8}$$

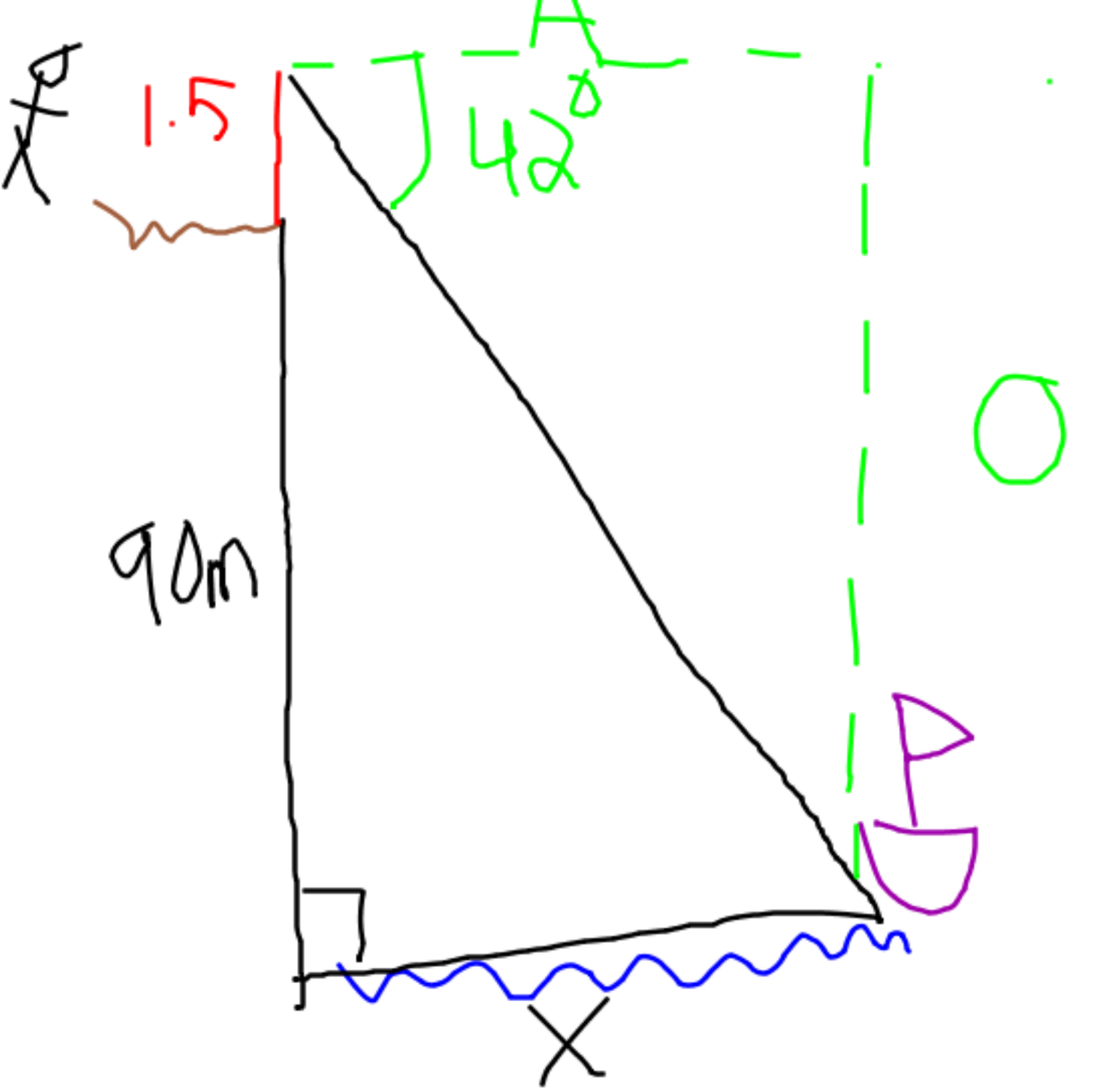
$$X = 9.5\text{m}$$



$$9.5 + 1.5$$

$$= 11\text{m}$$

∴ The height of the building is 11m



$90 + 1.5$

$= 91.5$

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

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

$91.5 = \tan 42 \, x$

$\frac{91.5}{\tan 42} = \frac{\tan 42 \, x}{\tan 42}$

$101.6 = x$

∴ The boat is 101.6m from shore