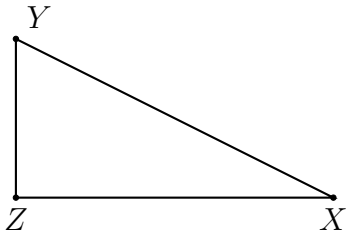
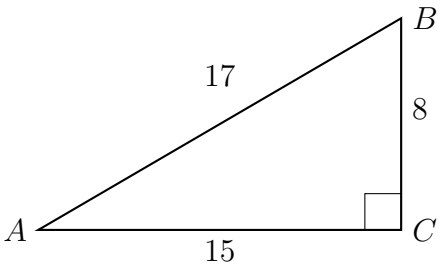
10.4 Classwork: Tangent applications **CCSS.HSG.SRT.C.8**

Write an equation expressing $\tan\theta$ as a ratio of *opposite* over *adjacent*, then solve for the missing length. Round angle measures to the *nearest degree* and lengths to the *nearest tenth* unless otherwise stated.

1. Given right $\triangle XYZ$ with $\overline{YZ} \perp \overline{XZ}$, $XZ = 15$, $m\angle X = 27°$. Let x be the length of the side opposite $\angle X$, $x = YZ$. Mark the figure then solve.



2. $\triangle ABC$ is shown with $m\angle C = 90°$ and the lengths of the triangle's sides are $BC = 8$, $AC = 15$, and $AB = 17$. (not drawn to scale)

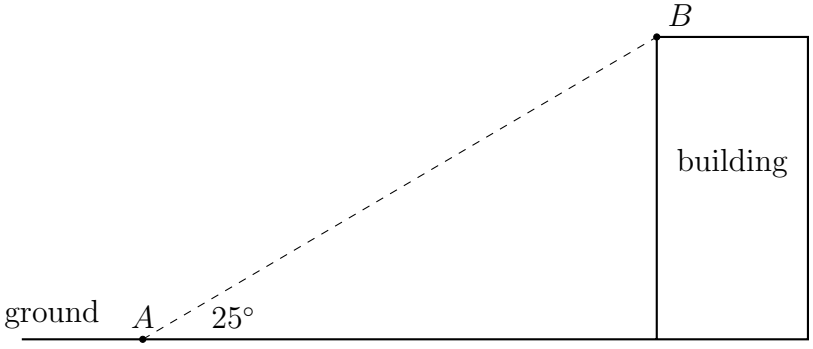


(a) Write down the value of $\tan A$.

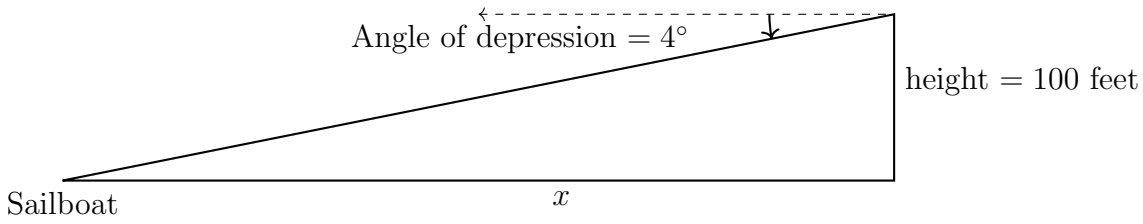
(b) Find the measure of $\angle A$.

3. The diagram shows a building with observer A on the ground looking up at B on the building roof. Point A is 40 feet from the building and the angle of elevation from A to B is 25°.

Find the height of the building to the *nearest foot*. (not drawn to scale)



4. From the top of a seaside cliff, a sailboat is visible at an angle of depression of 4°. If the cliff is 100 feet tall, determine the distance of the boat from shore, x, to the *nearest foot*.



5. A zipline wire is strung from a pole to the ground with an angle of elevation of 12°. If the pole is 30 feet tall, how long is the wire, to the *nearest foot*.

   (hint: first find the distance to the pole horizontally, then use the Pythagorean theorem to find the hypotenuse, the wire)