12.2 Classwork: Tangent inverse **CCSS.HSG.SRT.C.8**

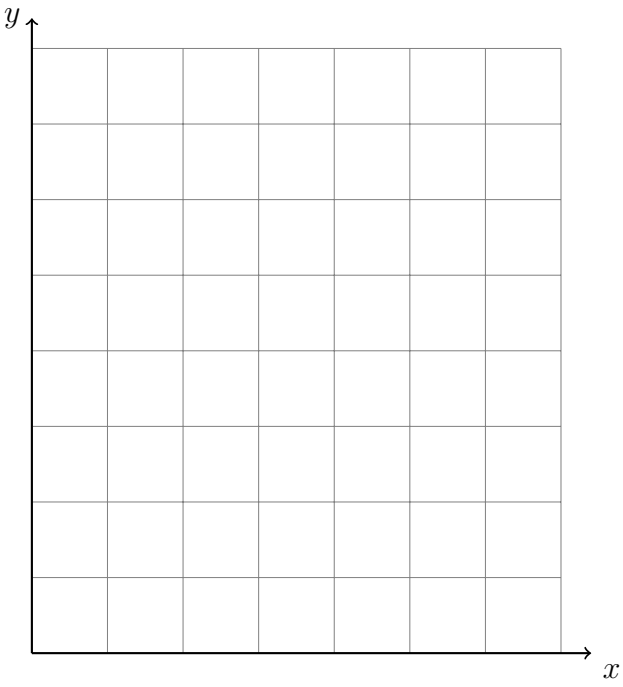
1. Graph and label $\triangle ABC$ with $A(0,0)$, $B(3,6)$, and $C(3,0)$. Calculate each value:

   (a) $AC =$

   (b) $BC =$

   (c) Express first as a radical, then approximate with a decimal rounded to two decimal places.

   $AB =$



   (d) Use a protractor to measure $m\angle BAC = \theta$ in degrees.

   (e) The tangent of an angle is the ratio of the side lengths *opposite* over *adjacent* to the angle. Write down the value as a fraction.

   $\tan\theta =$

   (f) Find $m\angle BAC = \theta$ in degrees with a calculator's inverse tangent function.
   $\theta = \tan^{-1}(\frac{opp}{adj})$

   (g) Convert θ to radians. ($180^\circ = \pi$ radians)

Mastery topic: Calculator use

2. Express the result to the nearest thousandth.

   (a) $\tan 22^\circ =$

   (b) $\tan 81^\circ =$

   (c) $\tan 15^\circ =$

   (d) $\tan 65^\circ =$

3. Round each value to the nearest degree.

   (a) $\tan^{-1}(2) =$

   (b) $\tan^{-1}(0.5) =$

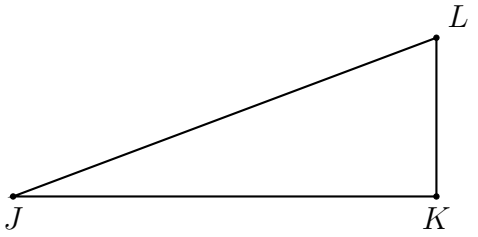
   (c) $\tan^{-1}(1) =$

   (d) $\tan^{-1}(\frac{1}{\sqrt{3}}) =$

Mastery topic: Modeling. Do Not Solve

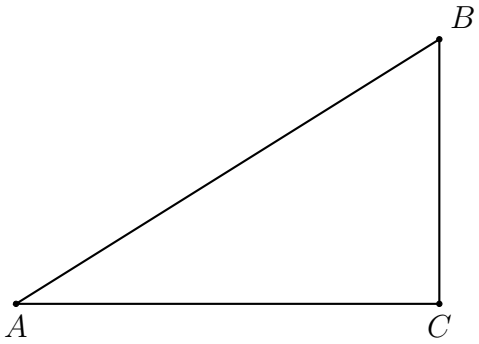
4. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JK = 11$, $m\angle J = 18^\circ$. (mark the diagram)

   Let x be the length of the side opposite $\angle J$, $x = KL$. Write an equation expressing $\tan \angle J$ as a ratio of *opposite* over *adjacent*.



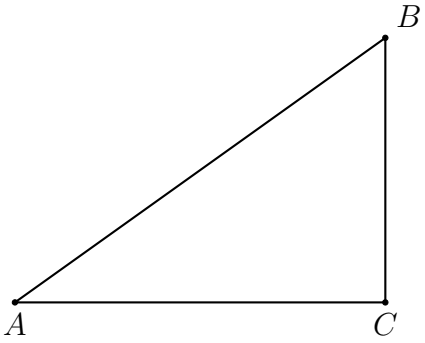
5. Given right $\triangle ABC$ with $m\angle C = 90°$, $BC = 5$, $m\angle A = 38°$. (mark the diagram)

   Let x be the length of the side adjacent to $\angle A$, $x = AC$. Write an equation expressing $\tan\angle A$ as a ratio of *opposite* over *adjacent*.



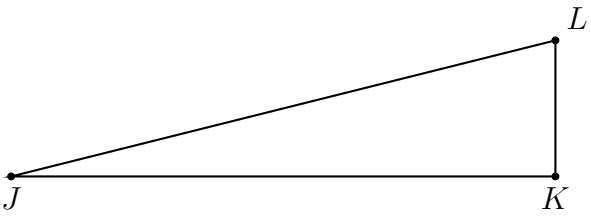
6. Given right $\triangle ABC$ with $m\angle C = 90°$, $BC = 11$, $AC = 17$, and $m\angle A = x°$. (mark the diagram)

   Write an equation expressing $\tan x$ as a ratio of *opposite* over *adjacent*.



7. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JK = 20$, $m\angle J = 11°$. (mark the diagram)

   Let x be the length of the side opposite $\angle J$, $x = KL$. Write an equation expressing $\tan\angle J$ as a ratio of *opposite* over *adjacent*.



Mastery topic: Algebraic solution

Use your calculator and solve each equation for x, rounding to the nearest tenth.

8. $\tan 75^\circ = \dfrac{x}{15}$

9. $\tan 26^\circ = \dfrac{4}{x}$

10. $x = \tan^{-1}(\dfrac{2}{3.5})$

11. $\tan x^\circ = \dfrac{17}{9}$