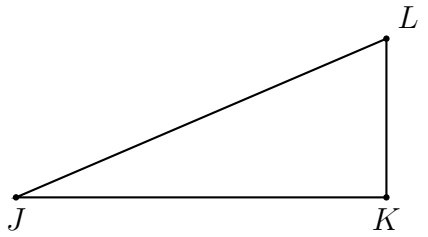
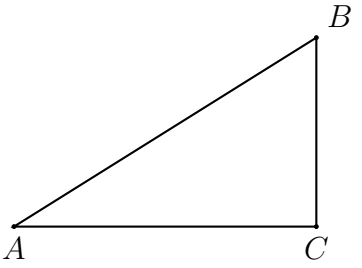
10.3 Classwork: Tangent inverse **CCSS.HSG.SRT.C.8**

Write an equation expressing $\tan\theta$ as a ratio of *opposite* over *adjacent*, then solve for the missing length.

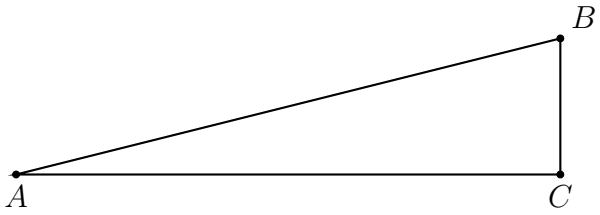
1. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JK = 8$, $m\angle J = 24°$. Let x be the length of the side opposite $\angle J$, $x = KL$.



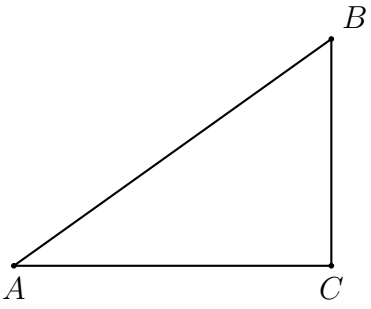
2. Given right $\triangle ABC$ with $m\angle C = 90°$, $BC = 15$, $m\angle A = 41°$.
   (a) Solve for $x = AC$.
   (b) Find the length of the hypotenuse AB using the Pythagorean theorem.



3. Given right $\triangle ABC$ with $m\angle C = 90°$, $BC = 4$, $AC = 19$, and $m\angle A = x°$.



4. Given right $\triangle ABC$ with $\overline{AC} \perp \overline{BC}$, $BC = 7$, $m\angle B = 55°$. Let $x = AC$.



Mastery topic: Algebraic solution

5. Solve each equation for x, rounding to the nearest hundredth.

   (a) $\tan 63^\circ = \dfrac{x}{14}$

   (c) $\tan 46^\circ = \dfrac{x}{3.5}$

   (b) $\tan 77^\circ = \dfrac{10}{x}$

   (d) $\tan 35^\circ = \dfrac{21}{x}$

6. Solve for x, rounding to the nearest whole degree.

   (a) $\theta = \tan^{-1}(\dfrac{12}{5})$

   (b) $\tan\theta = \dfrac{3.2}{4.8}$

Mastery topic: Calculator use

7. Express the result to the nearest thousandth. Angle measures are in radians.

   (a) $\tan\dfrac{\pi}{4} =$

   (b) $\tan\dfrac{\pi}{3} =$

   (c) $\tan\dfrac{\pi}{6} =$

   (d) $\tan\dfrac{\pi}{12} =$

8. Find each value in radians, rounding to the nearest thousandths.

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

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

9. Convert between radians and degrees. Leave radians in terms of π.

   (a) $45^\circ =$

   (b) $\dfrac{\pi}{6} =$

10. Round each value to the nearest hundredth.

    (a) $AB = \sqrt{11^2 + 7^2}$

    (b) $AB = \sqrt{3.2^2 + 1.9^2}$

    (c) $AB = \sqrt{(-8.0)^2 + (14.5)^2}$

    (d) $AB = \sqrt{(4-3)^2 + (7-11)^2}$

11. Express the result to the nearest thousandth. Angle measures are in degrees.

    (a) $\tan 33^\circ =$ (b) $\tan 81^\circ =$

12. Find the tangent of each radian angle measure. Round to the nearest thousandth.

    (a) $\tan 1.1 =$ (b) $\tan \frac{\pi}{5} =$

13. Find each angle measure, to the nearest whole degree.

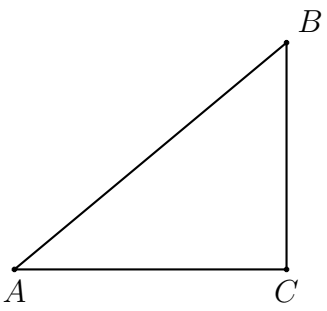
    (a) $\tan^{-1}(\frac{7}{4}) =$ (b) $\tan^{-1}(0.75) =$

14. Convert between radians and degrees. Leave radians in terms of π.

    (a) $60^\circ =$ (b) $\frac{\pi}{8} =$

15. Find the value, rounding to the nearest hundredth.
    $AB = \sqrt{(-7.7)^2 + (26.4)^2}$

16. Mark and label the diagram to reflect the equation:
    $\tan 41^\circ = \frac{12}{14}$



17. Solve each equation, rounding to the nearest tenth.

(a) $\tan 53^\circ = \dfrac{x}{11}$

(b) $\tan 47^\circ = \dfrac{19}{x}$

(c) $\tan \theta = \dfrac{5.7}{4.4}$

(d) $41 = \sqrt{x^2 + 40^2}$

Radian degree conversion practice

Express the result to the nearest hundredth. (Degree measures to whole degrees)

18. $\tan 25^\circ =$

19. $\tan 1.25$ radians $=$

20. $\tan^{-1}(\frac{7}{5}) =$ degrees

21. $\tan^{-1}(\frac{20}{13}) =$ radians

22. Convert radians and degrees. (nearest whole degree, nearest hundredth radian).

    (a) $35^\circ =$ (b) $0.45 =$

Challenge

23. Find the value, rounding to the nearest hundredth.

    $c = \sqrt{(-7.625)^2 + (\sqrt{83})^2}$

24. Solve for x

    $5 = \sqrt{8x - 15}$