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## 10.2 Classwork: Tangent inverse

CCSS.HSG.SRT.C.8

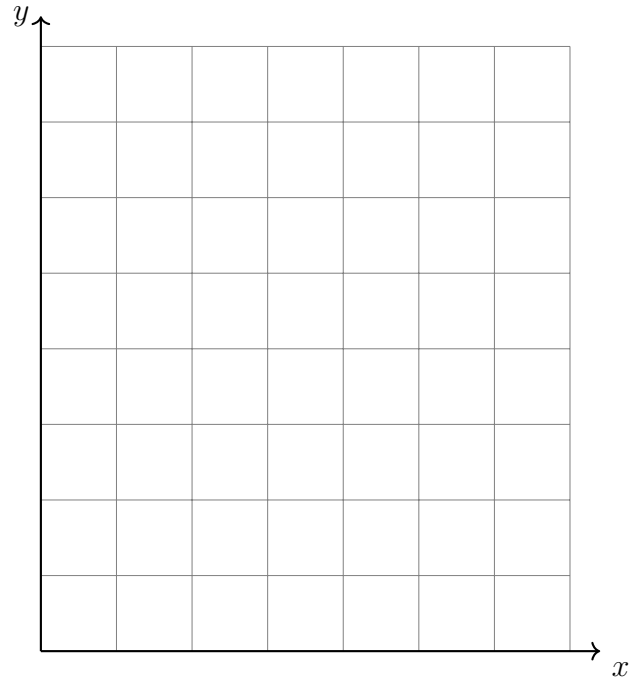
1. Graph and label  $\triangle ABC$  with  $A(0, 0)$ ,  $B(3, 6)$ , and  $C(3, 0)$ . Calculate each value:

(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.

$\theta = \tan^{-1}\left(\frac{opp}{adj}\right)$

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

**Mastery topic: Calculator use**

2. Express the result to the nearest thousandth.

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

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

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

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

3. Round each value to the nearest degree.

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

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

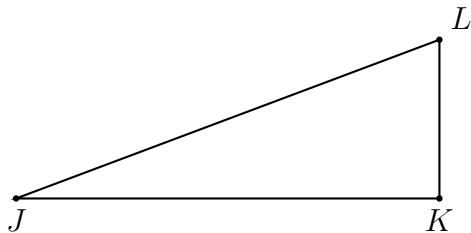
(b)  $\tan^{-1}(0.5) =$

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

**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)

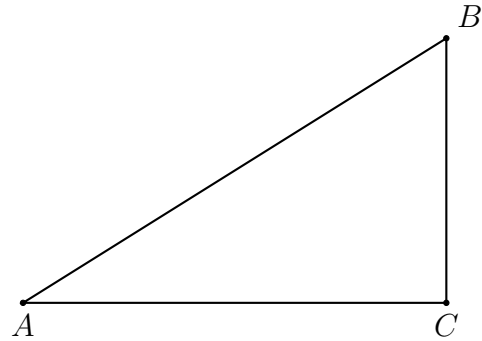
Let  $x$  be the length of the side opposite  $\angle J$ ,  $x = KL$ . Write an equation expressing  $\tan \angle J$  as a ratio of *opposite* over *adjacent*.



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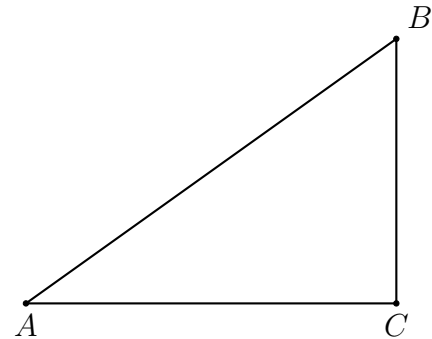
5. Given right  $\triangle ABC$  with  $m\angle C = 90^\circ$ ,  $BC = 5$ ,  $m\angle A = 38^\circ$ . (mark the diagram)

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*.



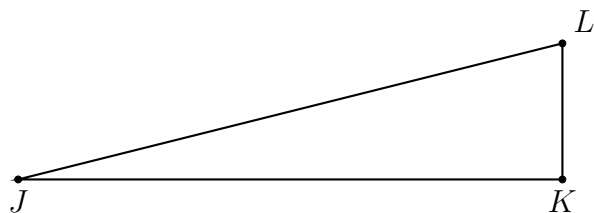
6. Given right  $\triangle ABC$  with  $m\angle C = 90^\circ$ ,  $BC = 11$ ,  $AC = 17$ , and  $m\angle A = x^\circ$ . (mark the diagram)

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



7. Given right  $\triangle JKL$  with  $\overline{JK} \perp \overline{KL}$ ,  $JK = 20$ ,  $m\angle J = 11^\circ$ . (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*.



**Mastery topic: Algebraic solution**

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

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

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

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

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