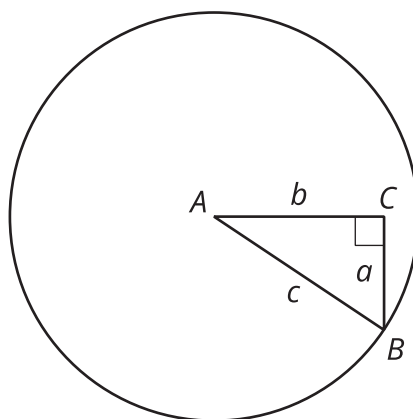


Revisiting Right Triangles

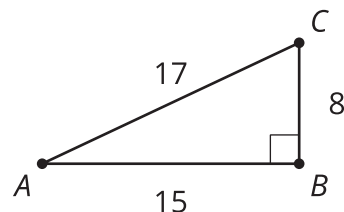
Let's recall and use some things we know about right triangles.

2.1 A Right Triangle



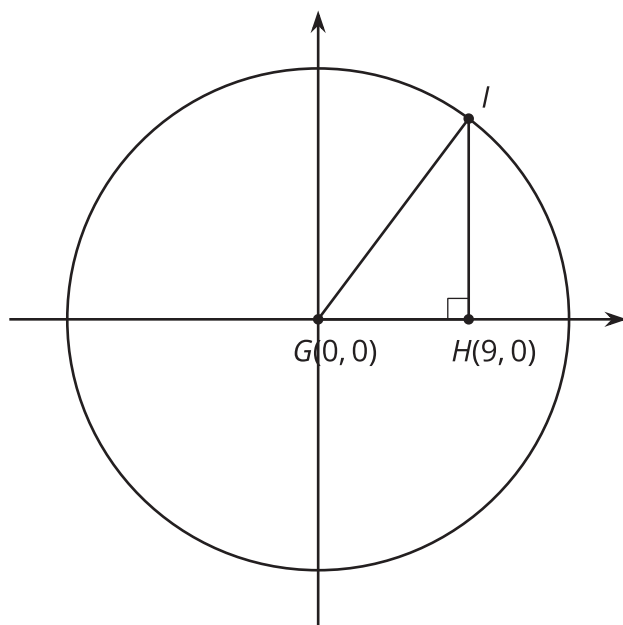
2.2 Recalling Right Triangle Trigonometry

1. Find $\cos(A)$, $\sin(A)$, and $\tan(A)$ for triangle ABC .



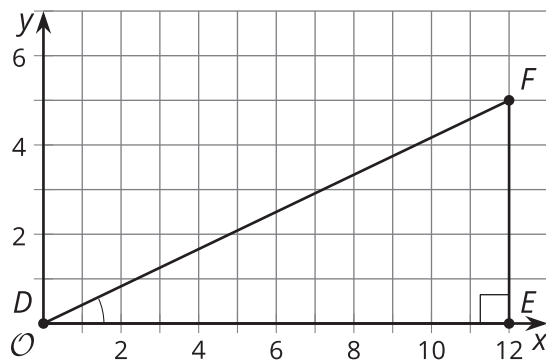
2. Sketch a triangle DEF where $\sin(D) = \cos(D)$ and E is a right angle. What is the value of $\tan(D)$ for this triangle? Explain how you know.

3. If the coordinates of point I are $(9, 12)$, what is the value of $\cos(G)$, $\sin(G)$, and $\tan(G)$ for triangle GHI ? Explain or show your reasoning.



2.3 Shrinking Triangles

1. What are $\cos(D)$, $\sin(D)$, and $\tan(D)$? Explain how you know.

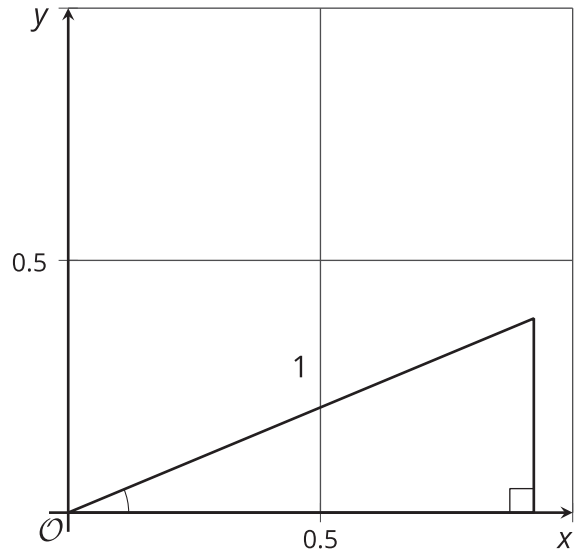


2. Here is a triangle similar to triangle DEF .



- a. What is the scale factor from triangle DEF to triangle $D'E'F'$? Explain how you know.
- b. What are $\cos(D')$, $\sin(D')$, and $\tan(D')$?

3. Here is another triangle similar to triangle DEF .



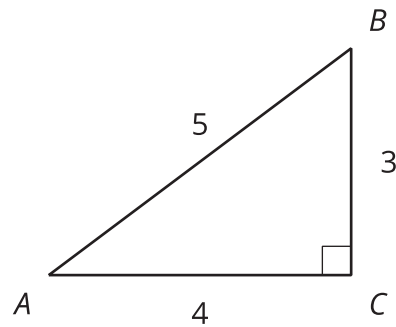
- Label the triangle $D''E''F''$.
- What is the scale factor from triangle DEF to triangle $D''E''F''$?
- What are the coordinates of F'' ? Explain how you know.
- What are $\cos(D'')$, $\sin(D'')$, and $\tan(D'')$?

Are you ready for more?

Angles C and C' in triangles ABC and $A'B'C'$ are right angles. If $\sin(A) = \sin(A')$, is that sufficient to show that $\triangle ABC$ is similar to $\triangle A'B'C'$? Explain your reasoning.

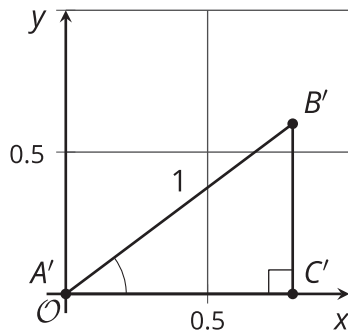
Lesson 2 Summary

Recall that the ratios of side lengths in similar right triangles are equivalent.



In this triangle, the cosine of angle A is the ratio of the length of the side adjacent to angle A to the length of the hypotenuse, or $\cos(A) = \frac{4}{5}$. The sine of angle A is the ratio of the length of the side opposite angle A to the length of the hypotenuse, or $\sin(A) = \frac{3}{5}$. The tangent of angle A is the ratio of the length of the side opposite angle A to the length of the side adjacent to angle A , or $\tan(A) = \frac{3}{4}$.

Now consider triangle $A'B'C'$, which is similar to triangle ABC with a hypotenuse of length 1 unit. Here is a picture of triangle $A'B'C'$ on a coordinate grid:



Since the two triangles are similar, angles A and A' are congruent. So how do the values of cosine, sine, and tangent of these angles compare to the angles in triangle ABC ? It turns out that since all three values are ratios of side lengths, $\cos(A) = \cos(A')$, $\sin(A) = \sin(A')$, and $\tan(A) = \tan(A')$.

Notice that the coordinates of B' are $(\frac{4}{5}, \frac{3}{5})$ because segment $A'C'$ has length $\frac{4}{5}$ and segment $B'C'$ has length $\frac{3}{5}$. In other words, the coordinates of B' are $(\cos(A'), \sin(A'))$.