8.2 Trigonometric Ratios
Trigonometry Part 1: Finding Missing Sides

Key

8.2.a.: Write trigonometric ratios for a right triangle.
8.2.b.: Use a calculator to find decimal trigonometric ratios.
8.2.c.: Use trigonometric ratios to find side lengths of a right triangle.

Part 1: Important Vocabulary

Trigonometric Ratio: A ___ratio___ of two sides of a right triangle.

- The **SINE** of an angle is the ratio of the leg ___opposite___ the angle to the ___hypotenuse___.
- The **COSINE** of an angle is the ratio of the leg ___adjacent___ to the angle to the ___hypotenuse___
- The **TANGENT** of an angle is the ratio of the leg ___opposite___ the angle to the leg ___adjacent___ to the angle.

sin= $\frac{opp}{hyp}$ **cos=** $\frac{adj}{hyp}$ **tan=** $\frac{opp}{adj.}$

S $\frac{O}{H}$ C $\frac{A}{H}$ T $\frac{O}{A}$

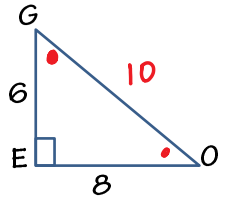
Part 2: Trigonometric Ratios 8.2.a.: Write trigonometric ratios for a right triangle.

Directions: Write each trig ratio as a simplified fraction.

1) sin(G)= $\frac{8}{10}$

cos(G)= $\frac{6}{10}$

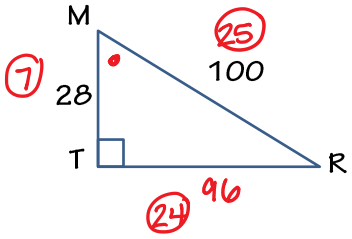
tan(O)= $\frac{6}{8}$



2) sin (M)= $\frac{96}{100}$

cos(M)= $\frac{28}{100}$

tan(R)= $\frac{28}{96}$



Part 3: Trigonometric Calculations 8.2.b.: Use a calculator to find decimal trigonometric ratios.

Directions: Use your calculator to find each trigonometric ratio. Round to the nearest hundredth.
Make sure your calculator is in degree mode (not radians)

3) cos 76° = .24

4) sin 8° = .14

5) tan 82° = 7.12

6) sin 64° = .90

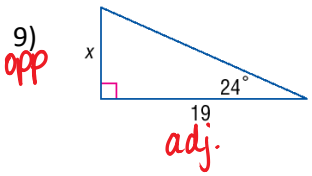
7) tan 16° = .29

8) cos 81° = .16

Part 4: Using Trig Ratios to Find SIDES *8.2.c.: Use trigonometric ratios to find side lengths of a right triangle.*

Directions: Find each length. Round to the nearest hundredth.

9)

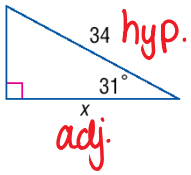


$\tan 24 = \frac{x}{19}$

$19 \cdot \tan 24 = x$

$x = 8.46$

10)

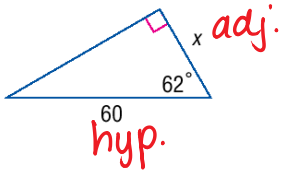


$\cos 31 = \frac{x}{34}$

$34 \cdot \cos 31 = x$

$29.14 = x$

11)

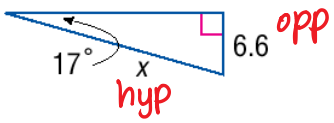


$\cos 62 = \frac{x}{60}$

$60 \cdot \cos 62 = x$

$x = 28.17$

12)



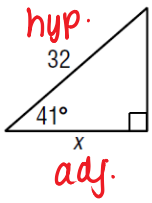
$\sin 17 = \frac{6.6}{x}$

$\frac{x \cdot \sin 17}{\sin 17} = \frac{6.6}{\sin 17}$

$x = \frac{6.6}{\sin 17}$

$x = 22.6$

13)

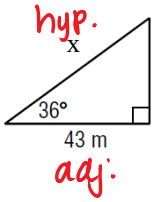


$\frac{\cos 41}{1} = \frac{x}{32}$

$32 \cdot \cos 41 = x$

$24.15 = x$

14)



$\cos 36 = \frac{43}{x}$

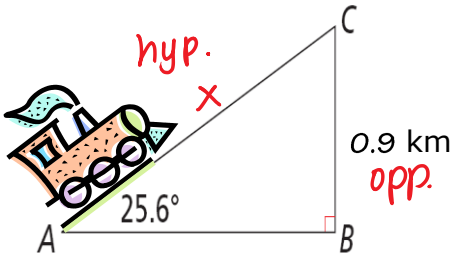
$\frac{x \cdot \cos 36}{\cos 36} = \frac{43}{\cos 36}$

$x = \frac{43}{\cos 36}$

$x = 53.15$

Real-Life Application

15) The Pilatusbahn in Switzerland is the world's steepest cog railway. Its steepest section makes an angle of about 25.6° with the horizon and rises about 0.9 km. To the nearest hundredth of a kilometer, how long is this section of the railway track?



$\sin 25.6 = \frac{0.9}{x}$

$\frac{x \cdot \sin 25.6}{\sin 25.6} = \frac{0.9}{\sin 25.6}$

$x = 2.08$