

Algebra 2/Pre-Calculus

More Practice (Day 3, Right Triangle Trigonometry)

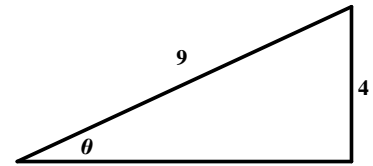
Name _____

In this problem set, we will continue practicing problems involving right triangle trigonometry.

1. Explain why the sides of a 45-45-90 triangle are always in a ratio of 1, 1, and $\sqrt{2}$. Make your explanation as clear as possible. *Suggestion:* Same as the last problem. *Note:* A hinted version of this question was asked in a previous problem set, so you can look up the solution, if necessary.

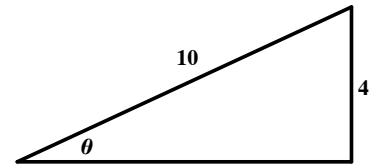
2. Explain why the sides of a 30-60-90 triangle are always in a ratio of 1, $\sqrt{3}$ and 2. Make your explanation as clear as possible. *Suggestion:* Same as the last problem. *Note:* A hinted version of this question was asked in a previous problem set, so you can look up the solution, if necessary.

3. Find the values of $\cos \theta$, $\sin \theta$, $\tan \theta$, $\sec \theta$, $\csc \theta$, and $\cot \theta$ in the right triangle pictured below.



Answers $\cos \theta = \frac{\sqrt{65}}{9}$, $\sin \theta = \frac{4}{9}$, $\tan \theta = \frac{4}{\sqrt{65}} = \frac{4\sqrt{65}}{65}$, $\sec \theta = \frac{9}{\sqrt{65}} = \frac{9\sqrt{65}}{65}$, $\csc \theta = \frac{9}{4}$, $\cot \theta = \frac{\sqrt{65}}{4}$

4. Consider the right triangle pictured below.

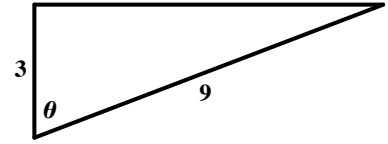


- a. Mudit said that $\sin \theta = \frac{4}{10}$ whereas Alex said that $\sin \theta = \frac{2}{5}$. Who was right?

- b. Adi said that $\cos \theta = \frac{\sqrt{84}}{10}$ whereas Fiona said that $\cos \theta = \frac{\sqrt{21}}{5}$. Who was right?

Answers a. They are both right. b. They are both right because $\frac{\sqrt{84}}{10} = \frac{\sqrt{4} \sqrt{21}}{10} = \frac{2\sqrt{21}}{10} = \frac{\sqrt{21}}{5}$

5. Consider the right triangle pictured below.

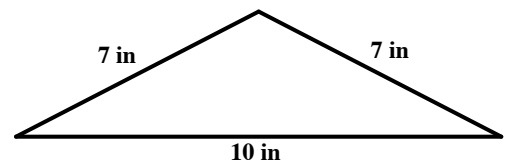


a. What are two different ways you could answer the question, "What is the value of $\cos \theta$?" **Note:** Both answers are the same number, but one answer is more simplified.

b. What are two different ways you could answer the question, "What is the value of $\sin \theta$?" **Note:** Both answers are the same number, but one answer is more simplified.

Answers a. $\frac{3}{9}$ or $\frac{1}{3}$ (both are equal) b. $\frac{\sqrt{72}}{9}$ or $\frac{\sqrt{8}}{3}$ or $\frac{2\sqrt{2}}{3}$ (all equal)

6. Find the area of the triangle pictured below.

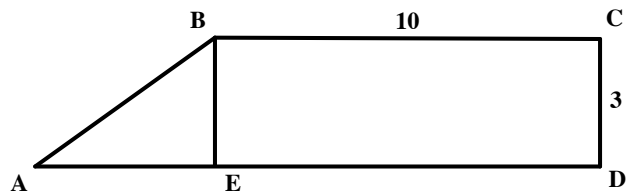


Answer 24.49 square inches

7. A rectangle has side lengths of 6 cm and 10 cm. Find the angle formed by the diagonals of the rectangle. *Note:* The diagonals form both an acute angle and an obtuse angle. Find both. *Important:* Start by drawing the diagram!

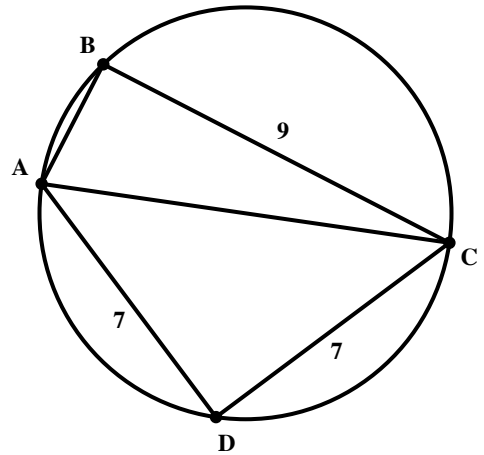
Answers 61.93° and 118.07°

8. In the diagram below, BCDE is a rectangle and quadrilateral ABCD has an area of 36. Find the perimeter of ABCD and the measure of $\angle A$.



Answers The perimeter of ABCD is 32 and the measure of $\angle A$ is 36.87° .

9. In the diagram below, AC is a diameter of the circle.
- a. Find the length of AC . Give your answer as an exact expression (involving a square root) and as a decimal (accurate to two decimal places).

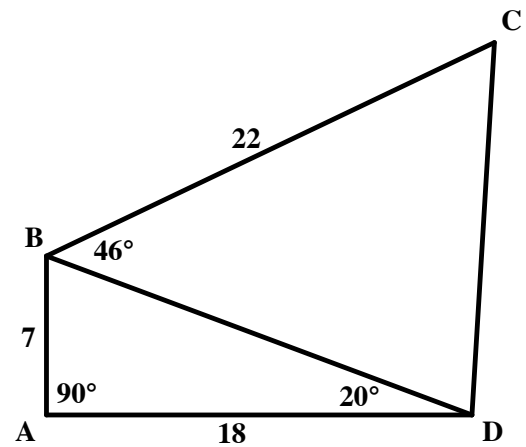


- b. Find the measure of $\angle BAD$.
- c. Find the measure of $\angle BCD$.
- d. How are $\angle BAD$ and $\angle BCD$ related? Explain.

Answers a. $7\sqrt{2} = 9.90$ b. 110.39° c. 69.61° d. They are supplementary. (The opposite angles of an inscribed quadrilateral are always supplementary.)

10. Consider the diagram given below.

- a. Find the area of quadrilateral ABCD. *Note:* If you need a hint, look ahead to part b. But try it on your own first!



b. Here are some hints!

- Find the area of $\triangle ABD$
- Find the length of BD
- Draw an altitude from C to side BD. Find the length of the altitude
- Find the area of $\triangle BCD$ and finish the problem.

Answer 215.82