

Name _____ Score _____/10

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Calculators are permitted. **HOWEVER**, work must be presented to show me what you did to answer the question.

1. Refer to Figure 1. If $c = 9$ and $a = 7$, what is the value of b ? Use the Pythagorean Theorem to compute b

$$b = \sqrt{c^2 - a^2} = \sqrt{9^2 + 7^2} = \sqrt{32} = 4\sqrt{2} \approx 5.66$$

2. Refer to Figure 1. What is the relation between $\sin(\alpha)$ and $\cos(\beta)$

$$\sin(\alpha) = \frac{\text{opp}}{\text{hyp}} = \frac{a}{c} \quad \text{and} \quad \cos(\beta) = \frac{\text{adj}}{\text{hyp}} = \frac{a}{c}$$

Therefore $\sin(\alpha) = \cos(\beta)$

Observe this is actually a proof that the sin and cos of complementary angles are equal.

3. Refer to Figure 1.

Suppose $\alpha = 54^\circ$ and $c = 4.3$. Find β , a , and b .

$$\beta = 90^\circ - 54^\circ = 36^\circ$$

$$\sin(36^\circ) = \frac{b}{4.3} \Rightarrow b = 4.3 \sin 36^\circ = 2.53$$

$$\cos(36^\circ) = \frac{a}{4.3} \Rightarrow a = 4.3 \cos 36^\circ = 3.48$$

Of course one could use $\sin(54^\circ)$ to determine a and $\cos(54^\circ)$ to determine b .

Another alternative is to use a trig function to determine either a or b and then use the Pythagorean Theorem to determine the other side.

After determining either a or b , it is also possible to use $\tan(36^\circ)$, $\tan(54^\circ)$, $\cot(36^\circ)$ or $\cot(54^\circ)$ to determine the other side.

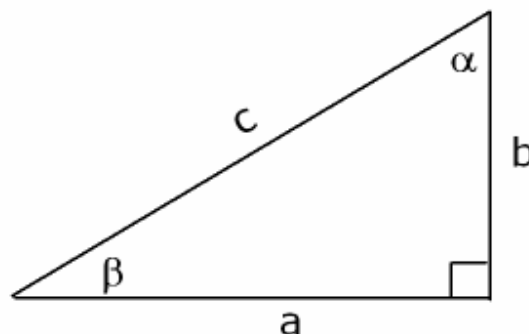


Figure 1

4. Express each of the following in terms of $\sin(x)$ and/or $\cos(x)$

$$\tan(x) = \frac{\sin(x)}{\cos(x)} \quad \cot = \frac{\cos(x)}{\sin(x)} \quad \csc(x) = \frac{1}{\sin(x)} \quad \sec(x) = \frac{1}{\cos(x)}$$

5. Supply the coordinates of the point P on the UNIT CIRCLE diagram

