

Name: Answers

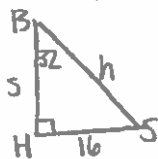
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**Class Examples: Right Triangle Trigonometry**

**Honors PreCalculus**

1. In  $\triangle BHS$ ,  $H$  is a right angle,  $m\angle B = 32^\circ$  and  $b = 16$ . Solve the triangle.



$$s \cdot \tan 32 = \frac{16}{s} \cdot s \quad h \cdot \sin 32 = \frac{16}{h} \cdot h$$

$$s \tan 32 = 16 \quad h \sin 32 = 16$$

$$s = \frac{16}{\tan 32} \quad h = \frac{16}{\sin 32}$$

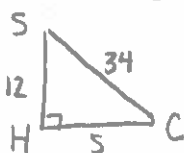
$$s = 25.605 \quad h = 30.193$$

$$\angle B = 32^\circ \quad b = 16$$

$$\angle H = 90^\circ \quad h = 30.193$$

$$\angle S = 58^\circ \quad s = 25.605$$

2. Solve  $\triangle SHC$  given  $m\angle H = 90^\circ$ ,  $c = 12$ , and  $h = 34$ .



$$12^2 + s^2 = 34^2$$

$$s^2 = 1012$$

$$s = 31.812$$

$$\cos S = \frac{12}{34}$$

$$\cos^{-1}\left(\frac{12}{34}\right) = S$$

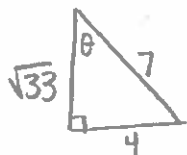
$$69.333 = S$$

$$\angle S = 69.333^\circ \quad s = 31.812$$

$$\angle H = 90^\circ \quad h = 34$$

$$\angle C = 20.667^\circ \quad c = 12$$

3. Given  $\sin \theta = \frac{4}{7}$ , find the value of the other five trigonometric functions of  $\theta$ . Give exact values.



$$x^2 + 4^2 = 7^2$$

$$x^2 = 33$$

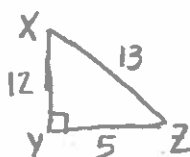
$$x = \sqrt{33}$$

$$\sin \theta = \frac{4}{7} \quad \csc \theta = \frac{7}{4}$$

$$\cos \theta = \frac{\sqrt{33}}{7} \quad \sec \theta = \frac{7}{\sqrt{33}} = \frac{7\sqrt{33}}{33}$$

$$\tan \theta = \frac{4}{\sqrt{33}} = \frac{4\sqrt{33}}{33} \quad \cot \theta = \frac{\sqrt{33}}{4}$$

4. In triangle  $XYZ$ , angle  $Y$  is a right angle and  $\sec X = 13/12$ . Find the value of all six trigonometric functions of  $Z$ .



$$12^2 + x^2 = 13^2$$

$$x^2 = 25$$

$$x = 5$$

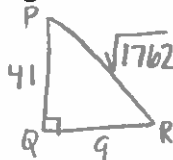
$$\cos X = \frac{12}{13} \quad \frac{A}{H}$$

$$\sin Z = \frac{5}{13} \quad \csc Z = \frac{13}{5}$$

$$\cos Z = \frac{12}{13} \quad \sec Z = \frac{13}{12}$$

$$\tan Z = \frac{5}{12} \quad \cot Z = \frac{12}{5}$$

5. In triangle  $PQR$ , angle  $Q$  is a right angle and the  $\tan P = 9/41$ . Find the value of the other five trigonometric functions of  $P$ .



$$41^2 + 9^2 = q^2$$

$$1762 = q^2$$

$$\sqrt{1762} = q$$

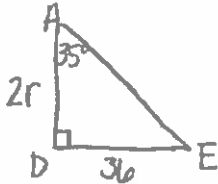
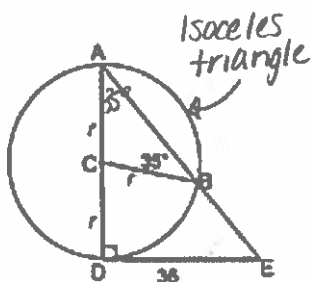
$$\sin P = \frac{9}{\sqrt{1762}} = \frac{9\sqrt{1762}}{1762} \quad \csc P = \frac{\sqrt{1762}}{9}$$

$$\cos P = \frac{41}{\sqrt{1762}} = \frac{41\sqrt{1762}}{1762} \quad \sec P = \frac{\sqrt{1762}}{41}$$

$$\tan P = \frac{9}{41} \quad \cot P = \frac{41}{9}$$

Omit if need more time

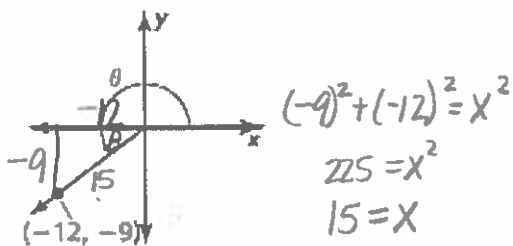
6. The circle shown has a radius of  $r$  and a center  $C$ . If the distance  $DE = 36$  cm, find the radius of the circle to the nearest centimeter.



$$\begin{aligned} \tan 35 &= \frac{36}{2r} \\ r \cdot \tan 35 &= \frac{18}{1} \\ r \tan 35 &= 18 \\ r &= \frac{18}{\tan 35} \\ r &= 25.707 \text{ cm} \end{aligned}$$

Evaluate the six trigonometric functions of  $\theta$ .

\* simplify?



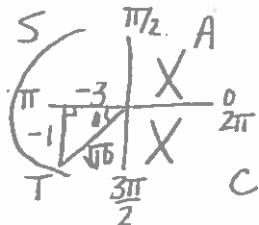
$$\begin{aligned} \sin \theta &= \frac{-9}{15} & \csc \theta &= \frac{-15}{9} \\ \cos \theta &= \frac{-12}{15} & \sec \theta &= \frac{-15}{12} \\ \tan \theta &= \frac{9}{12} & \cot \theta &= \frac{12}{9} \end{aligned}$$

$$8. \theta = \frac{7\pi}{2} - \frac{4\pi}{2} = \frac{3\pi}{2}$$



$$\begin{aligned} \sin \theta &= -1 & \csc \theta &= -1 \\ \cos \theta &= 0 & \sec \theta &= \frac{1}{0} = \text{und} \\ \tan \theta &= \frac{-1}{0} = \text{und} & \cot \theta &= \frac{0}{-1} = 0 \end{aligned}$$

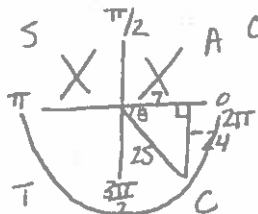
9. Given  $\tan \theta = \frac{1}{3}$  and  $\frac{\pi}{2} \leq \theta \leq \frac{3\pi}{2}$  find the value of all six trigonometric functions.



$$\begin{aligned} (-1)^2 + (-3)^2 &= x^2 \\ 10 &= x^2 \\ \sqrt{10} &= x \end{aligned}$$

$$\begin{aligned} \sin \theta &= \frac{-1}{\sqrt{10}} = \frac{-\sqrt{10}}{10} & \csc \theta &= \frac{-\sqrt{10}}{1} = -\sqrt{10} \\ \cos \theta &= \frac{-3}{\sqrt{10}} = \frac{-3\sqrt{10}}{10} & \sec \theta &= \frac{-\sqrt{10}}{3} \\ \tan \theta &= \frac{1}{3} & \cot \theta &= \frac{3}{1} = 3 \end{aligned}$$

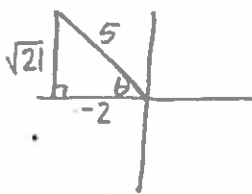
10. Given  $\sec \theta = \frac{25}{7}$  and  $\pi \leq \theta \leq 2\pi$  find the value of all six trigonometric functions.



$$\begin{aligned} 7^2 + x^2 &= 25^2 \\ x^2 &= 576 \\ x &= 24 \end{aligned}$$

$$\begin{aligned} \sin \theta &= \frac{-24}{25} & \csc \theta &= \frac{-25}{24} \\ \cos \theta &= \frac{7}{25} & \sec \theta &= \frac{25}{7} \\ \tan \theta &= \frac{-24}{7} & \cot \theta &= \frac{-7}{24} \end{aligned}$$

11. Given that the point  $(-\frac{2}{5}, \frac{\sqrt{21}}{5})$  is on the unit circle, find the value of all six trigonometric functions.



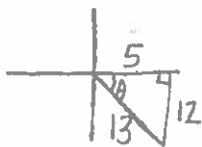
$$\begin{matrix} \frac{A}{H} & \frac{O}{H} \\ \frac{2}{5} & \frac{\sqrt{21}}{5} \\ \uparrow & \uparrow \\ x = \cos\theta & y = \sin\theta \end{matrix}$$

$$\sin\theta = \frac{\sqrt{21}}{5} = \frac{\sqrt{21}}{5} \quad \csc\theta = \frac{5}{\sqrt{21}} = \frac{5\sqrt{21}}{21}$$

$$\cos\theta = \frac{-2}{5} = -\frac{2}{5} \quad \sec\theta = -\frac{5}{2}$$

$$\tan\theta = \frac{\frac{\sqrt{21}}{5}}{-\frac{2}{5}} = -\frac{\sqrt{21}}{2} \quad \cot\theta = \frac{-2}{\sqrt{21}} = -\frac{2\sqrt{21}}{21}$$

12. Given that the point  $(\frac{5}{13}, y)$  is on the unit circle and in the Quadrant IV, complete the ordered pair for the quadrant indicated.



$$\sin\theta = \frac{12}{13}$$

$$y = \frac{12}{13}$$

$$\begin{matrix} (x, y) \\ \uparrow \quad \uparrow \\ \cos\theta \quad \sin\theta \end{matrix}$$

$$5^2 + x^2 = 13^2$$

$$x^2 = 144$$

$$x = 12$$

