

## Trigonometry Exercise 6: Solving for an Unknown

Name: \_\_\_\_\_

Due Date: \_\_\_\_\_

[ /35 marks]

1. Solve for the variables indicated. Answer to the closest degree for  $\theta$  and to one decimal place for  $x$ .

(a)  $\frac{x}{25.75} = \sin 47.5^\circ$

$x = 19.0$

(b)  $\frac{x}{28.35} = \tan 82.0^\circ$

$x = 201.7$

(c)  $\frac{2478}{x} = \csc 81^\circ$

$x = 2447.5$

(d)  $\frac{107.5}{x} = \cot 53.5^\circ$

$x = 145.3$

(e)  $\sin \theta = \frac{1.271}{2.784}$

$\theta = 27^\circ$

(f)  $\tan \theta = \frac{1.5372}{2.712}$

$\theta = 30^\circ$

(g)  $\sec \theta = \frac{0.08754}{0.02445}$

$\theta = 74^\circ$

(h)  $\csc \theta = \frac{2.784}{1.423}$

$\theta = 31^\circ$

2. Find the values of the trigonometric functions and write as a fraction.  $0 \leq \theta \leq \frac{\pi}{2}$

(a) If  $\cos \theta = \frac{20}{29}$ , then find  $\tan \theta$

(b) If  $\tan \theta = \frac{3}{4}$ , then find  $\sec \theta$

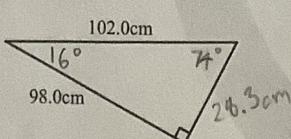
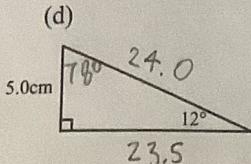
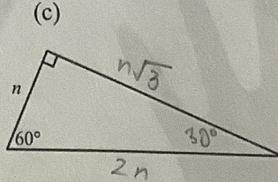
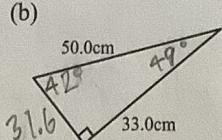
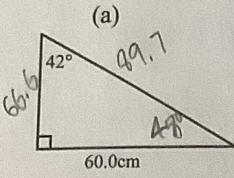
(c) If  $\cot \theta = \frac{2}{7}$ , then find  $\cos \theta$

(d) If  $\sin \theta = \frac{12}{13}$ , then find  $\cos \theta$

(e) If  $\csc \theta = \frac{7}{3}$ , then find  $\cot \theta$

(f) If  $\sec \theta = \frac{5}{4}$ , then find  $\csc \theta$

3. Solve the triangles. (Find the value of the unknown angles to the closest degree, and the unknown sides to 1 decimal place.)



$$29) \cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{20}{29}$$

$$\sqrt{29^2 - 20^2} = 21$$

$$\begin{aligned}\text{adj} &= 20 \\ \text{opp} &= 21 \\ \text{hyp} &= 29\end{aligned}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{21}{20}$$

$$b) \tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{3}{4}$$

$$\sqrt{3^2 + 4^2} = 5$$

$$\begin{aligned}\text{adj} &= 4 \\ \text{opp} &= 3 \\ \text{hyp} &= 5\end{aligned}$$

$$\sec \theta = \frac{1}{\frac{\text{opp}}{\text{hyp}}} = \frac{1}{\frac{3}{5}} = \frac{5}{3}$$

$$c) \cot \theta = \frac{1}{\frac{\text{opp}}{\text{adj}}} = \frac{1}{\frac{3}{4}} = \frac{4}{3}$$

$$\sqrt{2^2 + 7^2} = \sqrt{53}$$

$$\begin{aligned}\text{adj} &= 2 \\ \text{opp} &= 7 \\ \text{hyp} &= \sqrt{53}\end{aligned}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{2}{\sqrt{53}} = \frac{2\sqrt{53}}{53}$$

$$d) \sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{12}{13}$$

$$\sqrt{13^2 - 12^2} = 5$$

$$\begin{aligned}\text{adj} &= 5 \\ \text{opp} &= 12 \\ \text{hyp} &= 13\end{aligned}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{5}{13}$$

$$e) \csc \theta = \frac{1}{\frac{\text{opp}}{\text{hyp}}} = \frac{1}{\frac{12}{13}} = \frac{13}{12}$$

$$\sqrt{13^2 - 12^2} = 5$$

$$\begin{aligned}\text{adj} &= 12 \\ \text{opp} &= 5 \\ \text{hyp} &= 13\end{aligned}$$

$$\cot \theta = \frac{1}{\frac{\text{opp}}{\text{adj}}} = \frac{1}{\frac{5}{12}} = \frac{12}{5}$$

$$f) \sec \theta = \frac{1}{\frac{\text{adj}}{\text{hyp}}} = \frac{1}{\frac{12}{13}} = \frac{13}{12}$$

$$\sqrt{13^2 - 12^2} = 5$$

$$\begin{aligned}\text{adj} &= 13 \\ \text{opp} &= 12 \\ \text{hyp} &= 5\end{aligned}$$

$$\csc \theta = \frac{1}{\frac{\text{opp}}{\text{hyp}}} = \frac{1}{\frac{12}{5}} = \frac{5}{12}$$