

Formal Geometry
Right Triangle Trig Worksheet

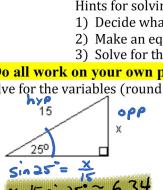
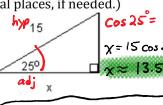
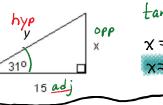
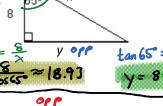
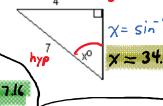
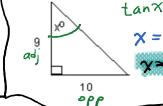
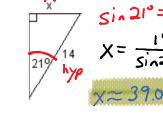
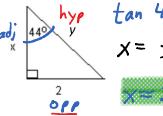
Name: _____

Hints for solving for a variable:

- 1) Decide what trig function matches your picture.
- 2) Make an equation. Trig function angle = ratio
- 3) Solve for the variable.

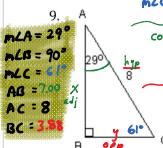
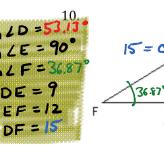
***Do all work on your own paper!**

Solve for the variables (round to 2 decimal places, if needed.)

<p>1.  $\sin 25^\circ = \frac{x}{15}$ $x = 15 \sin 25^\circ \approx 6.34$</p>	<p>2.  $\cos 25^\circ = \frac{x}{15}$ $x = 15 \cos 25^\circ \approx 13.59$</p>	<p>3.  $\tan 31^\circ = \frac{y}{15}$ $y = 15 \tan 31^\circ \approx 9.01$</p>
<p>4.  $\cos 65^\circ = \frac{x}{8}$ $x = 8 \cos 65^\circ \approx 16.93$</p>	<p>5.  $\sin x = \frac{4}{7}$ $x = \sin^{-1}(4 \div 7) \approx 34.85^\circ$</p>	<p>6.  $\tan x = \frac{9}{10}$ $x = \tan^{-1}(9 \div 10) \approx 48.01^\circ$</p>
<p>7.  $\sin 21^\circ = \frac{14}{x}$ $x = 14 \sin 21^\circ \approx 39.07$</p>	<p>8.  $\tan 44^\circ = \frac{2}{x}$ $x = 2 \tan 44^\circ \approx 2.07$</p>	<p>$\sin 44^\circ = \frac{2}{y}$ $y = 2 \sin 44^\circ \approx 2.88$</p>

Solving a triangle means to find all of its parts. (3 sides, 3 angles)

Solve the following triangles. Round to 2 decimal places, if needed.

<p>9.  $m\angle C = 90 - 29 = 61^\circ$ $\cos 29^\circ = \frac{x}{8}$ $x = 8 \cos 29^\circ \approx 7.00$ $\sin 29^\circ = \frac{y}{8}$ $y = 8 \sin 29^\circ \approx 3.88$</p>	<p>10.  $m\angle D = 53.13^\circ$ $m\angle E = 36.87^\circ$ $m\angle F = 90^\circ$ $DE = 9$ $EF = 12$ $DF = 15$</p>	<p>$\tan \angle F = \frac{9}{12}$ $\angle F = \tan^{-1}(9 \div 12) \approx 36.87^\circ$ $m\angle D = 90 - 36.87^\circ = 53.13^\circ$</p>
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Summary of Methods

If I know...	I should use...	to find the...
2 sides	the Pythag. Thm.	3rd side
2 sides	inverse trig function	related angle
A side and an angle	trig function	related side
2 angles	sum of 180 degrees	3rd angle

For #11-12 use special right triangles. (45-45-90 or 30-60-90). Simplify radical answers.

11. Find $\sin 30^\circ$, $\sin 60^\circ$, $\tan 30^\circ$.

$\sin 30^\circ = \frac{1}{2}$ $\sin 60^\circ = \frac{\sqrt{3}}{2}$ $\tan 30^\circ = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$
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12. Find $\tan 45^\circ$, $\cos 45^\circ$, $\sin 45^\circ$.

$\tan 45^\circ = \frac{1}{1} = 1$ $\cos 45^\circ = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\sin 45^\circ = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

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For #13 – 14, find the value of x as an exact answer (no decimals.) Use special right triangles!

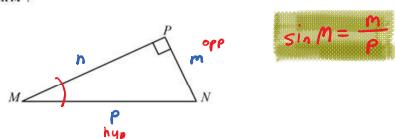


14) note: $\angle C$ is not a right \angle



15. Which of the following has the same value as $\sin M$?

- A. $\sin N = \frac{n}{p}$
- B. $\cos N = \frac{n}{p}$
- C. $\tan M = \frac{m}{n}$
- D. $\cos M = \frac{n}{p}$



16. Based on the figure below, choose all correct ways of solving for x .

I.	$x = \frac{16}{\sin 35^\circ}$
II.	$x = \frac{28}{\sin 55^\circ}$
III.	$x = \frac{28}{\cos 35^\circ}$
IV.	$x = \sqrt{28^2 + 16^2}$

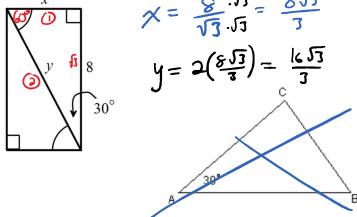
$\sin 35^\circ = \frac{16}{x}$ $\sin 55^\circ = \frac{28}{x}$

$x = \frac{16}{\sin 35^\circ}$ $x = \frac{28}{\sin 55^\circ}$

$\cos 35^\circ = \frac{28}{x}$ $\sqrt{28^2 + 16^2} = x$

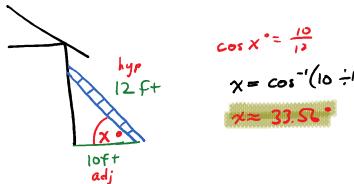
17. Find the values of x and y .

- A. $x = 4, y = 4\sqrt{3}$
- B. $x = 8\sqrt{3}, y = 16\sqrt{3}$
- C. $x = \frac{16\sqrt{3}}{3}, y = \frac{8\sqrt{3}}{3}$
- D. $x = \frac{8\sqrt{3}}{3}, y = \frac{16\sqrt{3}}{3}$



18. A 12 foot ladder is leaning up against the side of a house. The bottom of the ladder is placed 10 feet from the side of the house. What is the measure of the angle formed by the ground and the ladder?

- A. 33.6°
- B. 39.8°
- C. 50.2°
- D. 56.4°



11

19. A person is standing at ground level with the base of the Empire State Building in New York City. The angle formed by the ground and a line segment from his position to the top of the building is 48.4° . The height of the Empire State Building is 1472 feet. Find the distance that he is standing from the base of the Empire State Building to the nearest foot.

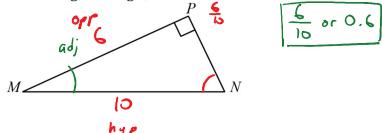
- A. 8 feet C. 1968 feet
 B. 1307 feet D. 2217 feet

$$\tan 48.4^\circ = \frac{1472}{x}$$

$$x = \frac{1472}{\tan 48.4^\circ} \approx 1306.90$$

20. In a right triangle, one angle measures x° , where $\sin x^\circ = \frac{4}{5}$, what is $\cos(90 - x^\circ)$?

21. In a right triangle, $\sin N = 0.6$, what is $\cos M$?

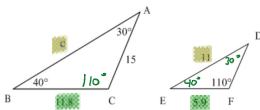


$$\frac{6}{10} \text{ or } 0.6$$

22. Given that $\triangle ABC \sim \triangle DEF$, find c.

~~$\frac{c}{11} = \frac{15}{5}$~~

$$\boxed{C = 22}$$
 ~~$5.9c = 129.8$~~



- Trig Worksheet ANSWERS
 1) 6.34 2) 13.59 3) $x = 9.01$; $y = 17.50$ 4) $x = 18.93$; $y = 17.16$ 5) 34.85° 6) 48.01° 7) 5.02
 8) $x = 2.07$; $y = 2.88$ 9) 29° , 90° , 61° , 7.00 , 3.88 , 8° 10) 53.13° , 90° , 36.87° , 15° , 9° , 12°
 11) $\frac{1}{2}, \frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{3}$ 12) $1, \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$ 13) $12\sqrt{2}$ 14) $2\sqrt{13}$
 15) B 16) D 17) D 18) A 19) B
 20) $\frac{4}{5}$. Hint: draw the triangle and find all sides. Notice that the acute angles are complementary. 4 is the missing side.
 21) 0.6 22) 22