

Geometry - Right Triangle Trigonometry - Answer Key

Common Core G-SRT.C.6, G-SRT.C.7, G-SRT.C.8 · maths-pdf.fr/en/

Use this answer key to check the 20 problems on right triangle trigonometry. Every solution shows the formula or theorem used, each step of the work, and the final answer in bold. If an answer differs from yours, compare the steps line by line to find where the work changed.

Geometry · Common Core State Standards: **G-SRT.C.6, G-SRT.C.7, G-SRT.C.8**

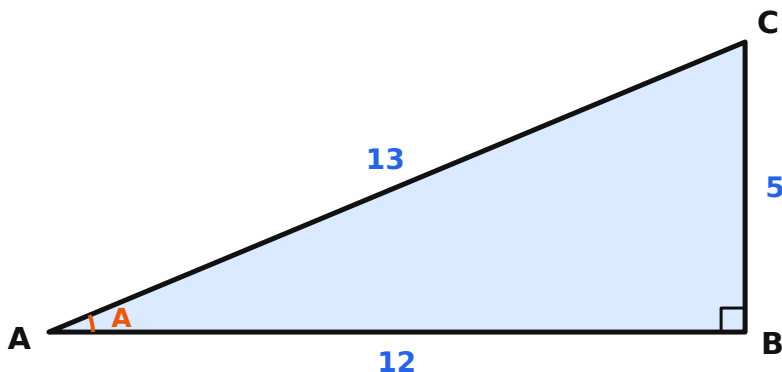
Exercise 1 - Name the ratios

Opposite 3, adjacent 4, hypotenuse 5.

$$\sin A = \frac{3}{5}, \cos A = \frac{4}{5}, \tan A = \frac{3}{4}.$$

3/5, 4/5, 3/4

Exercise 2 - Sine of a 5-12-13 triangle



A 5-12-13 triangle: $\sin A = 5/13$, $\cos A = 12/13$, $\tan A = 5/12$.

$$\sin A = \frac{5}{13}$$

5/13

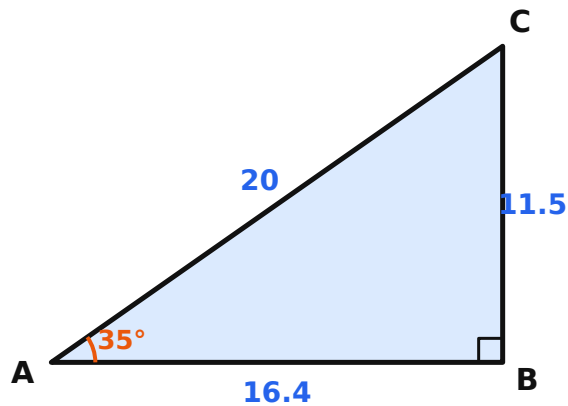
Exercise 3 - Tangent

$$\sqrt{8^2+15^2}=17.$$

$$\tan A = \frac{8}{15}$$

Hypotenuse 17; $\tan A = 8/15$

Exercise 4 - Find a side with sine



Opposite side about 11.5.

$$\sin 35^\circ = \frac{x}{20}$$

$$x = 20 \cdot \sin 35^\circ = 20 \cdot 0.5736 = 11.5$$

$$x = 11.5$$

Exercise 5 - Find a side with cosine

$$\cos 52^\circ = \frac{x}{15}$$

$$x = 15 \cdot 0.6157 = 9.2$$

$$x = 9.2$$

Exercise 6 - Find a side with tangent

$$\tan 28^\circ = \frac{x}{12}$$

$$x = 12 \cdot 0.5317 = 6.4$$

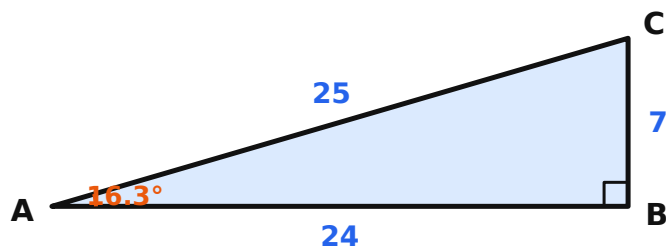
$$x = 6.4$$

Exercise 7 - Find an angle: sine

$$A = \sin^{-1}(0.6) = 36.9^\circ$$

$$36.9^\circ$$

Exercise 8 - Find an angle from sides



A is about 16.3° .

$$\tan A = \frac{7}{24}$$

$$A = \tan^{-1}\left(\frac{7}{24}\right) = 16.3^\circ$$

$$16.3^\circ$$

Exercise 9 - Complementary angles

Sine of an angle equals the cosine of its complement.

$$x = 90 - 25 = 65$$

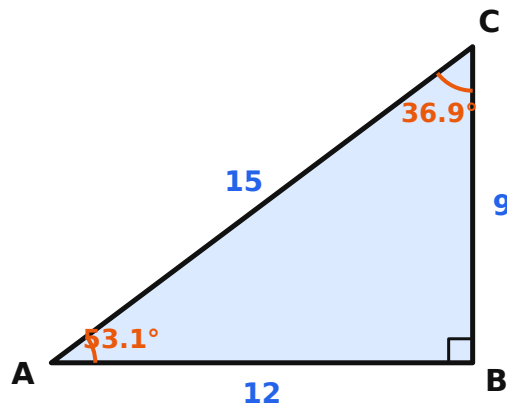
$$x = 65$$

Exercise 10 - Check complementary

$$\sin 38^\circ = 0.6157 \text{ and } \cos 52^\circ = 0.6157.$$

Both are 0.6157

Exercise 11 - Solve a right triangle



Solved triangle.

Hypotenuse: $\sqrt{9^2+12^2}=15$.

Angle opposite 9: $\tan^{-1}\left(\frac{9}{12}\right)=36.9^\circ$.

Other angle: $90^\circ-36.9^\circ=53.1^\circ$.

Hypotenuse 15; angles 36.9° and 53.1°

Exercise 12 - Solve from hypotenuse and angle

$90^\circ-40^\circ=50^\circ$.

Opposite the 40° angle: $25\cdot\sin 40^\circ=16.1$.

Adjacent: $25\cdot\cos 40^\circ=19.2$.

50°; legs 16.1 and 19.2

Exercise 13 - Solve from a leg and angle

Opposite: $10\cdot\tan 62^\circ=18.8$.

Hypotenuse: $\frac{10}{\cos 62^\circ}=21.3$.

Opposite 18.8; hypotenuse 21.3

Exercise 14 - 30-60-90 triangle

Shorter leg: $14 \div 2 = 7$.

Longer leg: $7\sqrt{3} = 12.12$. Check with $\sin 60^\circ = \frac{7\sqrt{3}}{14}$.

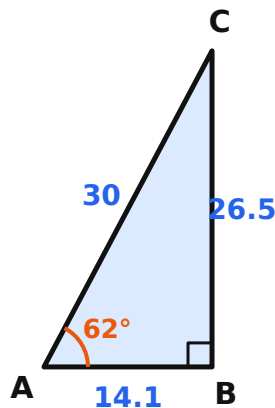
7 and $7\sqrt{3}$ (about 12.12)

Exercise 15 - 45-45-90 triangle

$$\sqrt{9^2 + 9^2} = 9\sqrt{2} = 12.73$$

$9\sqrt{2}$, about 12.73

Exercise 16 - Guy wire



Solved guy wire triangle.

Pole height: $30 \cdot \sin 62^\circ = 26.5$ ft.

Distance: $30 \cdot \cos 62^\circ = 14.1$ ft.

26.5 ft tall; 14.1 ft from the base

Exercise 17 - Height of a windmill

$$\tan 41^\circ = \frac{h}{80}$$

$$h = 80 \cdot 0.8693 = 69.5$$

69.5 feet

Exercise 18 - Wheelchair ramp

$$\tan A = \frac{2.5}{30}.$$

$$A = \tan^{-1}(0.0833) = 4.8^\circ$$

4.8°

Exercise 19 - Lighthouse

The angle of depression equals the angle of elevation from the boat: 12° .

$$\tan 12^\circ = \frac{80}{d}$$

$$d = \frac{80}{0.2126} = 376$$

About 376 feet

Exercise 20 - Kite string

$$\sin 54^\circ = \frac{h}{120}$$

$$h = 120 \cdot 0.8090 = 97.1$$

97.1 feet