

Right Triangle Worksheets — Answer Keys

RightTriangleSolver.com • Answers for Worksheets 1, 2 and 3, with working

Worksheet 1 — Basics

1. The hypotenuse. It is always the side opposite the right angle.
2. The legs. The two sides that form the right angle are always called the legs.
3. The hypotenuse. It sits opposite the 90° (right) angle.
4. A right triangle. It can have only one right angle, because two right angles would already add to 180° , leaving nothing for the third angle.
5. $c^2 = 3^2 + 4^2 = 9 + 16 = 25$, so $c = \sqrt{25} = 5$ cm.
6. $c^2 = 6^2 + 8^2 = 36 + 64 = 100$, so $c = \sqrt{100} = 10$ in.
7. $b^2 = 13^2 - 5^2 = 169 - 25 = 144$, so $b = \sqrt{144} = 12$ cm.
8. $c^2 = 9^2 + 12^2 = 81 + 144 = 225$, so $c = \sqrt{225} = 15$ cm.
9. Perimeter = $6 + 8 + 10 = 24$ cm.
10. Area = $\frac{1}{2} \times 5 \times 12 = 30$ in².
11. Area = $\frac{1}{2} \times 9 \times 12 = 54$ cm².
12. Perimeter = $7 + 24 + 25 = 56$ m.

Worksheet 2 — Pythagorean Theorem

1. Given legs 8 and 15. $c = \sqrt{a^2 + b^2}$; $c^2 = 8^2 + 15^2 = 64 + 225 = 289$; $c = \sqrt{289} = 17$ cm.
2. Given legs 20 and 21. $c^2 = 20^2 + 21^2 = 400 + 441 = 841$; $c = \sqrt{841} = 29$ in.
3. Given legs 12 and 35. $c^2 = 12^2 + 35^2 = 144 + 1,225 = 1,369$; $c = \sqrt{1,369} = 37$ m.
4. Given hypotenuse 25, leg 24. $b = \sqrt{c^2 - a^2}$; $b^2 = 25^2 - 24^2 = 625 - 576 = 49$; $b = \sqrt{49} = 7$ cm.
5. Given hypotenuse 26, leg 10. $b^2 = 26^2 - 10^2 = 676 - 100 = 576$; $b = \sqrt{576} = 24$ in.
6. Given hypotenuse 41, leg 9. $b^2 = 41^2 - 9^2 = 1,681 - 81 = 1,600$; $b = \sqrt{1,600} = 40$ m.
7. Given legs 5 and 7. $c^2 = 5^2 + 7^2 = 25 + 49 = 74$; $c = \sqrt{74}$ cm ≈ 8.60 cm.
8. Given hypotenuse 11, leg 6. $b^2 = 11^2 - 6^2 = 121 - 36 = 85$; $b = \sqrt{85}$ cm ≈ 9.22 cm.
9. Given legs 4.5 and 6. $c^2 = 4.5^2 + 6^2 = 20.25 + 36 = 56.25$; $c = \sqrt{56.25} = 7.5$ cm.
10. Given hypotenuse 12.5, leg 7.5. $b^2 = 12.5^2 - 7.5^2 = 156.25 - 56.25 = 100$; $b = \sqrt{100} = 10$ in.
11. The ladder is the hypotenuse (5 m) and the ground distance is one leg (3 m). $h^2 = 5^2 - 3^2 = 25 - 9 = 16$; $h = \sqrt{16} = 4$ m up the wall.
12. The diagonal splits the field into two right triangles with legs 30 and 40. $d^2 = 30^2 + 40^2 = 900 + 1,600 = 2,500$; $d = \sqrt{2,500} = 50$ m.

Worksheet 3 — Special Right Triangles and Trigonometry

1. Short leg $x = 7$. Longer leg $= 7\sqrt{3} \approx 12.12$ cm; hypotenuse $= 2 \times 7 = 14$ cm.
2. Hypotenuse $2x = 16$, so the short leg $x = 8$ in; longer leg $= 8\sqrt{3} \approx 13.86$ in.
3. Longer leg $= x\sqrt{3} = 9\sqrt{3}$, so the short leg $x = 9\sqrt{3} \div \sqrt{3} = 9$ cm; hypotenuse $= 2 \times 9 = 18$ cm.
4. Short leg $x = 2.5$. Longer leg $= 2.5\sqrt{3} \approx 4.33$ m; hypotenuse $= 2 \times 2.5 = 5$ m.
5. Hypotenuse $= \text{leg} \times \sqrt{2} = 11\sqrt{2}$ cm ≈ 15.56 cm.
6. Hypotenuse $= 4\sqrt{2} \times \sqrt{2} = 4 \times 2 = 8$ in.
7. Each leg $= \text{hypotenuse} \div \sqrt{2} = 10\sqrt{2} \div \sqrt{2} = 10$ cm.
8. Hypotenuse $= 13 \times \sqrt{2} = 13\sqrt{2}$ m ≈ 18.38 m.
9. Opposite $= \text{hypotenuse} \times \sin 30^\circ = 18 \times 0.5 = 9$ cm. Adjacent $= \text{hypotenuse} \times \cos 30^\circ = 18 \times (\sqrt{3}/2) = 9\sqrt{3} \approx 15.59$ cm.
10. Hypotenuse $= \text{adjacent} \div \cos 60^\circ = 6 \div 0.5 = 12$ cm. Opposite $= \text{adjacent} \times \tan 60^\circ = 6\sqrt{3} \approx 10.39$ cm.
11. Adjacent $= \text{opposite} \div \tan 45^\circ = 7 \div 1 = 7$ cm. Hypotenuse $= 7\sqrt{2} \approx 9.90$ cm.
12. Opposite $= 15 \times \sin 52^\circ \approx 11.82$ cm. Adjacent $= 15 \times \cos 52^\circ \approx 9.23$ cm. (Check: $11.82^2 + 9.23^2 \approx 225 \approx 15^2$.)