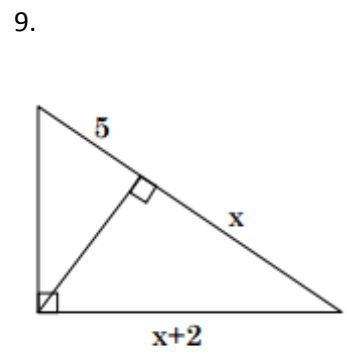
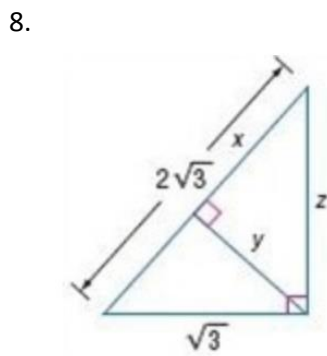
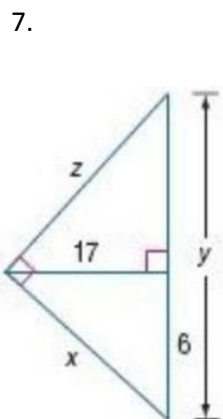
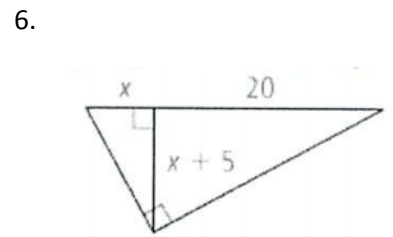
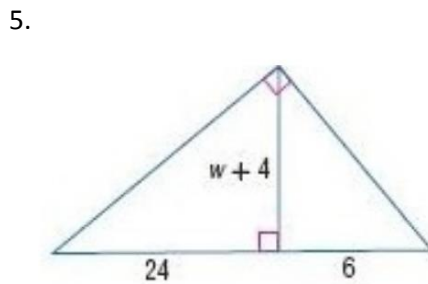
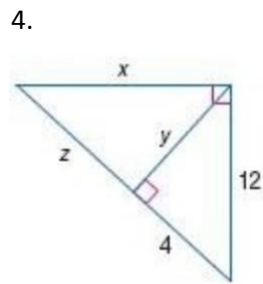
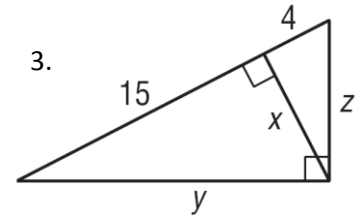
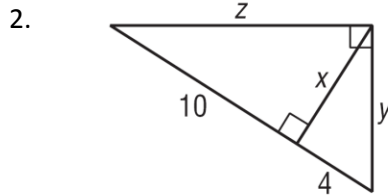
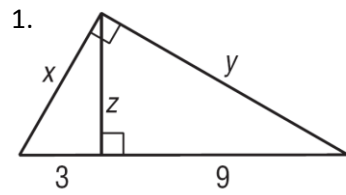
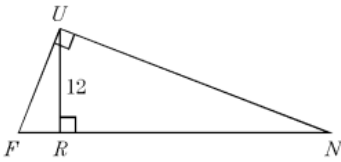


For #1 – 9, please solve for the indicated variable(s). Write your answers in simplest radical form.



10. In the accompanying diagram, $\triangle FUN$ is a right triangle, \overline{UR} is the altitude to the hypotenuse \overline{FN} . $UR = 12$, and the lengths of \overline{FR} and \overline{RN} are in the ratio 1:9. What is the length of \overline{FR} ?

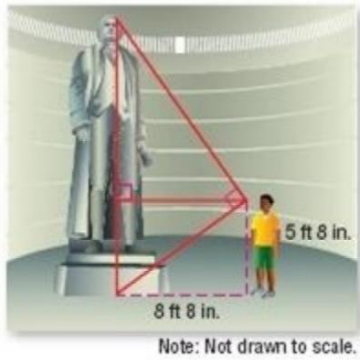


11. The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments with lengths in the ratio 1:2. The length of the altitude is 8. How long is the hypotenuse?

12. In right triangle ABC , altitude CD is drawn to the hypotenuse AB . If AB is four times greater than AD and AC is 3 more than AD , find the length of altitude CD .

13. **Civil Engineering** An airport, a factory, and a shopping center are at the vertices of a right triangle formed by three highways. The airport and factory are 6.0 miles apart. Their distances from the shopping center are 3.6 miles and 4.8 miles, respectively. A service road will be constructed from the shopping center to the highway that connects the airport and factory. What is the shortest possible length for the service road? Round to the nearest hundredth.

14. **Monuments** Corey is visiting the Jefferson Memorial with his family. He wants to estimate the height of the statue of Thomas Jefferson. Corey stands so that his line of vision to the top and base of the statue form a right angle as shown in the diagram. About how tall is the statue in feet and inches?



Answer Key

1. $x=6, y=6\sqrt{3}, z=3\sqrt{3}$

2. $x=2\sqrt{10}, y=2\sqrt{14}, z=2\sqrt{35}$

3. $x=2\sqrt{15}, y=\sqrt{285}, z=2\sqrt{19}$

4. $x=24\sqrt{2}, y=8\sqrt{2}, z=32$

5. $w=8$

6. $x=5$

7. $x=5\sqrt{13}, y=\frac{325}{6}, z=\frac{85\sqrt{13}}{6}$

8. $x=\frac{3\sqrt{3}}{2}, y=\frac{3}{2}, z=3$

9. $x=4$

10. $FR=4$

11. $12\sqrt{2}$

12. $x=3, y=3\sqrt{3}$

13. 2.88 miles

14. $8 \text{ ft } 7 \text{ in}$