

Spiraled Review: Radicals

Simplify and rationalize the denominator when necessary.

1. $\sqrt{68} = \sqrt{4 \cdot 17} = 2\sqrt{17}$

2. $\sqrt{300} = \sqrt{100 \cdot 3} = 10\sqrt{3}$

3. $\frac{2}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{2\sqrt{7}}{\sqrt{49}} = \frac{2\sqrt{7}}{7}$

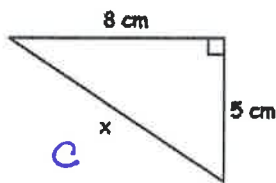
4. $\frac{2\sqrt{3}}{\sqrt{15}} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{\sqrt{25}} = \frac{2\sqrt{5}}{5}$

5. $\frac{14}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{14\sqrt{2}}{\sqrt{4}} = \frac{14\sqrt{2}}{2} = 7\sqrt{2}$

Spiraled Review: Pythagorean theorem

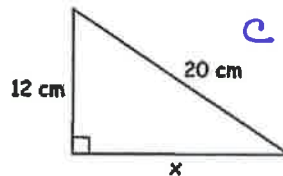
$a^2 + b^2 = c^2$

6. Find x.



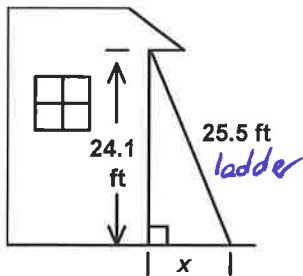
$5^2 + 8^2 = c^2$
 $25 + 64 = c^2$
 $89 = c^2$
 $c = \sqrt{89}$

7. Find x



$x^2 + 12^2 = 20^2$
 $x^2 + 144 = 400$
 $x^2 = 256$
 $x = 16$

8. A 25.5 foot ladder rests against the side of a house at a point 24.1 feet above the ground. The foot of the ladder is x feet from the house. Find the value of x to one decimal place.

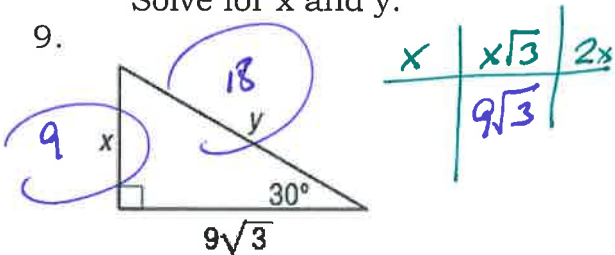


$x^2 + 24.1^2 = 25.5^2$
 $x^2 + 580.81 = 650.25$
 $x^2 = 69.44$
 $x = \sqrt{69.44} \approx 8.3$

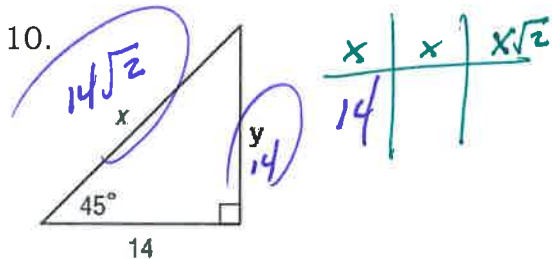
Spiraled Review: Special Right Triangles

Solve for x and y:

9.



10.



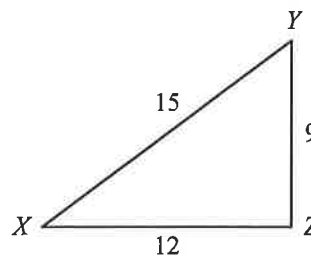
Write the *trigonometric ratio* as a fraction and as a decimal rounded to the nearest hundredths.

Fraction Decimal (hundredths)

11. $\sin \angle Y = \frac{12}{15} = .80$

12. $\cos \angle Y = \frac{9}{15} = .60$

13. $\tan \angle X = \frac{9}{12} = .75$



Use a calculator or trigonometry table as needed.

14. $\sin 29^\circ = .4848$

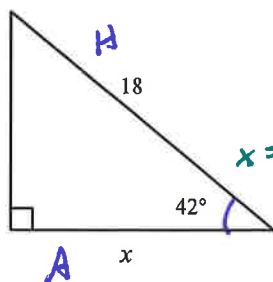
15. $\cos 52^\circ = .6157$ or $\cos^{-1}.6157$

16. $\tan 71^\circ = 2.9042$

17. $\cos 27^\circ = .8910$

Round all sides to the nearest hundredth and angles to the nearest degree

18. Find the value of x:

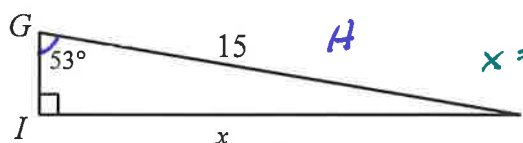


$\cos 42^\circ = \frac{x}{18}$

$x = 18 \cos 42^\circ$

$x = 13.38$

19. Find the value of x

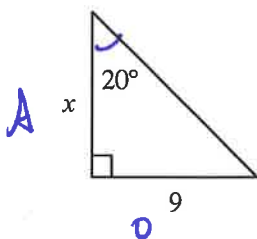


$\sin 53^\circ = \frac{x}{15}$

$x = 15 \sin 53^\circ$

$x = 11.98$

20. Find the value of x:



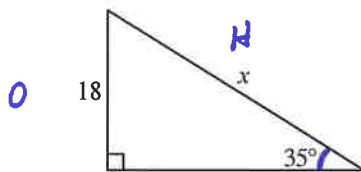
$\tan 20^\circ = \frac{9}{x}$

$x \tan 20^\circ = 9$

$x = \frac{9}{\tan 20^\circ}$

$x = 24.73$

21. Find the value of x.



$\sin 35^\circ = \frac{18}{x}$

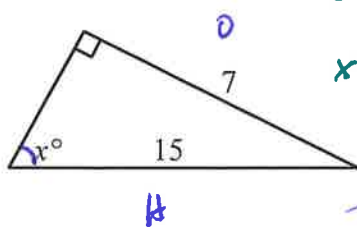
$x \sin 35^\circ = 18$

$x = \frac{18}{\sin 35^\circ}$

$x = 31.38$

Not drawn to scale

22. Find the measure of $\angle x$:



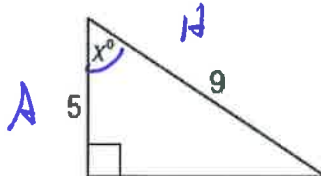
$\sin x = \frac{7}{15}$

$x = \sin^{-1}(\frac{7}{15})$

$x = 27.8^\circ$

$x = 28^\circ$

23. Find the measure of $\angle x$:



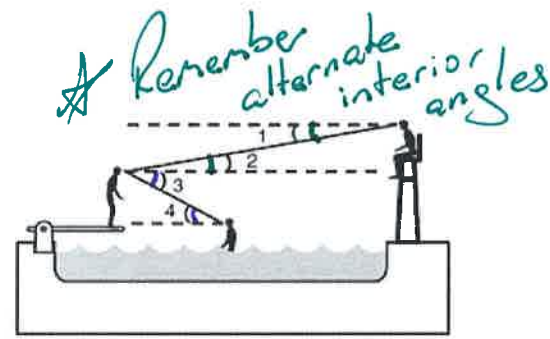
$\cos x = \frac{5}{9}$

$x = \cos^{-1}(\frac{5}{9})$

$x = 56.2^\circ$

$x = 56^\circ$

Ben is on the diving board at the neighborhood pool. Jenna is in the pool and a lifeguard sits at her station on the opposite end of the pool. Classify each angle as an angle of depression or an angle of elevation.



Remember alternate interior angles

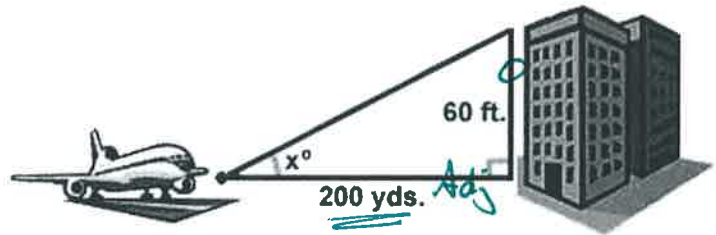
$\angle 1 \cong \angle 2$
 $\angle 3 \cong \angle 4$

24. $\angle 1$: angle of depression
 26. $\angle 3$: angle of depression

25. $\angle 2$: angle of elevation
 27. $\angle 4$: angle of elevation

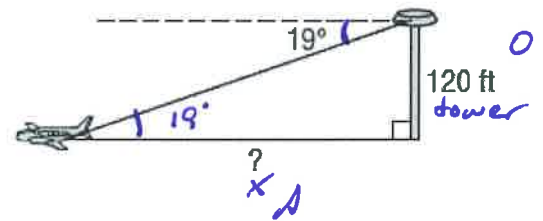
28. An airplane takes off ~~600~~²⁰⁰ feet in front of a 60-foot building. At what angle of elevation must the plane take off in order to avoid the building? Assume that the airplane flies in a straight line and the angle of elevation remains constant until the airplane flies over the building. Round the angle to the nearest degree.

$\tan x = \frac{60}{200}$
 $x = \tan^{-1}(60/200)$
 $x = 17^\circ$

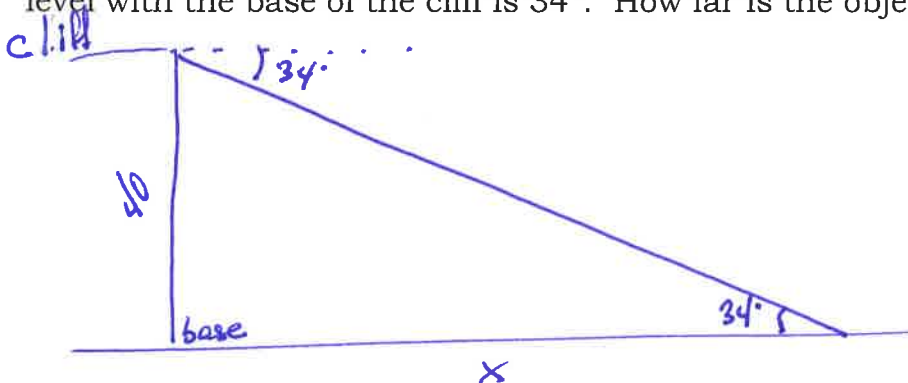


29. **AIR TRAFFIC** From the top of a 120-foot-high tower, an air traffic controller observes an airplane on the runway at an angle of depression of 19° . How far is the plane from the base of the tower? Round your answer to the nearest hundredths.

$\tan 19 = \frac{120}{x}$
 $x = \frac{120}{\tan 19}$
 $x = 348.51 \text{ ft}$



30. From the top of a vertical cliff 40 m high, the angle of depression of an object that is level with the base of the cliff is 34° . How far is the object from the base of the cliff?



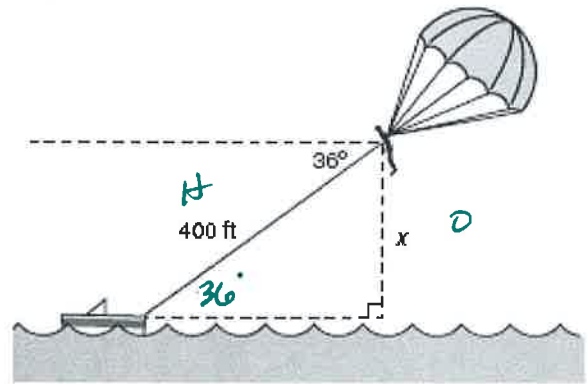
$\tan 34 = \frac{40}{x}$
 $x = \frac{40}{\tan 34}$
 $x = 59.3 \text{ m}$

31. The figure shows a person parasailing. What is x , the height of the parasail to the nearest hundredths of a foot

$$\sin 36 = \frac{x}{400}$$

$$x = 400 \sin 36$$

$$x = 235.11 \text{ ft}$$

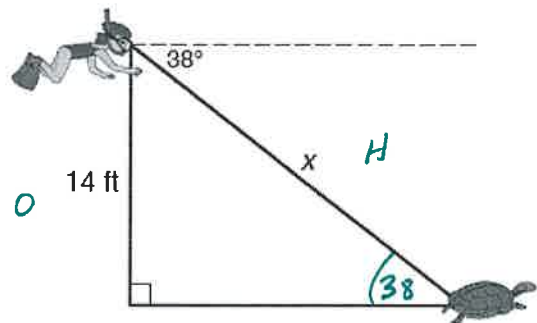


32. A person snorkeling sees a turtle on the ocean floor at an angle of depression of 38° . She is 14 feet above the ocean floor. How far is she from the turtle? Round to the nearest hundredths of a foot.

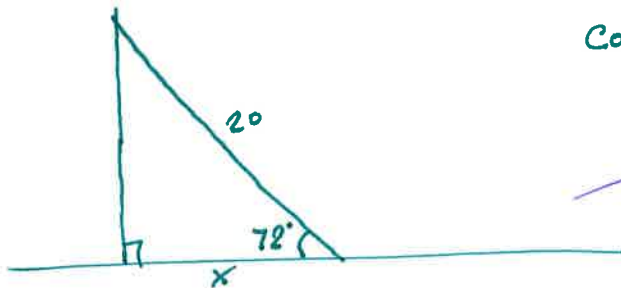
$$\sin 38^\circ = \frac{14}{x}$$

$$x = \frac{14}{\sin 38}$$

$$x = 22.74 \text{ ft}$$



33. A 20-foot ladder leans against a building and makes an angle of 72° with the ground. Find the distance between the foot of the ladder and the building.



$$\cos 72 = \frac{x}{20}$$

$$x = 20 \cos 72$$

$$x = 6.2 \text{ ft}$$

34. Michael, whose eyes are six feet off the ground, is standing 36 feet away from the base of a building, and he looks up at a 50° angle of elevation to a point on the edge of building's roof. To the nearest foot, how tall is the building?

$$\tan 50^\circ = \frac{x}{36}$$

$$x = 36 \tan 50$$

$$x = 42.9 \Rightarrow 43$$

$$\text{building} = 43 + 6 = 49 \text{ ft.}$$

