

## Chapter 7 Review

The lengths of three sides of a triangle are given. Describe each triangle as acute, right, or obtuse.

1. 9 cm, 10 cm, 12 cm

$$9^2 + 10^2 > 12^2$$

acute

2. 8 m, 17 m, 15 m

$$8^2 + 15^2 = 17^2$$

right

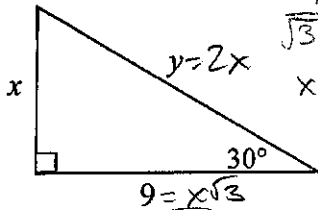
3. 10 in, 5 in, 6 in

$$5^2 + 6^2 < 10^2$$

obtuse

Find the value of the variables. Round your answer to the nearest hundredth.

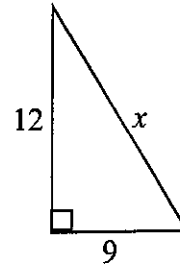
4.



$$\begin{aligned} 9 &= x\sqrt{3} \\ \frac{9}{\sqrt{3}} &= \frac{x\sqrt{3}}{\sqrt{3}} \\ x &= \frac{9}{\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{9\sqrt{3}}{3} = 3\sqrt{3} \\ y &= 2(3\sqrt{3}) = 6\sqrt{3} \end{aligned}$$

$$\begin{aligned} x &= 5.20 \\ y &= 10.39 \end{aligned}$$

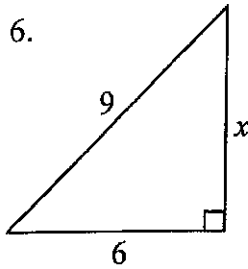
5.



$$x = 15$$

$$\begin{aligned} 9^2 + 12^2 &= x^2 \\ 81 + 144 &= x^2 \\ \sqrt{225} &= \sqrt{x^2} \end{aligned}$$

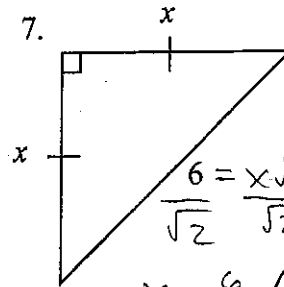
6.



$$x = 6.71$$

$$\begin{aligned} x^2 + 6^2 &= 9^2 \\ x^2 + 36 &= 81 \\ -36 & \quad -36 \\ \hline \sqrt{x^2} &= \sqrt{45} \end{aligned}$$

7.



$$x = 4.24$$

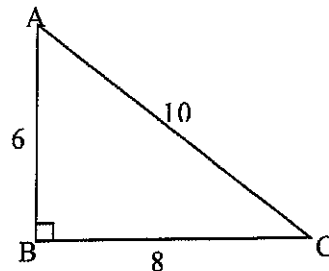
$$\begin{aligned} 6 &= \frac{x\sqrt{2}}{\sqrt{2}} \\ x &= \frac{6}{\sqrt{2}} \left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{6\sqrt{2}}{2} = 3\sqrt{2} \end{aligned}$$

8. Use the diagram below to find the following ratios.

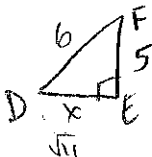
a)  $\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{8}{10} = \frac{4}{5}$

b)  $\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{6}{10} = \frac{3}{5}$

c)  $\tan A = \frac{\text{opp}}{\text{adj}} = \frac{8}{6} = \frac{4}{3}$



9. In  $\triangle DEF$ ,  $\angle E$  is a right angle and  $\sin D = \frac{5}{6}$ . Find  $\tan D$ . Leave your answer as a radical.



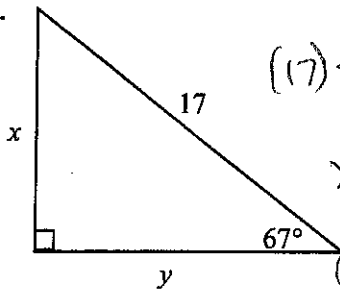
$$\begin{aligned} 5^2 + x^2 &= 6^2 \\ 25 + x^2 &= 36 \\ -25 & \quad -25 \\ \hline \sqrt{x^2} &= \sqrt{11} \\ x &= \sqrt{11} \end{aligned}$$

$$\tan D = \frac{\text{opp}}{\text{adj}} = \frac{5}{\sqrt{11}} \left(\frac{\sqrt{11}}{\sqrt{11}}\right) = \frac{5\sqrt{11}}{11}$$

Questions

#10-12: Find the value of each variable. Round all answers to the nearest tenth.

10.



$$(17) \sin 67 = \frac{x}{17} (17)$$

$$x = 17 \sin 67$$

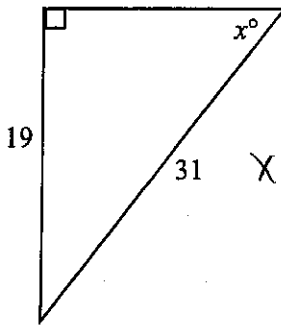
$$(17) \cos 67 = \frac{y}{17} (17)$$

$$y = 17 \cos 67$$

$$x = \underline{15.6}$$

$$y = \underline{6.6}$$

11.

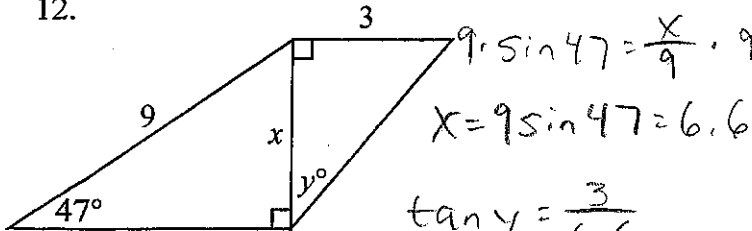


$$\sin x = \frac{19}{31}$$

$$x = \sin^{-1}\left(\frac{19}{31}\right)$$

$$x = \underline{37.8}$$

12.



$$9 \cdot \sin 47 = \frac{x}{9} \cdot 9$$

$$x = 9 \sin 47 = 6.6$$

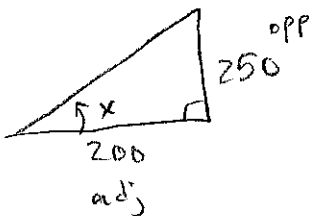
$$\tan y = \frac{3}{6.6}$$

$$y = \tan^{-1}\left(\frac{3}{6.6}\right)$$

$$x = \underline{6.6}$$

$$y = \underline{24.5}$$

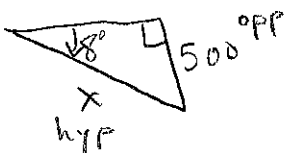
13. Julia is on a boat 200 feet away from the base of a cliff. She sees her friend Allison standing on top of the 250 foot cliff. What is the angle of elevation when Julia looks up at Allison? Round your answer to the nearest degree.



$$\tan x = \frac{250}{200}$$

$$x = \tan^{-1}\left(\frac{250}{200}\right) = \boxed{51^\circ}$$

14. A blimp is providing aerial television views of a Chicago Bears game. The television camera sights the field at an  $8^\circ$  angle of depression. The blimp's altitude is 500 m. In order to put the camera in focus, the camera operator needs to know the length of the direct line of sight from the TV camera to the field. What is that distance? Round your answer to the nearest tenth. Hint: Draw a picture!



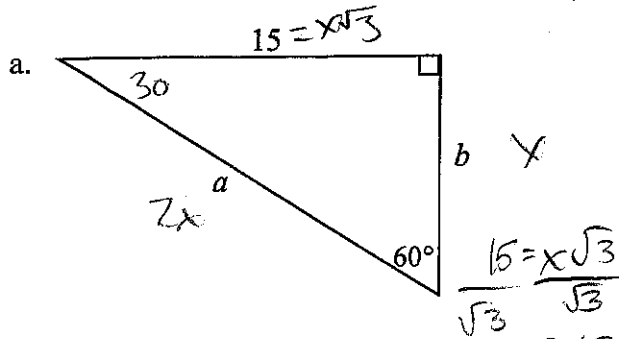
$$x \cdot \sin 8 = \frac{500}{x} \cdot x$$

$$\frac{x \sin 8}{\sin 8} = \frac{500}{\sin 8}$$

$$x = \frac{500}{\sin 8} = \boxed{3592.6 \text{ m}}$$

Questions

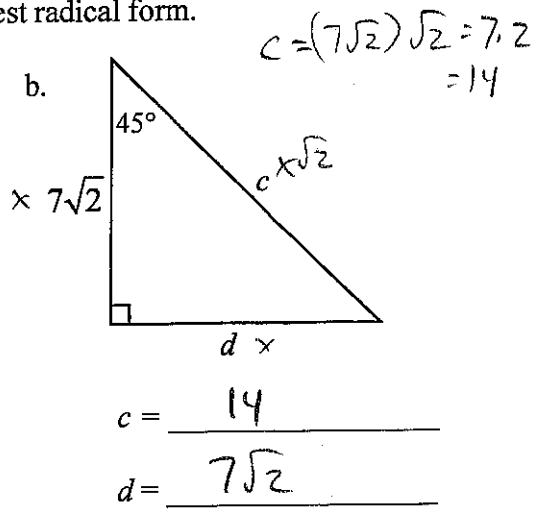
15. Find the value of each variable. Leave your answer in simplest radical form.



$$15 = x\sqrt{3}$$

$$\frac{15}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}} \Rightarrow b = x = \frac{15}{\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{15\sqrt{3}}{3} = 5\sqrt{3}$$

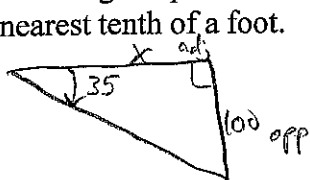
$$a = 2x = 2(5\sqrt{3}) = 10\sqrt{3}$$



$$c = \frac{14}{\sqrt{2}} = 7\sqrt{2}$$

$$d = 7\sqrt{2}$$

16. A forest ranger looking out from a ranger's station can see a forest fire at a 35° angle of depression. The ranger's position is 100 feet above the ground. How far is the ranger from the fire? Round to the nearest tenth of a foot.

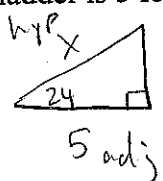


$$x \cdot \tan 35 = \frac{100}{x} \cdot x$$

$$\frac{x \tan 35}{\tan 35} = \frac{100}{\tan 35}$$

$$x = \frac{100}{\tan 35} = 142.8 \text{ ft}$$

17. A ladder leaning against a house makes an angle of 24° with the ground. The foot (bottom) of the ladder is 5 feet from the base of the house. How long is the ladder? Round to the nearest tenth of a foot.

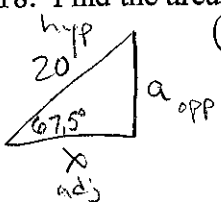


$$x \cdot \cos 24 = \frac{5}{x} \cdot x$$

$$\frac{x \cos 24}{\cos 24} = \frac{5}{\cos 24}$$

$$x = \frac{5}{\cos 24} = 5.5 \text{ ft}$$

18. Find the area of a regular octagon with radius 20 in. Round to the nearest hundredth.



$$(8-2) \cdot 180 \div 8 \div 2 = 67.5^\circ$$

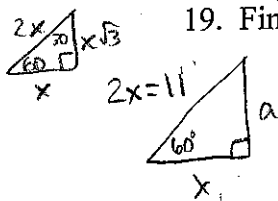
$$\sin 67.5 = \frac{a}{20} \Rightarrow a = 20 \sin 67.5 = 18.4776$$

$$\cos 67.5 = \frac{x}{20} \Rightarrow x = 20 \cos 67.5 = 7.65367$$

$$\text{Side} = 2x = 2(7.65367) = 15.30734$$

$$A = \frac{1}{2} a p = \frac{1}{2} (18.4776)(15.30734) = 141.37 \text{ in}^2$$

19. Find the area of a regular hexagon with radius 11 cm. Round to the nearest hundredth.



$$(6-2) \cdot 180 \div 6 \div 2 = 60^\circ$$

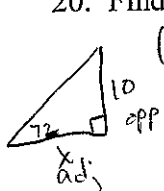
$$\frac{11}{2} = 2x \Rightarrow x = 5.5$$

$$5.5 = x$$

$$\text{Side} = 2(5.5) = 11$$

$$A = \frac{1}{2} (5.5\sqrt{3})(11 \times 6) = 314.37 \text{ cm}^2$$

20. Find the area of a regular decagon with apothem 10 in. Round to the nearest hundredth.



$$(10-2) \cdot 180 \div 10 \div 2 = 72^\circ$$

$$x \cdot \tan 72 = \frac{10}{x} \cdot x$$

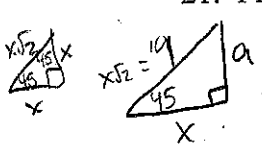
$$\frac{x \tan 72}{\tan 72} = \frac{10}{\tan 72}$$

$$x = \frac{10}{\tan 72} = 3.2492$$

$$\text{Side} = 2(3.2492) = 6.4984$$

$$A = \frac{1}{2} (10)(6.4984 \times 10) = 324.92 \text{ in}^2$$

21. Find the area of a square with radius 9 cm. Round to the nearest hundredth.



$$(4-2) \cdot 180 \div 4 \div 2 = 45^\circ$$

$$\frac{9}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$x = \frac{9}{\sqrt{2}} \left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{9\sqrt{2}}{2} = a$$

$$\text{Side} = 2 \left(\frac{9\sqrt{2}}{2}\right) = 9\sqrt{2}$$

$$A = \frac{1}{2} \left(\frac{9\sqrt{2}}{2}\right) (9\sqrt{2} \cdot 4) = 162 \text{ cm}^2$$

