
8-2

TRIGONOMETRY



OBJECTIVE

TO USE THE SINE,
COSINE AND TANGENT
RATIOS TO DETERMINE
SIDE LENGTHS

VOCABULARY

By the AA Similarity Postulate, a right triangle with

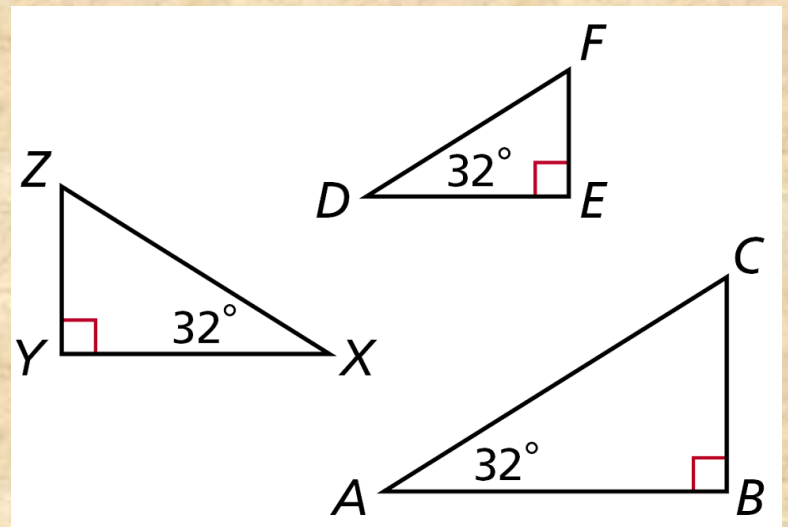
a given acute angle is similar to every other right triangle with that same acute angle measure.

So $\triangle ABC \sim \triangle DEF \sim \triangle XYZ$, and

$$\frac{BC}{AC} = \frac{EF}{DF} = \frac{YZ}{XZ}. \text{ These are}$$

trigonometric ratios. A

trigonometric ratio is a ratio of two sides of a right triangle.

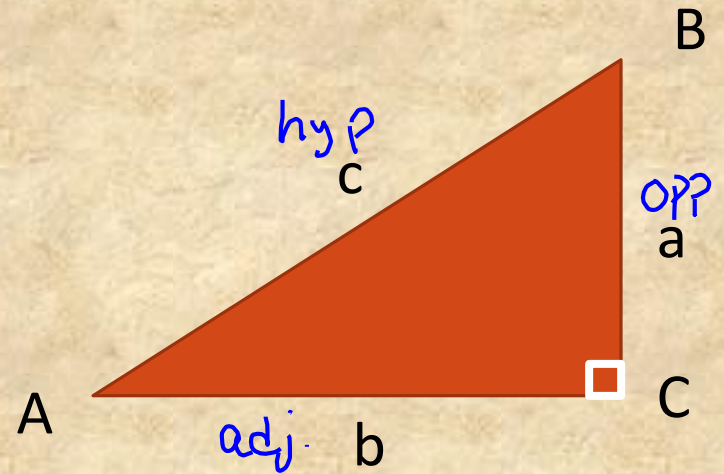


VOCABULARY

$$\text{Sine of } \angle A = \sin A = \frac{\text{opp}}{\text{hyp}} = \frac{a}{c}$$

$$\text{Cosine of } \angle A = \cos A = \frac{\text{adj}}{\text{hyp}} = \frac{b}{c}$$

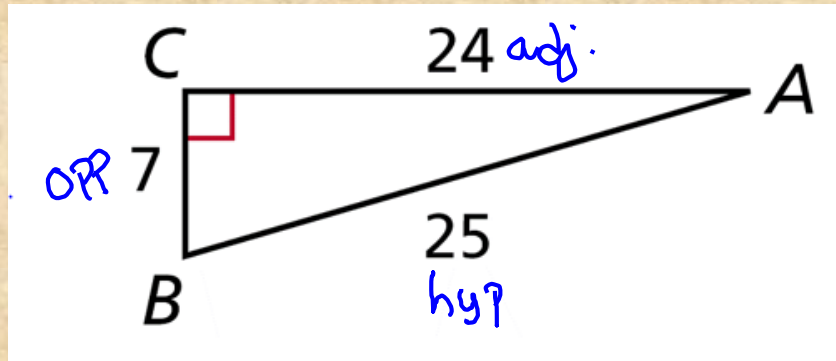
$$\text{Tangent of } \angle A = \tan A = \frac{\text{opp}}{\text{adj}} = \frac{a}{b}$$



CLASS WORK

Write the trigonometric ratios $\sin A$, $\cos A$, and $\tan A$.

1.

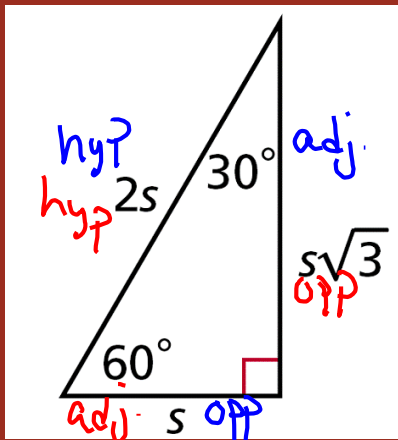
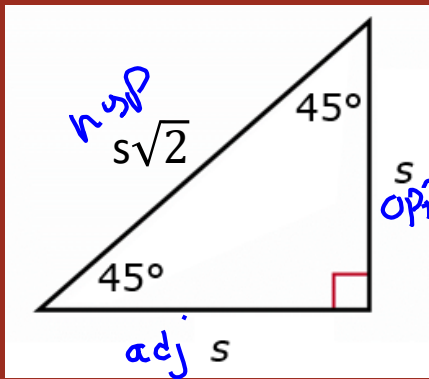


$$\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{7}{25}$$

$$\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{24}{25}$$

$$\tan A = \frac{\text{opp}}{\text{adj}} = \frac{7}{24}$$

Use special right triangles to find the following:



CLASS WORK

$$2. \quad \cos 30^\circ = \frac{s\sqrt{3}}{2s} = \frac{\sqrt{3}}{2}$$

$$3. \quad \sin 45^\circ = \frac{s}{s\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$4. \quad \tan 60^\circ = \frac{s\sqrt{3}}{s} = \sqrt{3}$$

$$5. \quad \sin 60^\circ = \frac{s\sqrt{3}}{2s} = \frac{\sqrt{3}}{2}$$

Use a calculator to find the following trigonometric ratios: (round to four decimal places.)

CLASS WORK

6. $\sin 52^\circ = 0.7880$

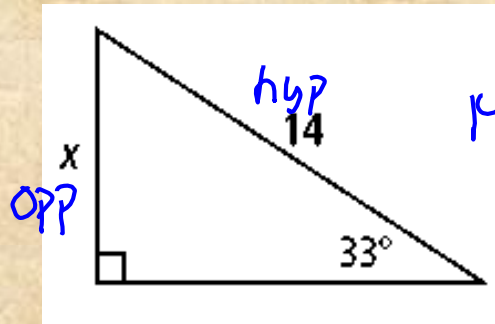
7. $\cos 23^\circ = 0.9205$

8. $\tan 65^\circ = 2.1445$

CLASS WORK

Find the value of x .
Round to the nearest tenth.

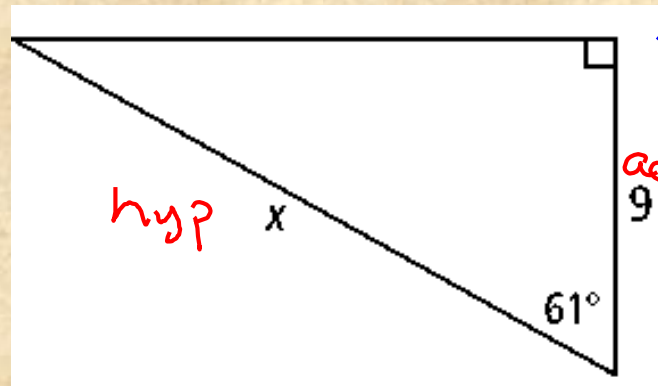
9.



$$14 \cdot \sin 33^\circ = \frac{x}{14} \cdot 14$$

$$x = 14(\sin 33^\circ) = 7.6$$

10.



$$x \cdot \cos 61^\circ = \frac{9}{x} \cdot x$$

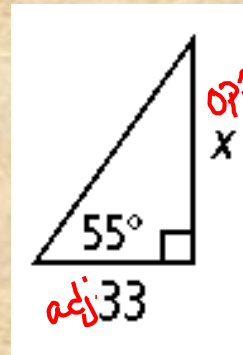
$$x(\cos 61^\circ) = 9$$

$$x = \frac{9}{\cos 61^\circ} = 18.6$$

Find the value of x .
Round to the nearest tenth.

CLASS WORK

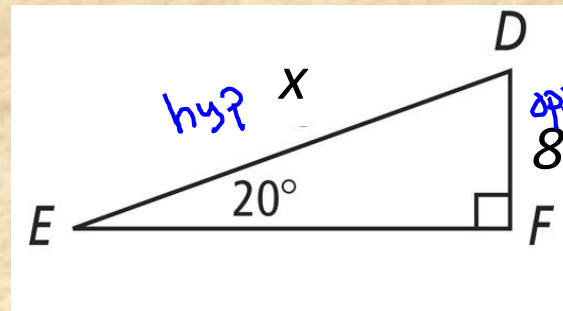
11.



$$\tan 55 = \frac{x}{33}$$

$$x = 33(\tan 55) = 47.1$$

12.



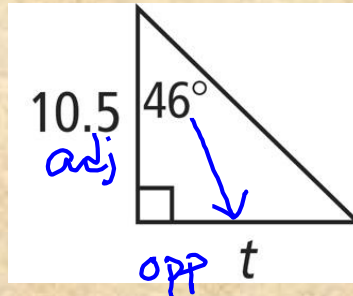
$$\sin 20 = \frac{8}{x}$$

$$x = \frac{8}{\sin 20} = 23.4$$

CLASS WORK

Find the value of t .
Round to the nearest tenth.

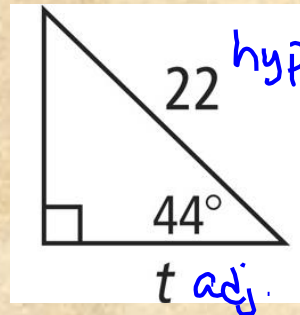
13.



$$\tan 46^\circ = \frac{t}{10.5}$$

$$t = 10.5(\tan 46^\circ) = 10.9$$

14.



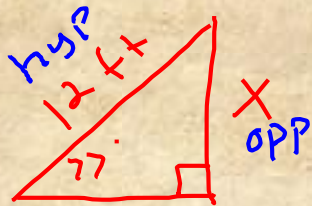
$$\cos 44^\circ = \frac{t}{22}$$

$$t = 22(\cos 44^\circ)$$

$$t = 15.8$$

CLASS WORK

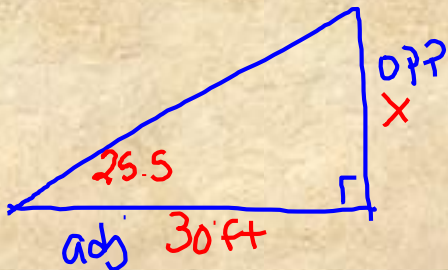
15. A 12-ft-long ladder is leaning against a wall and makes a 77° angle with the ground. How high does the ladder reach on the wall? Round to the nearest inch.



$$\sin 77 = \frac{X}{12}$$

$$X = 12(\sin 77) = 11.69 \text{ ft} = 11 \text{ ft } 8 \text{ in}$$

16. A straight ramp rises at an angle of 25.5° and has a base 30 ft long. How high is the ramp? Round to the nearest foot.

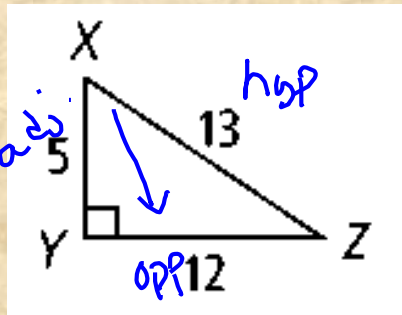


$$\tan 25.5 = \frac{X}{30}$$

$$X = 30(\tan 25.5) = 14 \text{ ft}$$

EXIT PROBLEMS

17. Write the ratios for $\sin X$, $\cos X$, and $\tan X$.

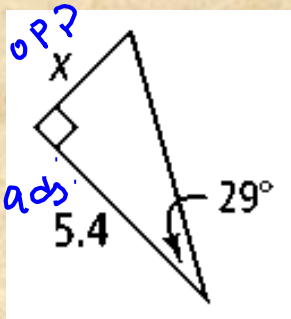


$$\sin X = \frac{12}{13}$$

$$\cos X = \frac{5}{13}$$

$$\tan X = \frac{12}{5}$$

18. Find the value of x . Round to the nearest tenth.



$$\tan 29^\circ = \frac{x}{5.4}$$

$$x = 5.4 (\tan 29^\circ) = 3.0$$

SUMMARY

- $\text{SIN } A = \frac{\textit{opp}}{\textit{hyp}}$ SOH

- $\text{COS } A = \frac{\textit{adj}}{\textit{hyp}}$ CAH

- $\text{TAN } A = \frac{\textit{opp}}{\textit{adj}}$ TOA

HOMework

PAGES 545 - 548

22 - 42 EVEN

48, 50, 54, 68, 70
