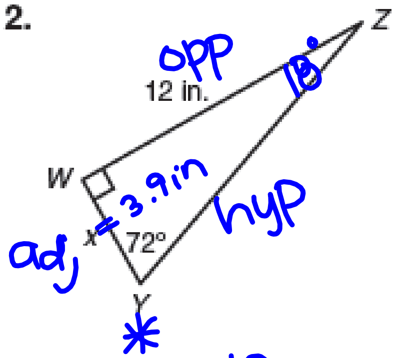
Starter

Use the tangent ratio or the inverse tangent to solve for x in both right triangles below - this will help you get ready for your quiz on tangent you'll have later in the week!

2.

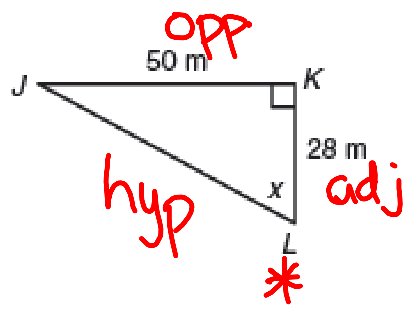


$$x \cdot \tan 72 = \frac{12}{x} \cdot x$$

$$\frac{x \cdot \tan 72}{\tan 72} = \frac{12}{\tan 72}$$

$$x = 3.9 \text{ in}$$

4.



$$\tan x = \frac{50}{28}$$

$$\tan^{-1}(\tan x) = \tan^{-1}\left(\frac{50}{28}\right)$$

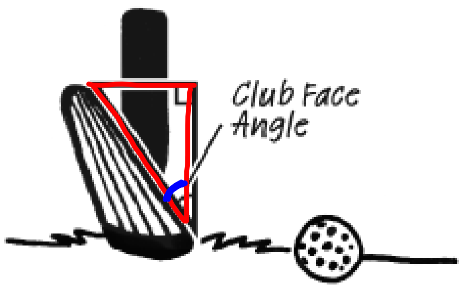
$$x = 60.8^\circ$$

8.3 The Sine Ratio

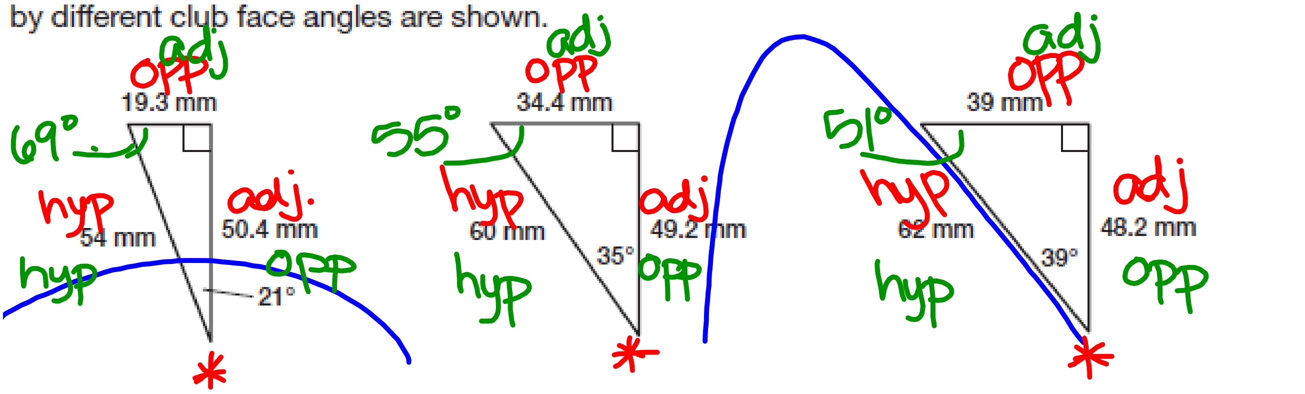
Sine Ratio, Cosecant Ratio, and Inverse Sine

PG.595-596 IN YOUR BOOK

Each golf club in a set of clubs is designed to cause the ball to travel different distances and different heights. One design element of a golf club is the angle of the club face.



You can draw a right triangle that is formed by the club face angle. The right triangles formed by different club face angles are shown.



1. How do you think the club face angle affects the path of the ball?

larger angle makes the ball go higher, but a shorter distance. The smaller angle makes the ball go lower, but a farther distance.

2. For each club face angle, write the ratio of the side length opposite the given acute angle to the length of the hypotenuse. Write your answers as decimals rounded to the nearest hundredth.

$\sin 21 = \frac{19.3}{54} \approx 0.36$ | $\sin 35 = \frac{34.4}{60} \approx 0.57$ | $\sin 39 = \frac{39}{62} \approx 0.63$

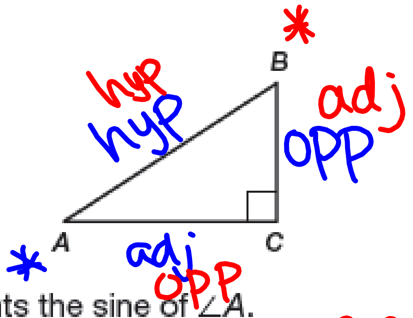
$0.36 = 0.36$

PG.597 IN YOUR BOOK

3. What happens to this ratio as the angle measure gets larger?

As the angle measure gets bigger, the ratio also gets bigger.

The **sine (sin)** of an acute angle in a right triangle is the ratio of the length of the side that is opposite the angle to the length of the hypotenuse. The expression "sin *A*" means "the sine of ∠*A*."



4. Complete the ratio that represents the sine of ∠*A*.

$\sin A = \dfrac{\text{length of side opposite } \angle A}{\text{length of hypotenuse}} = \dfrac{BC}{AB}$

$\sin B = \dfrac{AC}{AB}$

≅ ~

5. For each triangle in Problem 1, calculate the sine value of the club face angle. Then calculate the sine value of the other acute angle. Round your answers to the nearest hundredth.

$\sin 21 \approx 0.36$

$\sin 35 \approx 0.57$

$\sin 39 \approx 0.63$

$\sin 69 = \frac{50.4}{54} \approx 0.93$

$\sin 55 = \frac{49.2}{60} \approx 0.82$

$\sin 51 = \frac{48.2}{62} \approx 0.78$

6. What do the sine values of the angles in Question 5 all have in common?

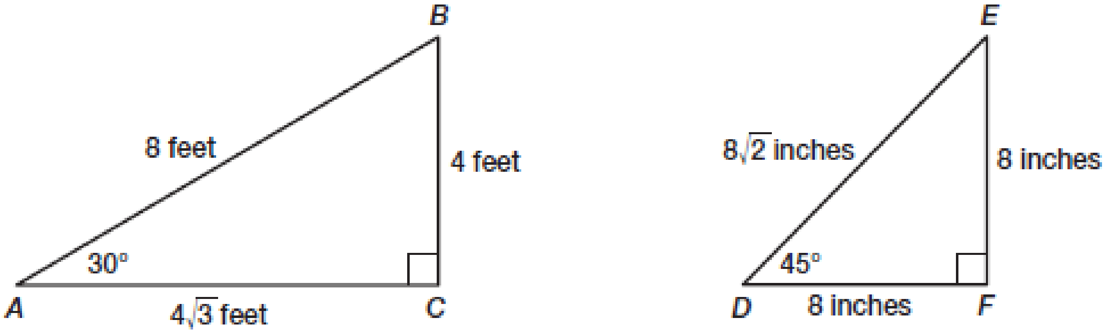
All less than 1

HW: finish pgs. 597-598

Nov 18-8:54 AM

PG.598 IN YOUR BOOK

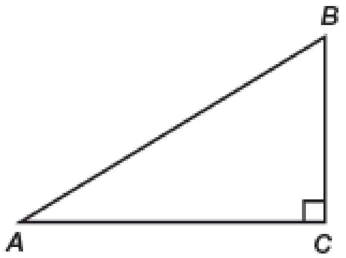
9. Use the right triangles shown to calculate the values of sin 30°, sin 45°, and sin 60°.

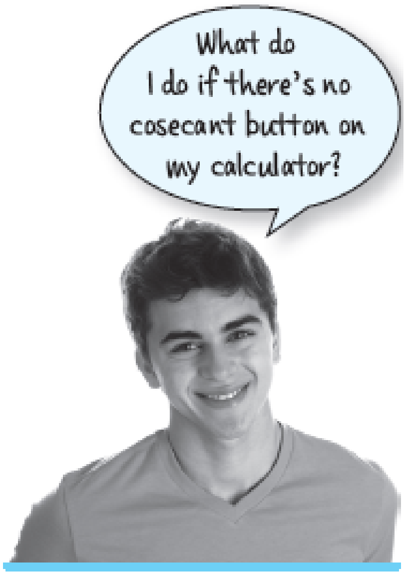


10. A golf club has a club face angle A for which $\sin A \approx 0.45$. Estimate the measure of $\angle A$. Use a calculator to verify your answer.

PG.599 IN YOUR BOOK

The **cosecant (csc)** of an acute angle in a right triangle is the ratio of the length of the hypotenuse to the length of the side that is opposite the angle. The expression "csc A" means "the cosecant of $\angle A$."





1. Complete the ratio that represents the cosecant of $\angle A$.

$$\csc A = \frac{\text{length of hypotenuse}}{\text{length of side opposite } \angle A} = \frac{\square}{\square}$$

2. Prove algebraically that the cosecant of $A = \frac{1}{\sin A}$.

3. As the measure of an acute angle increases, the sine value of the acute angle increases. Explain the behavior of the cosecant value of an acute angle as the measure of the acute angle increases.

PG.600 IN YOUR BOOK

The **inverse sine** (or arc sine) of x is defined as the measure of an acute angle whose sine is x. If you know the length of any two sides of a right triangle, it is possible to calculate the measure of either acute angle by using the inverse sine, or $\sin^{-1}$ button on a graphing calculator.

In right triangle ABC, if $\sin A = x$, then $\sin^{-1} x = m\angle A$.

1. In right triangle ABC, if $\sin A = \frac{2}{5}$, calculate $\sin^{-1}\left(\frac{2}{5}\right)$ to determine $m\angle A$.

$\sin^{-1}(\sin A) = \sin^{-1}\left(\frac{2}{5}\right)$

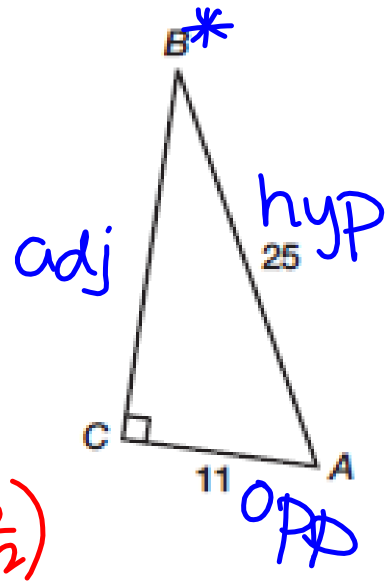
$A = \sin^{-1}\left(\frac{2}{5}\right) \approx 23.58°$

2. Determine the ratio for $\sin B$, and then use $\sin^{-1}(\sin B)$ to calculate $m\angle B$.

$\sin B = \frac{11}{25}$

$\sin^{-1}(\sin B) = \sin^{-1}\left(\frac{11}{25}\right)$

$B = 26.1°$



3. Calculate $m\angle B$.

$\sin B = \frac{5}{12}$

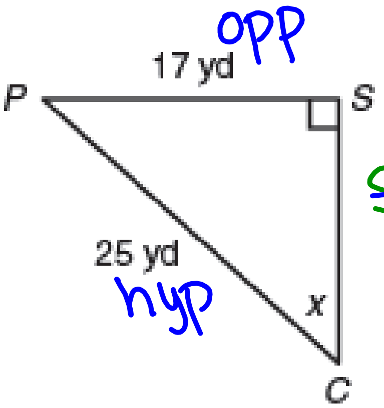
$\sin^{-1}(\sin B) = \sin^{-1}\left(\frac{5}{12}\right)$

$B = \sin^{-1}\left(\frac{5}{12}\right) \approx 24.6°$

Finish pg.601-604 for homework. The following problems are **not** in your book, so copy them down into your notes!

Use the sine ratio, the cosecant ratio, or the inverse sine to solve for x. Round each answer to the nearest tenth.

2.



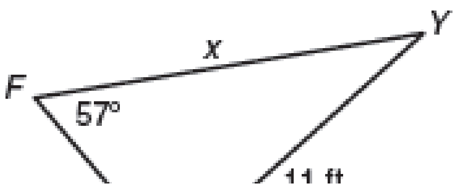
$\sin x = \frac{17}{25}$

$\sin^{-1}(\sin x) = \sin^{-1}\left(\frac{17}{25}\right)$

$x = \sin^{-1}\left(\frac{17}{25}\right)$

$x \approx 42.8^\circ$

1.



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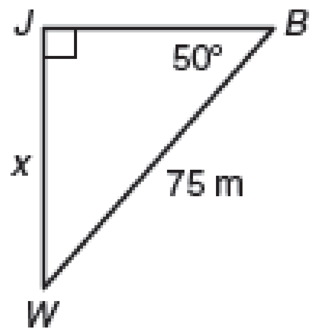
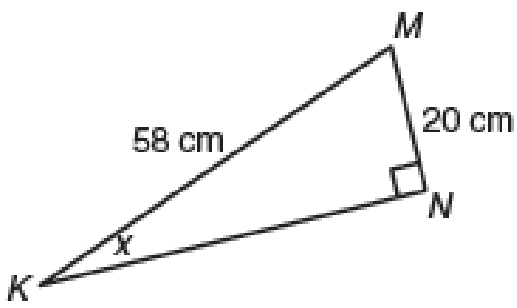


3.



pg.590 in your book

Nov 19-2:51 PM

pg.591 in your book

#2-3 on pg.592 in your book is **homework** &
problem 6 on pg.593 is also **homework**

pg.592 in your book

Nov 19-2:51 PM

not in your book

Homework

Finish Lesson 8.3

Aug 24-2:00 PM