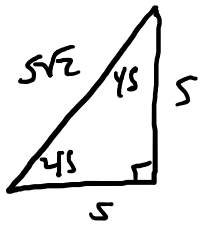
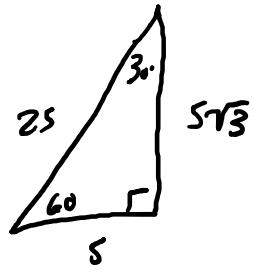
Warm Up- Need a calculator

What is true about the sine of an angle and the cosine of its complement? they are equal.

Draw the two special right triangles





Name all 4 Pythagorean Triples (that you need to memorize)

3-4-5 5-12-13 8-15-17 7-24-25

Without using a calculator Determine which is greater- tan 60° or tan 70° . Explain Your Answer.

Quiz WEDNESDAY

- Pythagorean Triples
- Special Right Triangles
- Trig Ratios and Reciprocals
- Trig of Special Right Triangles
- Inverse Trig
- Problem Solving

- Packet answers from last Friday are on my website

Check Homework

Objective

Use trigonometric ratios to find angle measures in right triangles and to solve real-world problems.

SOH CAH TOA

Sine
Opposite
Hypotenuse

Cosine
Adjacent
Hypotenuse

Tangent
Opposite
Adjacent

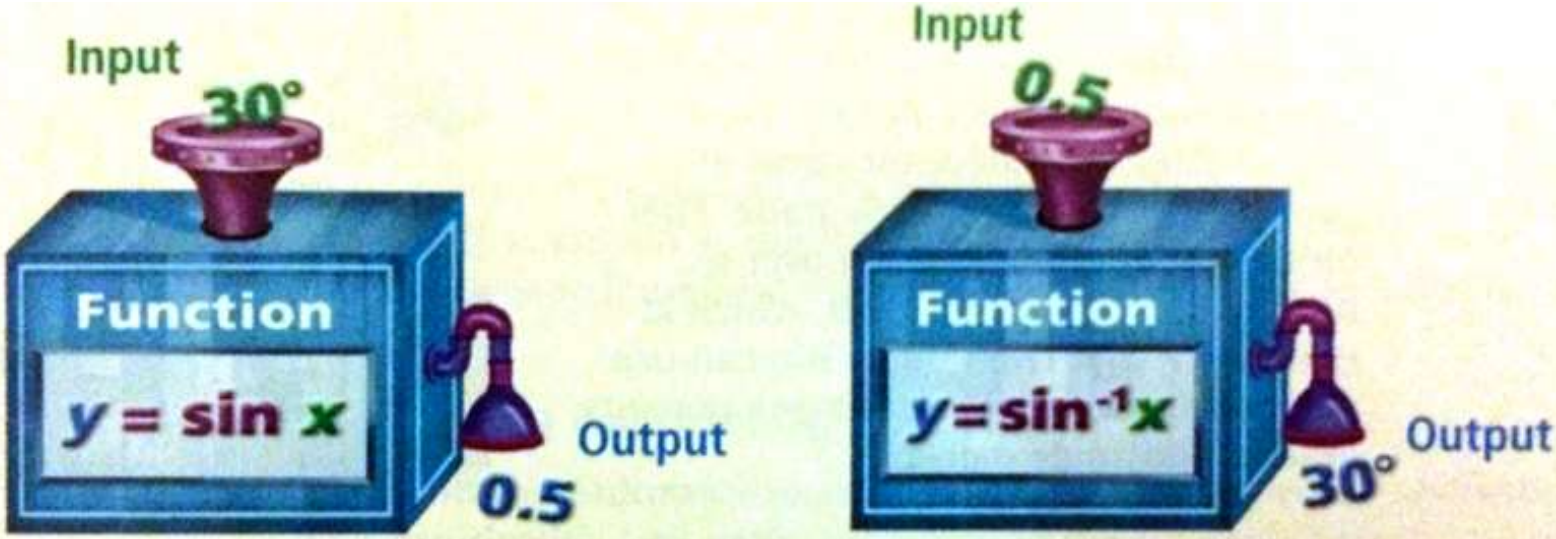
Inverse Trig

$$\sin 30^\circ = \frac{1}{2}$$

"the sine of 30 degrees is $\frac{1}{2}$"

$$\sin^{-1} \frac{1}{2} = 30^\circ$$

"the angle whose sine is $\frac{1}{2}$ is 30°"


Input
30°
Function
y = sin x
Output
0.5
Input
0.5
Function
y=sin⁻¹x
Output
30°

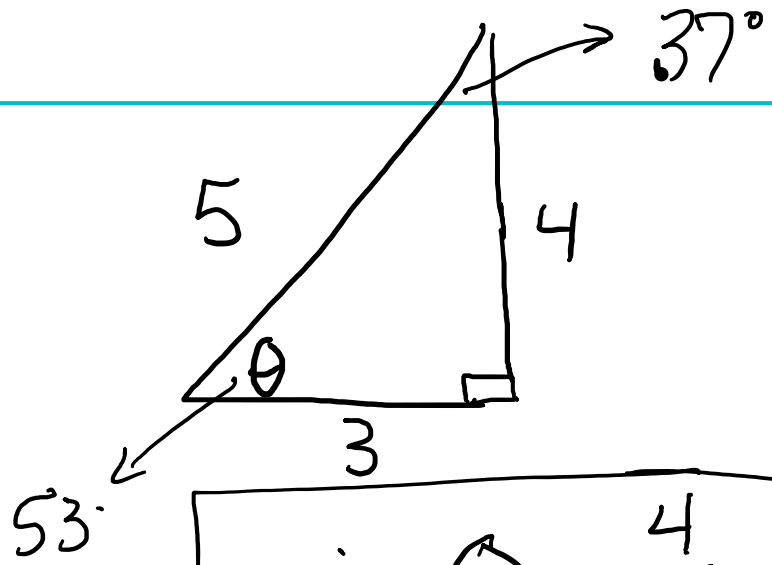
If you know the sine, cosine, or tangent of an acute angle measure, you can use the inverse trigonometric functions to find the measure of the angle.

Inverse Trigonometric Functions
If $\sin A = x$, then $\sin^{-1} x = m\angle A$.
If $\cos A = x$, then $\cos^{-1} x = m\angle A$.
If $\tan A = x$, then $\tan^{-1} x = m\angle A$.

$$\sin^{-1} x \neq \frac{1}{\sin x}$$

$\frac{1}{\sin x} \rightarrow \csc x$

CAREFUL!!!!! INVERSE TRIG IS NOT THE SAME THING AS THE RECIPROCALS!



$$\sin\theta = \frac{4}{5}$$

$$\frac{1}{\sin\theta} = \csc\theta = \frac{5}{4}$$

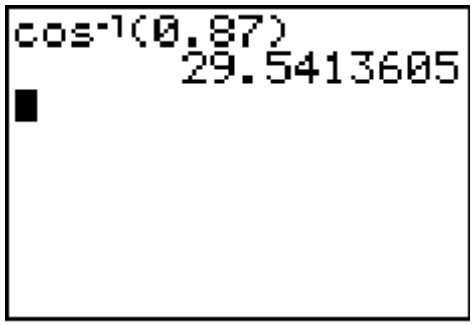
$$\sin^{-1}\frac{4}{5} = \theta$$

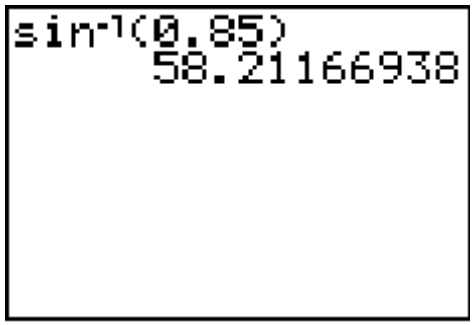
$$53° = \theta$$

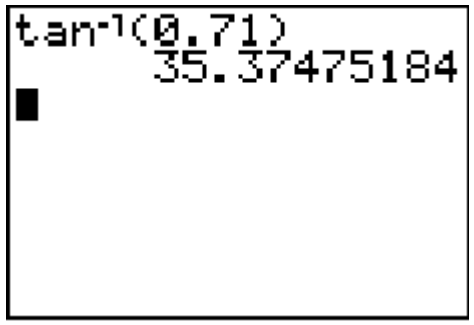
→ Inverse Trig

Use your calculator to find each angle measure to the nearest degree.

A. $\cos^{-1}(0.87)$ **B.** $\sin^{-1}(0.85)$ **C.** $\tan^{-1}(0.71)$







Using given measures to find the unknown angle measures or side lengths of a triangle is known as *solving a triangle*. To solve a right triangle, you need to know two side lengths or one side length and an acute angle measure.

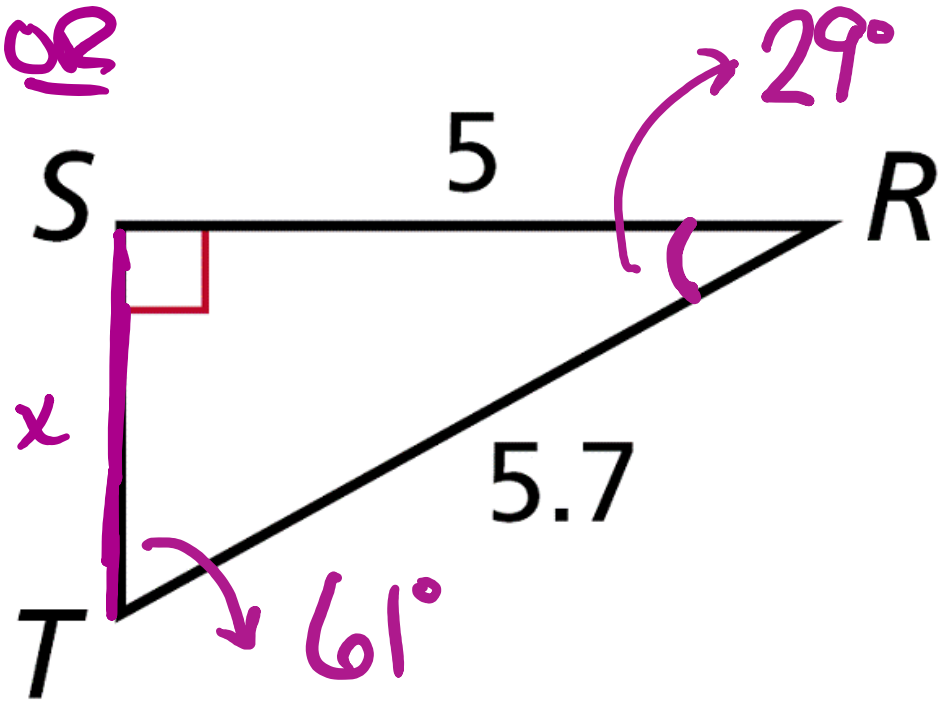
Find ALL unknown measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.

$m\angle R = \cos^{-1}\frac{5}{5.7} = 29°$

$m\angle T = 90° - 29° = 61°$

$\tan 61 = \frac{5}{x}$ OR $\tan 29 = \frac{x}{5}$

$ST \approx 2.77$



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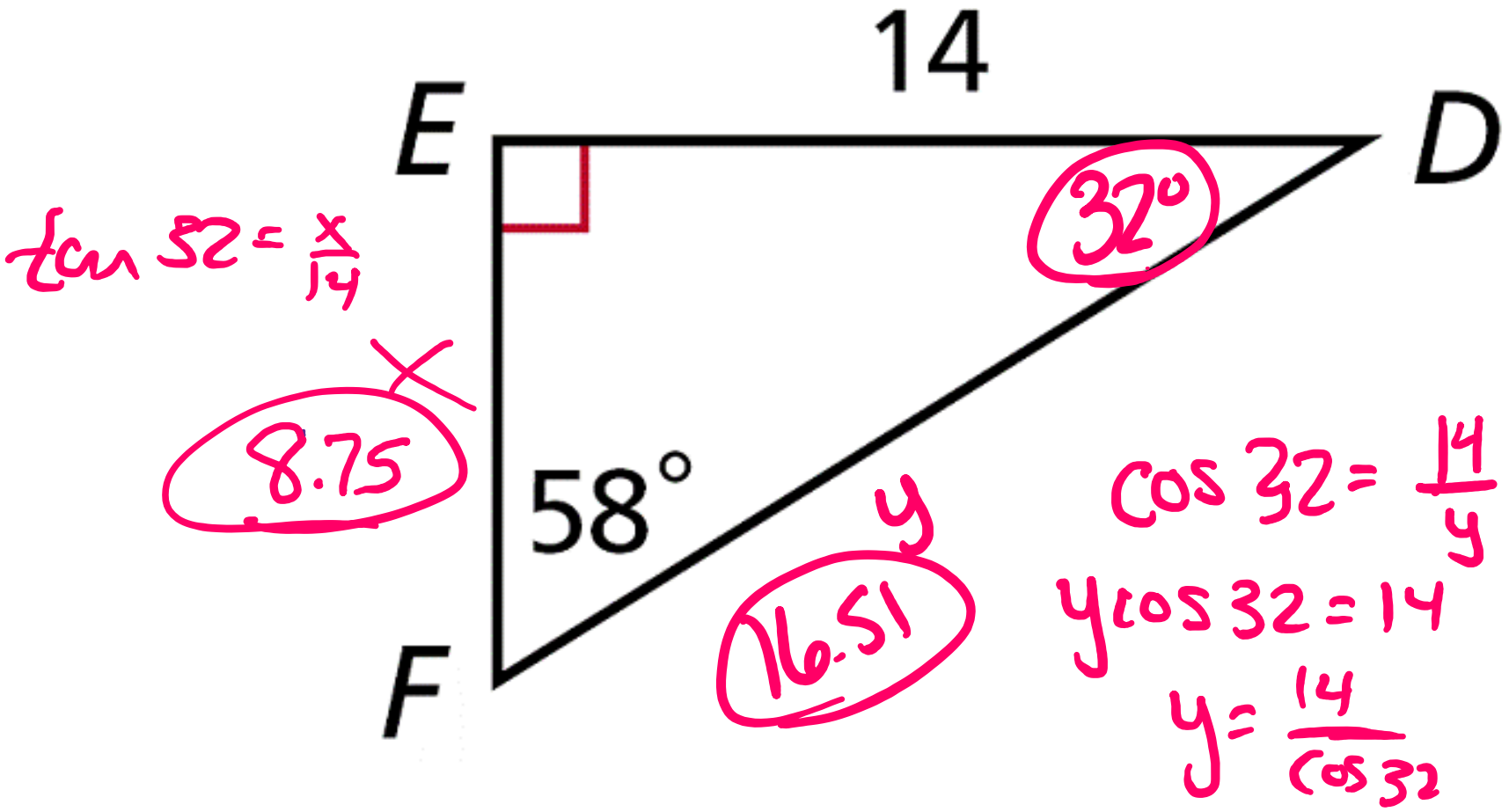

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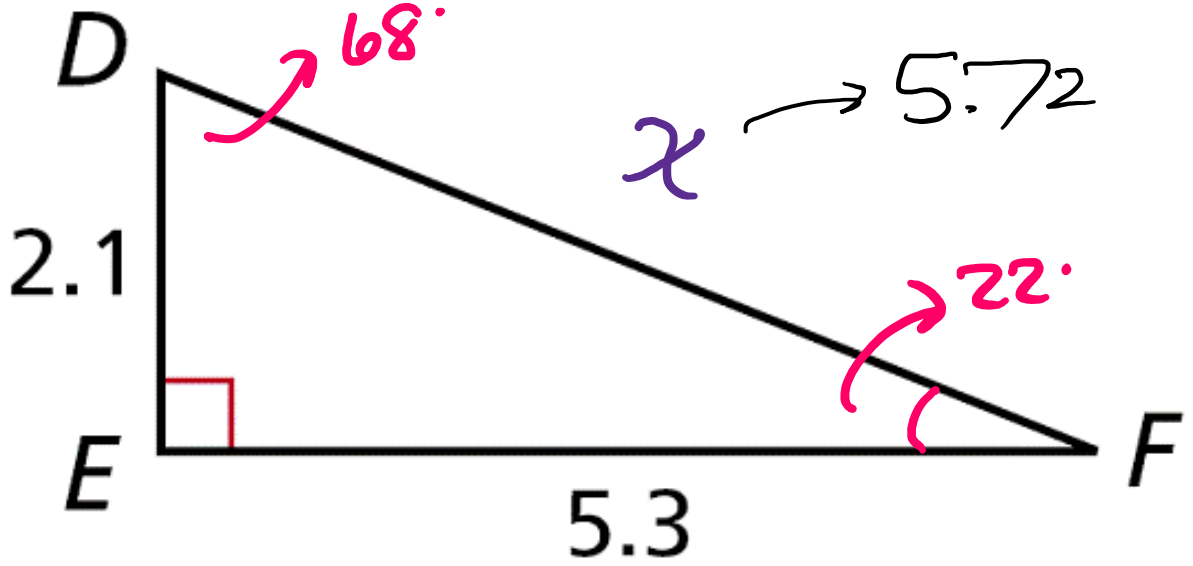


$\tan^{-1}\frac{2.1}{5.3} = 22°$

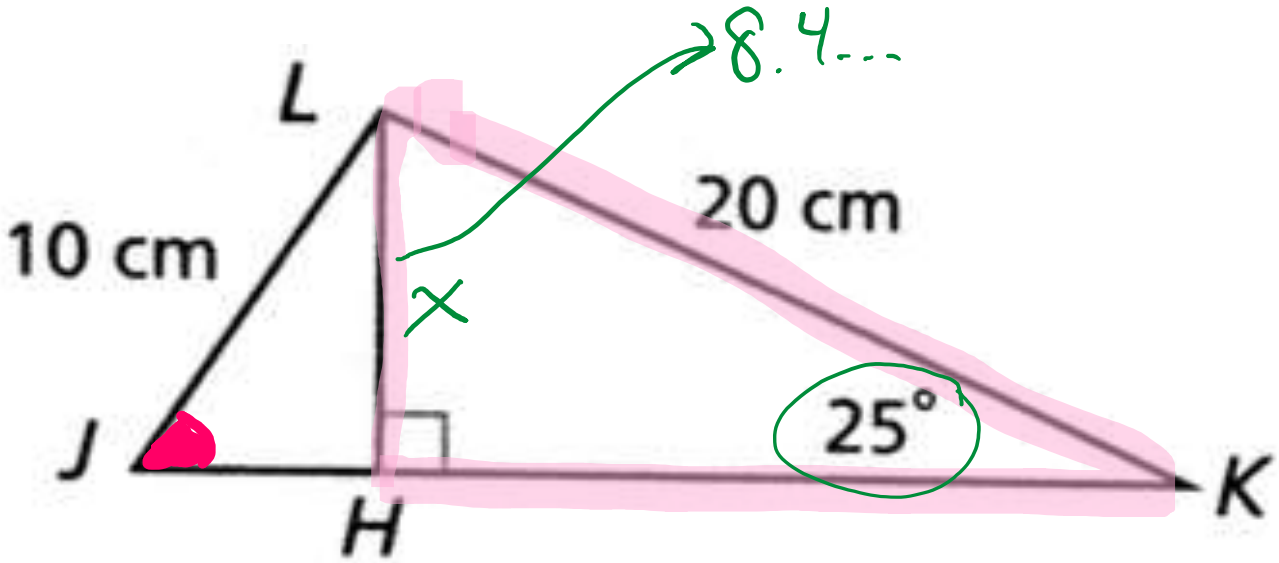
$\sin 22 = \frac{2.1}{x}$

$x \sin 22 = 2.1$

$x = \frac{2.1}{\sin 22}$

$x = 5.72$

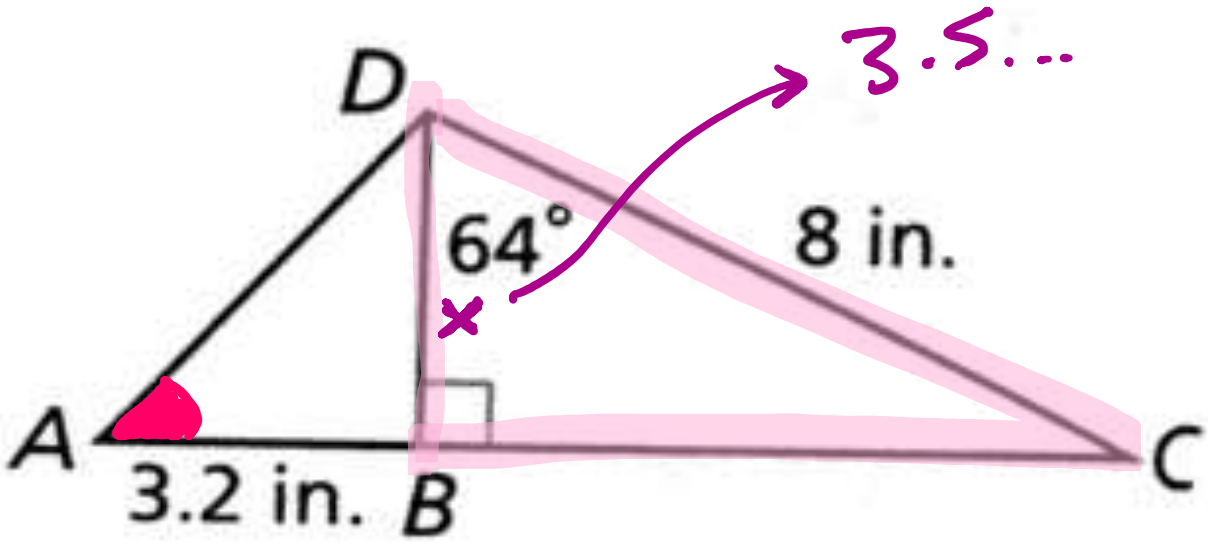
$m\angle J$



$\sin 25 = \frac{x}{20}$

$\sin^{-1}\frac{8.4...}{10} = \approx 58°$

$m\angle A$



$\cos 64 = \frac{x}{8}$

$8 \cos 64 = 3.5...$

$\tan^{-1} \frac{3.5...}{3.2} \approx 48°$

Simplify Each Expression without a calculator.

$$\cos^{-1}(\cos 34°)$$

34°

"the angle whose cosine is the cosine of 34°"

$$\tan[\tan^{-1}(1.5)]$$

"the tangent of the angle whose tangent is 1.5"

1.5

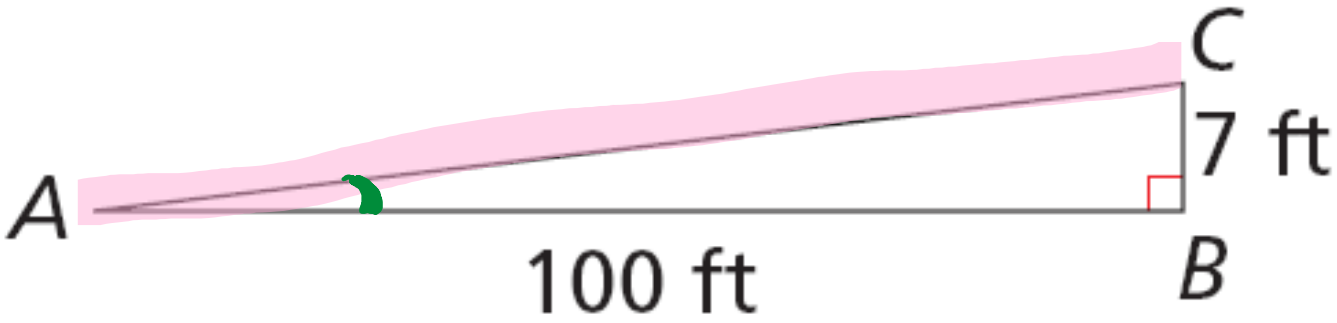
$$\sin(\sin^{-1} x)$$

"the sine of the angle whose sine is x"

x

A highway sign warns that a section of road ahead has a 7% grade. To the nearest degree, what angle does the road make with a horizontal line?

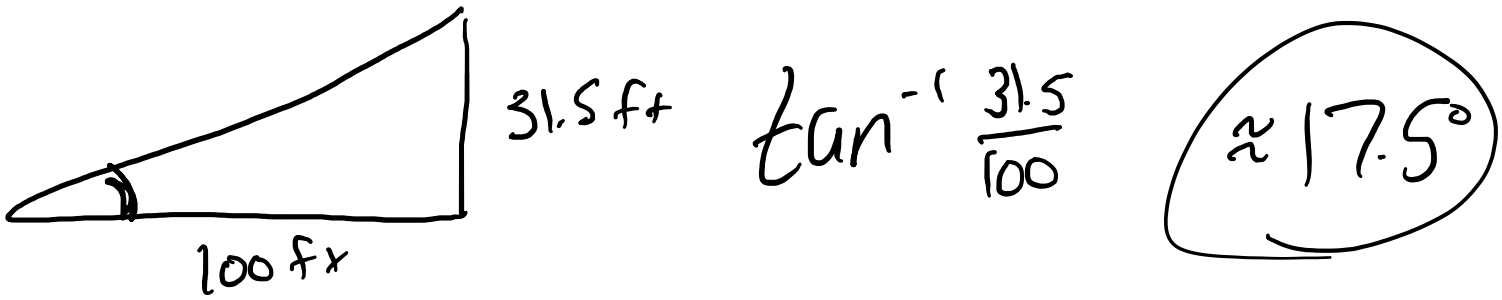
A 7% grade means the road rises (or falls) 7 ft for every 100 ft of horizontal distance.



$m\angle A = \tan^{-1}\frac{7}{100} \approx 4°$

San Francisco, California, is famous for its steep streets. Filbert Street, the steepest street in San Francisco, has a 31.5% grade. Remember, this means the road rises 31.5 ft over a horizontal distance of 100 ft.

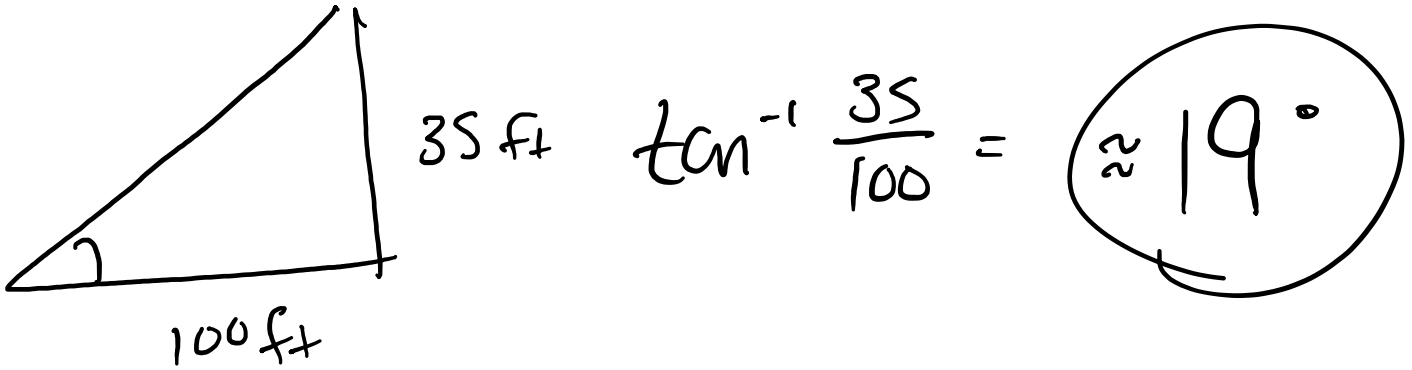
To the nearest degree, what angle does the road make with a horizontal line?



HTTP://WWW.YOUTUBE.COM/WATCH?V=G-ACBQRQWLM

Baldwin St. in Dunedin, New Zealand, is the steepest street in the world. It has a grade of 35% (at its steepest section). To the nearest degree, what angle does Baldwin St. make with a horizontal line?

A 35% grade means the road rises (or falls) 35 ft for every 100 ft of horizontal distance.



Homework

- Worksheet